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PART I

ILM AS SCIENCE

CHAPTER 1

POLARISING 'ILM: SCIENCE AND RELIGION IN EARLY MODERN ISLAM

SAMER AKKACH

ABSTRACT

The polarisation of the traditional concept of *ilm*, 'knowledge', into *ilm*, modern 'science' versus *dīn*, 'religion', has a short history in the Islamic tradition. Emerging awareness of the conflict between *ilm* and *dīn* can be traced back to the early decades of the 19th century; however, intense public debate of the polarity began later in the same century. Views about the conflict emerged after exposure to the European Enlightenment ideas generally, and the works of the fabricators of the 'conflict thesis', JW Draper and AD White, specifically. Arab and Turkish scholars celebrated Draper's view that, unlike Christianity, Islam nurtured and advanced science. Taking this as evidence of Islam's superiority over Christianity, they restricted the conflict thesis to Christendom and saw it as a result of the repressive practices of the Church. By the mid-20th century, new adaptations of the conflict thesis emerged, which mapped the polarity of science and religion over the traditional Islamic division of sciences into rational (*aqlī*) and transmitted (*naqlī*). This chapter discusses the polarisation of *ilm* into science and religion, which occurred in the 19th century, in order to show, first, its inconsistency with pre-19th century Islamic sources on the classification of the rational and transmitted sciences, and, second, the distinct trajectory the polarity took in the Arab-Islamic context. It argues that the questions the polarity has raised in the Islamic context are concerned primarily not with historiography and the lost moral guidance of the scientific enterprise, but rather with Islam's schizophrenic approach to modernity and its humanistic foundations.

'THE RESTORATION OF SCIENCE IN THE SOUTH'

In the second half of the 19th century two American authors, scientist John William Draper (1811-82) and historian Andrew Dickson White (1832-1918), each wrote a well-received book that had an enduring influence on the ways in which the relationship between science and religion has since been viewed and understood. These books were Draper's *History of the Conflict between Religion and Science*, published in 1874, and White's *A History of the Warfare of Science with Theology in Christendom*, published in two volumes in 1896.¹ As the titles clearly indicate, the central thesis of these two works was that the history of science was not a mere record of groundbreaking discoveries, but primarily 'a narrative of the conflict of two contending powers, the expansive force of the human intellect on one side, and the compression arising from traditionary faith and human interests on the other'.² These two influential works are widely recognised today as being responsible for the fabrication and promotion of the idea of the intrinsic intellectual conflict

between science and religion, which has become commonly known as the 'conflict thesis'. Still popular among many scientists and scholars, the conflict thesis came under strong attack in the second half of the 20th century and has since gradually lost its appeal among historians of science and religion in the West.³ In his recent book *The Territories of Science and Religion*, historian Peter Harrison has captured the prevailing sentiment on this topic, forcefully arguing that while territorial distinction might have existed between science and religion in the past, their perceived conflictual relationship emerged only after Draper's and White's influential intervention.⁴ While the critique of the conflict thesis might have been effective in changing prevailing perceptions of this sensitive topic, at least among historians, most Western studies concerned with the agency of these two texts have focused solely on their relevance to Christianity in the West and assumed that Draper's and White's generalisations extend to other religions. They overlooked or ignored Draper's lengthy and detailed discussions of Islam, which he viewed and presented in a completely different light.

Against the grim picture Draper painted of the oppressive, idolatrous, corrupt, and divisive history of the Catholic Church and its wicked clergy, he presented his unreserved admiration of Islam. He saw in the rise of the 'Arabian Empire' not only a shining beacon of enlightenment but indeed 'the salvation of Europe'.⁵ In his highly personal reading of the character of Muhammad and rise of Islam, Draper stressed its distinction from Christianity by highlighting Islam's rationalism, scientific-mindedness, inventiveness, and great scientific achievements, which made it not just compatible with science, but the religion of science *par excellence*. True, all religions in his view were founded on fanatical beliefs; however, he did not hide his surprise at seeing 'how quickly the ferocious fanaticism of the Saracens was transformed into a passion for intellectual pursuits'.⁶ The main cause for such rapid transformation, Draper explained, lies in the way Islam viewed and understood *progress* in contrast to Christianity. 'To the Christian', Draper wrote,

the progress of the world was an exhibition of disconnected impulses, of sudden surprises. To the Mohammedan that progress presented a very different aspect. Every corporeal motion was due to some preceding motion; every thought to some preceding thought; every historical event was the offspring of some preceding event; every human action was the result of some foregone and accomplished action.⁷

In this sharp awareness of unfailing causality, Draper saw the essence of the Muslims' unique scientific-mindedness. 'In science', Draper explained,

their great merit consists in this, that they cultivated it after the manner of the Alexandrian Greeks, not after the manner of the European Greeks. They perceived that it can never be advanced by mere speculation; its only sure progress is by the practical interrogation of Nature.⁸

Draper's view of Islam's scientific tradition, which he expounded in Chapter 4 of his book, 'The Restoration of Science in the South', shows clearly that in his conflict model 'religion' referred specifically to Christianity and its history in the West and not to all religions, or Islam in particular. This raises several hitherto undiscussed questions about how Muslims received and interpreted Draper's and White's works; how his conflict thesis has appeared from their perspectives; how they made use of it in their historical writings; and what issues it has provoked with regards to the relationship between science and religion. These are the main concerns of this chapter. To address

them, this chapter will discuss awareness of the conflict model among Arabs and Ottomans through three historical phases. The first phase is in the 19th century prior to the Muslim's exposure to Draper's and White's work; the second phase is after the translation of, and wide exposure to, their works in the late 19th to the early 20th centuries; and the third phase is in the second half of the 20th century, when scholars were making an attempt to explain the destruction of the Istanbul Observatory in 1580.

The discussions will show that prior to the 19th century Arab and Ottoman exposure to European Enlightenment ideas in general and to the new theories of heliocentrism and evolutionism in particular, there was no perceived division between science and religion in the Muslim world, and that the 20th-century mapping of this modern polarity over the traditional distinction between rational (*ʿaqlī*) and transmitted (*naqlī*) knowledge is inconsistent with early modern Islamic sources. The chapter will also show that unlike the intellectual developments in Europe where it was the transformation in understanding of the already existing polarity of *religio* and *scientia* that provided the basis for the new polarity of religion and science, in the Islamic context it was the transformation of the understanding of the notion of *ʿilm*, from 'knowledge' to 'modern science', that led to the polarisation of *ʿilm*'s unitary scope in order to support the emerging differentiation of science from religion.⁹ The chapter argues that the issues which the polarity of science and religion has raised in the Islamic context have not been concerned primarily with historiography and the lost moral guidance of the scientific enterprise, as is the case in Western studies, but rather with Islam's compatibility with modernity and its secular-scientific foundations.

'ENEMIES OF ENLIGHTENMENT'

Perceptions of the conflict between science and religion among both Arabs and Ottomans emerged in the early decades of the 19th century and were shaped by both external influences and internal intellectual developments. Journalists, intellectuals, and educated officials, using the powerful new mass media (journals and newspapers), actively engaged in the science and religion debates by questioning the validity of both religious beliefs and new scientific findings. Early awareness of the conflict can be found in the young Rifāʿa al-Ṭaḥṭāwī's (1801-73) memoirs of his educational trip to Paris. Describing the lack of faith among Parisians and their explicit contempt for religion, he referred to the public view of the religious clergy as 'enemies of enlightenment and knowledge' (*a'dā' li-l-anwār wa-li-l-māʿārif*).¹⁰ Even though he lamented the state of decline and backwardness Islam had reached during his time, Ṭaḥṭāwī never saw Muslim religious scholars as being enemies of enlightenment and knowledge. Being himself a religious cleric from the al-Azhar school in Cairo, he represented the religious establishment and its dedication to intellectual development and reform.¹¹ Yet, the long 19th century witnessed a growing awareness of the conflictual relationship between science and religion, which intensified in the second half of the century. Two important journals were instrumental in the promotion of the conflict model and the sharpening of public awareness of it, *al-Jinān* (The Gardens, 1870-86) and *al-Muqtataf* (The Snippets, 1876-1952), which featured heated debates on science and religion, and focused specifically on heliocentrism and evolutionism.¹²

In 1875, a Syrian journalist living in Egypt named Salīm Ilyās al-Ḥamawī (1843-1913) published a book in Alexandria entitled *al-Barāhīn al-qatʿiyya ʿalā ʿadam dawarān al-kurā al-arḍiyya* (The Definitive Proofs against the Circular Motion of the Planet Earth).¹³ Parts of the book were initially written as a response to a series of articles on new astronomy published in *al-Jinān* in 1872.¹⁴

Al-Ḥamawī first sent his response for publication to *al-Jinān*, but the editor seems to have ignored it.¹⁵ In 1873, al-Ḥamawī founded a new journal called *al-Kawkab al-Sharqī* (The Oriental Plant) and began exposing his ideas gradually there, until the journal suddenly folded after the 14th issue.¹⁶ Prompted by keen responses from his readers, who apparently were enthused by his ideas, as well as by encouragements from friends and colleagues, al-Ḥamawī decided to collect the fragments and publish them in a book.¹⁷ In this book al-Ḥamawī presented a mixture of religious, historical, and scientific arguments against the motion of the earth, which then formed a core proposition of the new heliocentric astronomy. His polemics, which were anchored in the perception of conflict between religion and science, were shaped by the raging debate between proponents and opponents of heliocentrism, and his 'definitive proofs' against the motion of the earth included, first, religious citations and interpretations from the three sacred books, the Torah, the Bible, and the Quran, so as to show a united traditional front against the new science of heliocentrism; second, a historical overview tracing the origin of heliocentrism to Greek thinkers, in order to undermine the originality of the Copernican discovery; and third, technical arguments discrediting the motion of the earth on 'scientific' grounds.¹⁸

In the following year (1876), only a few months after the publication of al-Ḥamawī's book, Abdullah Fikrī (1834-90), a high-ranking government bureaucrat and poet from Mecca also living and working in Cairo, published a treatise in favour of the new astronomy entitled *Risāla fī muqārant ba'd mabāhiṭh al-hay'ā bi-l-wārid fī al-nuṣūṣ al-shar'yya* (A Treatise on Comparing some of the Arguments of Astronomy with what is Mentioned in the Religious Texts).¹⁹ Fikrī's treatise was not prompted by al-Ḥamawī's book but rather by the growing awareness of the conflict between science and religion. Like al-Ḥamawī's text, it was first published in stages in a journal called *Wādī al-Nīl* (The Nile Valley) before it was republished as a treatise in response to popular demands. Unlike the monologue of al-Ḥamawī, however, Fikrī's treatise was presented in the form of a dialogue between an astronomer/scientist (*ṣāhib al-hay'ā*) and a jurist (*faqīh*), which was reminiscent of Galileo's *Dialogo*. Fikrī's main aim was to subject the long-held conventional understanding of certain texts of the Quran and Hadiths to critical discussions from a new scientific perspective. The then prevailing religious position on the new astronomy was revealed in the first statement by the *faqīh*:

I can see you now believing in this new astronomy (*al-hay'ā al-jadīda*) despite its being in contradiction with the lawful texts of the Book and the Tradition (*al-kitāb wa-l-sunna*). I have always thought you had certainty in your religion and insight in your affairs, so how did you choose for yourself the departure from religion and the exiting from the circle of the well-guided faithfuls?²⁰

Fikrī's response shows that his dialogical arguments were not intended to undermine or discredit Islam and its religious tenets, but rather to show that fresh interpretations of certain texts were becoming necessary for the Islamic religion to remain relevant to the indisputable scientific evidence of the new astronomy.²¹ These two books were only samples of a growing body of literature on the topic, which included monographs, translations, journal and newspaper articles, and school textbooks, resourcing a heated debate around the core propositions of the new heliocentric astronomy and the relationship between science and religion.²² Popular journals and newspapers were highly effective in promoting the conflict thesis, wittingly and unwittingly, as they presented numerous articles about the new scientific findings in astronomy, geography, physics, medicine, and other fields (*al-ʿulūm al-jadīda*). Progressive intellectuals, such as Shiblī Shumayyil (1850-1917),

Salāma Mūsā (1887-1958), and Ismā'īl Maḏhar (1891-1962), also vigorously engaged in the science and religion debates sparked by Darwin's then highly controversial theory of evolution. The most important aspect of this emerging discourse, as far as this study is concerned, is the new use of the term *'ilm* as 'modern science', which was now used in a contrasting polarity with religion (*dīn*). Still somewhat vague in its new scope, the new usage of *'ilm* was clearly different from the pre-19th century general meaning of the term as 'knowledge'.

The effect of this transformation in meaning was captured by a short article on 'Natural Sciences' (*al-'ulūm al-ṭabī'īyya*) published in January 1877 as an opening piece of the eighth issue of *al-Muqtataf*, a monthly journal devoted specifically to dealing with matters related to science and industry (*'ilmīyya ṣina'īyya*).²³ The article was meant to highlight the importance of natural sciences for the development of modern society and to show their indisputable benefits. It began by identifying four prevailing attitudes, presumably among Arabs, towards natural sciences:

Some people believe that natural sciences are harmful, for they lead to doubting what is revealed in the sacred books and thus they deny their benefits. Others believe that they do lead to doubts in religious matters; however, they admit that they are nonetheless beneficial. Yet others believe that they are truthful and beneficial and denounce revelation for their sake. Whereas the remaining group believe that they are the proofs of revelation, the delight of the minds, and the substance of prosperity, and those without doubt are the correct ones.²⁴

Immediately after this opening piece on natural sciences, the editors of *al-Muqtataf* published a lengthy correspondence sent to the journal by an archimandrite of the Antiochian Church, Gabriel Jbāra, who seemed to be a representative of the first group identified above. In his letter Jbāra presented his utter rejection of heliocentrism according to a host of evidence he cited from the Bible. He was prompted to write his rebuttal, as he explains, by an article published two months earlier in the sixth issue, which argued in favour of heliocentrism.²⁵ In other issues of this popular journal, readers referred to and discussed the works of al-Ḥamawī and Fikrī, mentioned earlier, and excerpts from Fikrī's treatise were republished to show the evolving Islamic position on new astronomy.²⁶

The four different attitudes towards natural sciences identified in the above article revealed the immediate effect of the polarised understanding of *'ilm*, which gradually became associated with natural sciences. Any such understanding now required people to have an expressed position on how 'science' relates to religion. It is difficult to know who the dominant group was; however, considering the growing popularity of *al-Muqtataf* and the increasing acceptance of the legitimacy and benefits of natural sciences, it is the fourth group endorsed by the journal that seems to have gradually become the dominant one. In contrast to the first three groups, who upheld the conflict model and took a position on it, the fourth group was the only one that maintained an understanding of the harmony between science and religion, even though science and religion now appear to have acquired a somewhat independent realm of their own.

DRAPER'S INTERVENTION

Draper emerged onto the Islamic intellectual scene when the eminent Ottoman journalist Aḥmed Midḥat (1844-1912) translated his text as *Nizā-i 'Ilm ü Dīn* (The Conflict between Science and Religion) and published it in four volumes between 1895 and 1900.²⁷ Midḥat was a prolific writer

who owned a major printing house which also published a leading journal. Most important, however, Midḥat was close to Sultan 'Abdülḥamīd II (r. 1876-1909) and thus had access to top social, political, and intellectual circles. The importance of Draper's work for Midḥat and for his wide network lay in his unambiguous testimony to the religious superiority of Islam over Christianity, especially on the ground of Islam's compatibility with science. Soon after the appearance of Draper's work in Ottoman Turkish, the Arabs welcomed Midḥat's translation and celebrated his findings, overlooking a critical point in Draper's narrative: that Islam's compatibility with science was a direct result of Muhammad's sustained exposure to the philosophical teachings of the Nestorians, which shaped his ideas and religious world view. This important point in Draper's argument was dropped in the three-part summary and review of Draper's book published in 1927 by an Egyptian author named 'Umar 'Ināyat in the newly established journal *al-Uṣūr* (The Ages 1927-29), founded and edited by the eminent Egyptian Scholar Ismā'īl Maḥzar. Prior to this introduction of Draper's work to Arabic readers, his ideas were indirectly introduced through a landmark debate between two leading Arab intellectuals that took place at the turn of the 20th century, shortly after the translation of Draper's work into Turkish.

Between 1902 and 1903, a heated debate on science and religion unfolded on the pages of two popular Arabic journals, *al-Jāmi'a* (The Gatherer, 1899-1910) and *al-Manār* (The Beacon, 1898-1935). The former was founded by Faraḥ Anṭūn (1874-1922), a Christian intellectual with liberal views, the latter by Muhammad Rashīd Riḍā (1865-1935), a Muslim reformer with a conservative outlook. The debate reflected the contrasting views of their founders, who were close colleagues of Syrian background living in Egypt.²⁸ The debate was not between Anṭūn and Riḍā, though, but between Anṭūn and the eminent Azhar cleric and reformer Muhammad 'Abduh (1849-1905), who, prompted by Riḍā, wrote lengthy responses to Anṭūn's provocative remarks on the development of science in Islam. Anṭūn's remarks appeared in a series of articles he wrote on the intellectual career of the great Muslim philosopher Ibn Rushd (1126-98) and his struggle against the religious establishment. Pointing to the persecution and opposition he faced, Anṭūn regarded Christianity as having been more tolerant towards, and supportive of, philosophy and science than Islam, evidenced by the rise of the Enlightenment's anti-religious sentiment as well as the development of modern science. Riḍā disagreed with Anṭūn's reading of Islamic intellectual history, and accused him of being prejudiced and offensive. Thus, the debate took on a religiously acrimonious tone from the start, and 'Abduh was bent on showing the superiority of Islam over Christianity by virtue of Islam's rationality, tolerance, and support of scientific creativity and philosophical thinking.²⁹ Both Anṭūn and Riḍā subsequently compiled and published their texts in separate volumes; however, it was Riḍā's book (of 'Abduh's commentaries) that achieved greater success, appearing in several editions, circulating widely, and remaining to this day a popular reference on science and religion in the Arab world. Entitled *al-Islam wa-l-naṣrāniyya ma' al-'ilm wa-l-madaniyya* (Islam and Christianity in Relation to Science and Civilisation), 'Abduh's passionate response to Anṭūn's rational critique has endured in the Muslim collective imagination ever since, and has become the standard position on Islam's relationship to science.³⁰

In the exchange, both Anṭūn and 'Abduh showed remarkable familiarity with Draper's book, with the latter quoting from it directly to support his argument. Yet each used Draper's text in a different way. It is likely that both Anṭūn and 'Abduh were introduced to Draper's text through Midḥat's translation, as they had limited knowledge of English. Ignoring what Draper had said

about Islam, Anṭūn used the conflict model to write an intellectual history of Islam, reflecting Draper's, to show the suffering endured by Muslim philosophers and scientists at the hands of the religious authorities. In his replies, 'Abduh used Draper's argument literally to show the oppressive history of Christianity and the tolerant history of Islam, which was upheld by Draper himself as *the* true religion of science. It was easy and convenient for 'Abduh, armed with such strong testimony to Islam's compatibility with modern science from an eminent American scholar, to blame the political circumstances and corruption of Muslim leaders for the civilisational decline, and to present the return to the true spirit of the Islamic religion as a way for Islam to reclaim its leadership in science and, with that, its lost glory.³¹

With the wide circulation of the Anṭūn-'Abduh debate, the popularity of Draper's book among Arab readers rose in the early decades of the 20th century. Ināyat's three-part summary and review, already mentioned, appeared consecutively in the September, October, and December issues of *al-Uṣūr*. Immediately after this introduction to Draper, in the fourth issue of January 1928, Maḏhar himself published a scathing review of 'Abduh's book, which Riḏā compiled and published, criticising 'Abduh's rehashing and representation of Draper's texts without a proper acknowledgment to Draper. He considered 'Abduh's commentaries as no more than a summary of Draper's book and disapproved of 'Abduh's uncritical adoption of Draper's arguments.³² Not only were 'Abduh's sloppy scholarship and indeed plagiarism of grave concern to Maḏhar, but also his inconsistent position on Islam and Christianity, following Draper's misreading and misrepresentation of historical facts. Yet, Maḏhar remained committed to the scientific critique of institutional religions and their official theology. He seemed closer to White than Draper in his ideas. Differentiating between religion (*dīn*) and theology (*lāhūt*), Maḏhar argued that the struggle of science has been against theology, not religion, for science can accommodate the religious belief in the supra-rational.³³ Remarkably, he credited White with clarifying this point in his famous book, which Maḏhar translated liberally into Arabic and published as *Bayn al-'ilm wa-l-dīn: tārikh al-ṣirā' baynahumā fī-l-qurūn al-wustā* (In between Religion and Science: The History of the Struggle between them in the Middle Ages).³⁴

After the wide exposure to Draper's and White's works, the conflict model became accepted among Arab and Ottoman scholars, notwithstanding the different ways in which it was interpreted and represented. Because of his favourable views of Islam, Draper received more attention among Arabs and Ottomans than White and exerted stronger influence. Midḥat's and 'Abduh's readings of Draper became the most popular, intersecting at two points: first, that what Draper meant by the word 'religion' in his conflict thesis was 'Christianity', and, second, that there could be no such conflict between Islam and science as testified by the author himself. Thus, the conflict thesis became a useful reference to use in the Islam versus Christianity politics. It was particularly handy in the argument against the growing presence of Christian missionaries in the Ottoman Empire. Many conservative Muslim reformers and intellectuals were becoming increasingly concerned about the rising popularity of the Christian missionaries' schools among the Muslim population. They were worried that Christian education was corrupting the young students' minds and leading them to doubt the basic principles of the Islamic religion. By showing the inherent conflict between Christianity and science in contrast to the harmony and compatibility with science that Islam promotes, both Midḥat and 'Abduh were able to use Draper's text as a potent resource in both their fight against the infiltrations of the Christian missionaries and their campaign to raise public awareness of Christianity's dangerous influences.³⁵

THE DEFEAT OF RATIONAL SCIENCES

By the mid-20th century, 'Abduh's emotional, selective, and methodologically sloppy reading of the Islamic history of science began to give way to more self-critical and conceptually and methodologically rigorous approaches. The conflict thesis remained, though, forming an integral part of post-Enlightenment modern thinking. Progressive, modernist historians began to see the relevance of the Enlightenment's rational critique of religion to Islam, and interpretations began to swing towards Anṭūn's and Mazhar's perspectives. In his famous *The Ottoman Empire: The Classical Age 1300-1600*, published in 1968 (English translation in 1973), the eminent Turkish historian Halil Inalcik (d. 2016) presented a widely shared reading of Ottoman history based on a new projection of the conflict thesis. In Chapter 18 of his book, which he devoted to what he called 'The Triumph of Fanaticism', Inalcik discussed the beginning of the decline of the Ottoman Empire, which he attributed to the defeat of 'rational sciences'.³⁶ The 'defeat' was represented by the declining interest in rational sciences, in contrast to the rising interest in these sciences in Europe that led to the scientific revolution. An evidence of this 'defeat', Inalcik argues, was the destruction of the Istanbul Observatory, which, in his view, marked a critical turning point in Ottoman history characterised by the triumph of religion over science.³⁷

In his new historical reading, Inalcik used Draper's and White's conflict model, which by then had become a normative approach; however, unlike 'Abduh and Riḍā he viewed Islam and Christianity as having shared the same repressive attitude towards science. Inalcik presented the Istanbul Observatory as having been the most advanced in the Islamic world at the time, and drew the readers' attention to how it was equipped with state-of-the-art observational instruments, which were strikingly similar to those in Tycho Brahe's (d. 1601) observatory, which was built and operated in Denmark around the same time.³⁸ As the destruction of the Istanbul Observatory took place in 1580, around the same time of the burning of Servetus (d. 1553) and Bruno (d. 1600), and the trial of Galileo (1633), the conflict model made good sense in Inalcik's narrative.

In his appropriation of the conflict thesis, Inalcik took a new tack: he mapped the modern polarity of science and religion over the tradition division of rational and transmitted sciences (*ʿaqlī* vs. *naqlī*). With this move, the conflict thesis acquired an Islamic history not unlike the largely Christian history presented by Draper and White. With the aid of this new theoretical lens, the destruction of the Istanbul Observatory became the outcome of a decisive confrontation between proponents of two long-entrenched and opposing approaches to Islamic knowledge, the rationalists and the traditionalists. The rationalists were advocates of *al-ʿulūm al-ʿaqliyya* (rational sciences), representing the philosophers, physicians, and scientists, while the traditionalists were advocates of *al-ʿulūm al-sharʿiyya* or *al-naqliyya* (religious or transmitted sciences), representing the jurists and religious scholars. With the observatory being viewed and represented as an advanced 'scientific' institution, its destruction could only signify the triumph of religion over science.

Inalcik's use of the conflict thesis with regard to the Istanbul Observatory resonates with Anṭūn's reading of Islamic intellectual history; it is an attempt to present a viable reason for the decline of Islamic science. Science triumphed in the West, whereas religion triumphed in the East. As with Galileo's trial and the burning of Bruno, the circumstances that led to the destruction of the Istanbul Observatory were far more complex and enigmatic than Inalcik's reading.³⁹ His explicit correlation between the rise of religious fanaticism and the waning of rational sciences has already been challenged and refuted in recent studies.⁴⁰ His implicit correlation between

the modern polarity of science and religion and the pre-modern Islamic division of rational and transmitted sciences, however, has escaped critical examination. I shall discuss this briefly here.

To begin with, seeing the Istanbul Observatory as a 'scientific' institution and its director Taqī al-Dīn bin Ma'rūf (d. 1585) as a 'scientist' involves historical distortion, because the polarity of science and religion did not exist then. This can be seen in the way in which Taqī al-Dīn was depicted in historical sources. In his biographical dictionary *Sullam al-wuṣūl* (The Ladder of Reach), the eminent 17th-century scholar Kātip Çelebi (d. 1657) introduced Taqī al-Dīn as *al-Qāḍī al-Allāma*, literally 'the judge, the most knowledgeable'.⁴¹ The chosen terms identify Taqī al-Dīn's earlier and latter professional engagements — that is, first as a judge and then as an astronomer. While his professional identification as a *qāḍī* (judge) is clear, his identification as a *'allāma* ('most knowledgeable', a superlative adjective of *'ālim*) is ambiguous. The Arabic title *'allāma* is normally used for individuals who possess a high or distinguished degree of knowledge, and it is most commonly used for religious scholars. Rarely, a distinguished literary figure (*adīb*) is called *'allāma* for his or her outstanding literary skills and knowledge. Accordingly, Çelebi's description of Taqī al-Dīn as *'allāma* shows his understanding of 'scientists' as individuals with a high degree of knowledge without distinction from religious scholars who carry the same title.⁴²

The cognate Arabic terms *'ilm*/*'ālim*/*'allāma* blur the boundaries between science and religion, showing how all knowledge-oriented activities were embraced by the unifying perspective of *'ilm*. This is not to say that there was no distinction between astronomy and jurisprudence as *'ilm*, or between an astronomer and a judge as *'ālim*, but rather that there were no inherent distinctions in the mode, method, and ultimate purpose of knowing that can render the astronomer as a 'scientist' in contrast to the judge as a 'religious scholar'. Taqī al-Dīn's works reflect the same intertwined scope of science and religion, although his main areas of study — astronomy, mathematics, mechanics, and optics — fall squarely within the purview of today's natural sciences and are not part of religious sciences. This intertwined relationship between science and religion in early modern Islam can also be seen in the popularity of a wide range of occult sciences at the time, which belonged to both realms of science and religion, and which are now completely disowned by both science and religion.⁴³ The lack of a clear conceptual distinction between science and religion casts doubt on the assumed identity of the observatory as a 'scientific institution' destroyed to put an end to its 'scientific' activities.

An examination of early modern Islamic sources sheds more light on the correspondence between the division of rational and transmitted sciences and the polarity of science and religion. Three key sources are identified: Ṭāshkubrīzāda's *Miftāḥ al-sa'āda* (16th century), Kātip Çelebi's *Kashf al-zunūn* (17th century), and al-Tahanawī's *Kashshāf* (18th century). These sources are concerned with the definition and classification of current and recorded sciences. The first two were by eminent Ottoman scholars who lived in Istanbul immediately before and after the destruction of the Istanbul Observatory, while the third was by an eminent scholar from Mughal India, thereby presenting a perspective external to the Ottoman cultural context. Each author's personality, individual experiences, and agency had certainly coloured his mode, style, and focus of writing; however, the texts themselves reflect the evolving perceptions of *'ilm*, especially in response to the increasing exposure to the European scientific developments.

Ṭāshkubrīzāda (1495-1561) divides his *Miftāḥ* into two parts, each of which he calls *ṭaraf*, literally 'edge' or 'end'. The first 'edge' is concerned with the production and classification of knowledge, whereas the second 'edge' is concerned with the morality of knowing — that is, the

religious conditions and implications of knowledge in practice. This main division maps over another division relating to modes of knowing: one is called *ṭarīq al-nazar* (the way of reflection) and is concerned with knowledge acquired through reasoning or rational thinking, while the other is called *ṭarīq al-tasfiya* (the way of purification) and is concerned with knowledge acquired through revelation or inner purification. This differentiation in the modes of knowledge acquisition does not, directly or indirectly, map over or translate into the division of science and religion, nor over the polarity of the rational versus transmitted knowledge. Under the approach of rational reflection (*ṭarīq al-nazar*), all sciences are included: religious, psychological, and natural. By contrast, under the approach of inner purification (*ṭarīq tasfiya*), only issues of morality are discussed, which Ṭāshkubrīzāda describes as the ways in which knowledge is put into practice — that is, how one conducts oneself according to the knowledge acquired (*thamarat al-ʿamal bi-l-ʿilm*).⁴⁴

The *Miftāḥ* classifies sciences into seven categories, each of which is referred to as *dawḥa* (large tree). The first four *dawḥas* include sciences classified according to the philosophical division of modes of existence: textual, verbal, mental, and material. The fifth *dawḥa* includes sciences concerned with ‘practical philosophy’ (*al-ḥikma al-ʿamaliyya*) — that is, ethics, politics, economics, and management. The sixth *dawḥa* includes religious sciences (*ʿulūm sharʿiyya*), while the seventh *dawḥa* includes mystical sciences (*ʿulūm al-bāṭin*). It is in the fourth *dawḥa*, which includes sciences concerned with physical existents or the ‘natural world’, where we find what are conventionally designated today as ‘rational sciences’. Yet the first branch of the fourth *dawḥa* is theology (*ʿilm ilāhī*), which includes a host of disciplines that fall squarely within the purview of religion from today’s perspective. Despite this intertwining of scopes between natural and theological sciences, the *Miftāḥ* delineates religious sciences clearly in the sixth *dawḥa*, which is larger than the first five put together. But religious sciences are not presented in opposition to rational sciences because all sciences, as mentioned earlier, follow one of two approaches, either the way of reason or the way of the heart. And all religious sciences except the mystical involve rational thinking and follow the way of reason (*ṭarīq al-nazar*). Thus Ṭāshkubrīzāda’s classifications and discussions show how conceptually broad the established division of sciences into rational and transmitted (*ʿaqlī* and *naqlī*) was, and the absence of a recognised distinction between scientific and religious modes of knowing.

Kātip Çelebi (1609-57), the author of the second source, was a celebrated Ottoman bibliophile, whose concept of *ʿilm* was discussed in several of his works.⁴⁵ Çelebi wrote one of the most important sources on Islamic sciences in the early modern period, *Kashf al-zunūn ʿan asāmī al-kutub wa-l-funūn* (Dispelling Doubts Concerning the Names of Books and Branches of Science).⁴⁶ This bibliographic dictionary includes a long and sophisticated introduction on the conceptualisation of *ʿilm*, covering many aspects such as its meanings, essence, objects, divisions, nobility, status, morality, and origin. Çelebi refers to and quotes from Ṭāshkubrīzāda’s *Miftāḥ*; however, he had a wider exposure to the emerging ‘new sciences’ of the Europeans and hence his conceptual approach was different from his predecessor.

Çelebi was a rational, scientifically inclined thinker; thus if we can describe Ṭāshkubrīzāda’s approach to *ʿilm* as an attempt to confer legitimacy on rational sciences within the authoritative space of religious knowledge, then Çelebi’s approach can be viewed as an attempt to confer legitimacy on religious sciences within the emerging new authoritative space of rational knowledge. With Çelebi’s work, a tension between the traditionalists’ and modernists’ approaches to *ʿilm* can be seen to have begun to emerge in the Ottoman society. His openness to European sciences and

critical view of the role of religion in constraining the pursuit of knowledge opened new horizons of thinking in the Ottoman context. In fact, his whole life and intellectual career were polarised by his oscillation between the rational and religious sciences. Yet he emphasised that, although *ilm* is divisible into many divisions according to different considerations, it remains 'one in meaning and in truth (*ma'nā waḥid wa ḥaqīqa wāḥida*)'.⁴⁷ The unity of the scope of *ilm* withstood the new challenges, with no vertical division appearing between science and religion during his time.

Çelebi refers to the rational and transmitted approaches to *ilm* as each being represented by a different type (*sinfayn*) of science: one is 'natural to man who is guided to it by his thought', while the other is 'transmitted and is taken from the one who established it'.⁴⁸ He called the first type the intellectual or philosophical sciences (*al-ʿulūm al-ḥikmīyya*), and the second type the transmitted and conventional sciences (*al-ʿulūm al-naqliyya al-waḍʿīyya*).⁴⁹ Thus Çelebi saw the rational versus transmitted approaches to *ilm* as *natural* versus *conventional* approaches. The rational sciences derive their validity and legitimacy from the universality of human nature, whereas the transmitted sciences derive their validity and legitimacy from the specificity of a community's religious conventions. 'These transmitted sciences', he wrote,

are all specific to the Islamic community, even though every community must have similar sciences; thus all communities share in the need for religious sciences; however, the Islamic community's conventions are specifically different from those of all other communities.⁵⁰

Çelebi's natural versus conventional polarity can be seen as an early form of the modern distinction between science and religion. This is further confirmed by his view that Islam's conventional sciences have already 'had its heydays (*naḥat aswāquha*) in the Muslim community with no new ascents, and that scholars' knowledge in those fields had already reached their limits with no leaps beyond'.⁵¹

Muhammad A'lā al-Tahānawī, the author of the third source, was both a philologist (especially a lexicologist) and a judge (*qāḍī*) who came from the town of Toḥāna northwest of Delhi. We know little about his life, other than that he was from a family steeped in religious knowledge and was a contemporary of the Mughal Emperor Aurangzeb (d. 1707), who was known for his conservative religious attitude. Al-Tahānawī's main work, *Kashshāf iṣṭilāḥāt al-funūn wa-l-ʿulūm* (Dictionary of Technical and Scientific Terms), continues the tradition of defining and classifying knowledge, albeit in a different way. Tahānawī's *Kashshāf* is notably different from both Çelebi's *Kashf* and Ṭāshkubrīzāda's *Miftāḥ* in being conceived of as a necessary reference to important terminologies in the context of the changing and expanding scope of science. Tahānawī prefaces his dictionary with a lengthy introduction in which he discusses the definition and classification of sciences using a similar approach to those of Çelebi and Ṭāshkubrīzāda. This shows the consistent methodology in discussing the conceptual dimensions of *ilm* among Muslim scholars. A number of critical shifts appear to be emerging in Tahānawī's reference dictionary, however. The first is the growing awareness of the necessity of such reference works to avoid ambiguity and confusion in understanding the meanings of discipline-specific terms (*iṣhtibāḥ al-iṣṭilāḥ*); the second is the growing confidence in the utility and adequacy of books in fulfilling the epistemological needs of seekers of knowledge without dependency on teachers; and the third is the growing need for encyclopaedic references that bring together all sciences in an 'objective' manner.⁵²

Despite his encyclopaedic perspective, Tahānawī follows the traditional divisions of sciences into the linguistic, the religious, and the rational. While the linguistic sciences of Arabic (*al-ʿulūm al-ʿarabiyya*) and the religious and transmitted science of Islam (*al-ʿulum al-sharʿīyya*) remained

within the traditional perspective in terms of scope, definition, and branches, the rational science took on a new scope and definition as *al-'ulūm al-ḥaqīqīyya*, literally 'real' or 'true sciences', which Tahānawī describe as 'those sciences which do not change by the change of sects and religions'.⁵³ They included, as listed by Tahānawī, logic, philosophy, theology, mathematical science, natural science, medicine (*'ilm al-tibb*), veterinary science, physiognomy, dream interpretation, astrology (*'ilm aḥkām al-nujūm*), magic, talismans, semiology, chemistry, agriculture, arithmetic, geometry, building construction, optics, science of mirrors, weight physics, surveying, water engineering, mechanical clocks, military machines, automata, astronomy, calendar and celestial conjunctions, time keeping, observation, the flattening of sphere, shadow machines, and heaven and the world.⁵⁴

The expression 'true sciences' itself is not new, as indicated by Tahānawī himself in his reference to the celebrated 15th-century theologian al-Jurjānī (d. 1414); however, the way in which Tahānawī appropriated the expression to describe and classify rational sciences in opposition to religious sciences was certainly new. Theology remained consistently part of the rational sciences. To describe the rational sciences, which had been under sustained attack from religious authorities, as 'true' or 'real' imbues them with a new form of legitimacy and immunity. This does not automatically mean that religious sciences become untrue or less true, but a new distinction on the basis of the relativity and universality of *'ilm* appears to have become necessary. By introducing this new distinction, Tahānawī did not seem to have been trying to create a new category for natural or empirical sciences alone, but a category that included the philosophical and religious rational sciences that were under attack, such as logic (*manṭiq*) and theology (*kalām*). The explanation he offers for the inclusion of theology is rather intriguing: 'for all prophets, peace be upon them, were in agreement concerning issues of beliefs [*muttafiqīn fī-l-i'tiqādiyyā*]', thus putting more emphasis on their common grounds rather than their differences.⁵⁵ Accordingly, Tahānawī's new ecumenical perspective is notably different from the one established by his predecessors and continued by many of his contemporaries.

The brief examination of these three early modern sources on the classification of sciences shows that, despite the texts' different scopes and approaches, they presented a consistent understanding of the concept of *'ilm*, which remained stable across the threshold of the early modern period; it shows, too, that awareness of an intrinsic split and conflict between science and religion did not emerge until the early decades of the 19th century. The sources also reveal that it was by the mid-18th century that the need to differentiate a category for a universal kind of scientific undertaking independent of time, place, and religion began to emerge, as the early delineation of 'true sciences' (*'ulūm ḥaqīqīyya*) indicates.⁵⁶ Yet these, as well as other important sources of this period (16th-19th century), were of interest neither to Draper and White, nor to the Arab and Ottoman intellectuals who adopted and promoted Draper and White's views, such as Miḍḥat, 'Abduh, Anṭūn, Riḍā, and Mazḥar. This was because the period did not carry any significance for any of them: it was the dark ages into which the Islamic civilisation had plunged after giving Europe her salvation and assisting her emancipation into the modern world.

'KNOWLEDGE IS POWER'

In Chapter 11 of his book, Draper focused on 'Science in Relation to Modern Civilization', in order to address a question that lies at the heart of his study: '[W]hat has science done for humanity?'⁵⁷ At the end of the chapter he asked: 'What has science done for the promotion of modern civilization[?]; and '[W]hat has it done for the happiness, the well-being of society?'⁵⁸ After giving various examples

of the remarkable intellectual, social, medical, and economic progress achieved with the aid of science, he concluded with two statements summing up the essential difference between religion and science: 'Ignorance is the mother of Devotion', while 'Knowledge is Power'.⁵⁹ Arab and Ottoman intellectuals and reformers, who were relentlessly searching for ways to catch up with the scientific advancement of the West, seem to have had Draper's postulation in their minds and hearts. *Ilm*, now standing for 'modern science', became the way to salvation. With the Arab and Ottoman polarisation of *'ilm* into science and religion, Draper's ideas aided two contrasting understandings of the role of science in bringing about modern civilisation and its social prosperity and progress.

One group championed Draper's conflict thesis and sought to apply it to Islam on the ground of the inherent incompatibility between religious and scientific thinking. For those, *'ilm* must triumph over *dīn* if society is to be modernised. They saw the new meaning of *'ilm* (that is, as modern science) as having helped dissolve the creedal differences between Muslim and Christian Arabs, who began to share common views on the relationship between science and religion. Anṭūn, for example, dedicated his book on Ibn Rūsh's life and philosophy to 'the rational thinkers of the Orient from Islam, Christianity, and other Religions', whom he described as 'the new cultivation' (*al-nabt al-jadīd*). 'By 'new cultivation', he wrote,

we mean those rational thinkers [*'uqalā'*] in every sect and religion in the Orient, who have realised the harms of mixing worldly affairs with religion in an age such as this, so they demanded putting their religion aside in a respectful, sacred place, in order to be able to achieve true unity among themselves, to be in line with the new trend of European civilisation, to compete with its people [that is, the Europeans], and to avoid being swept away by the new trend and turned into servants for others.⁶⁰

In a manner similar to Draper, Anṭūn concluded his exposition with questions concerning the significance of science for modern civilisation, asking: Has '*'ilm* achieved all the duties the human intellect has assigned to it? And has it succeeded in replacing religion permanently after that great intellectual war which unfolded in Europe between different nations and different philosophies?'⁶¹ Acknowledging that *'ilm* had thus far failed to meet all human expectations, Anṭūn wondered whether that was because of a weakness in *'ilm* itself or in humanity which could not bear *'ilm*'s tremendous power.⁶²

Yet the other group saw the conflict as an internal affair of Christendom, celebrated the superiority of Islam in this regard, and emphasised the harmony between science and religion in the Islamic tradition. Draper's forceful testimony on Islam made it easy and convenient for them to blame the political circumstances and corruption of Muslim leaders for the civilisational decline, and to advocate for the centrality of religion in Muslim life. Today's popular slogan 'Islam is the solution' is a view that had its roots in the fallout of Draper's intervention, with which a utopian dream emerged to reclaim Islam's leadership in science and, with that, its lost glory. This view received wide support and established a strong trend that enabled puritanical and fundamentalist ideologies to prosper side by side with liberal thought. Speaking of the Quran, 'Abduh described it in his reply to Anṭūn as

that glorious book, which was followed by *'ilm* wherever it went, east or west; its light will eventually re-appear to tear apart the veils of misguidedness, and return to its first home at the heart of all Muslims to reside there. *Ilm* will be following it as an intimate friend, in whom it finds solace and upon whom it depends.⁶³

This approach was instrumental in protecting the religious establishment from being undermined by the growing authority of modern science. The domain of the sacred thus remained immune from critical encroachments, and strands of pre-modern religious thought, discourse, ideas, and practices, which were no longer in line with scientific thinking and findings, have survived in the Islamic world in a unique way side by side with advanced science and technology. In many ways, this can no longer be seen as an expression of harmony between science and religion, but rather a forced marriage of contradictions. This stands out today as a unique feature of Muslim modernity, which has been sustained, as Dan Diner has put it in *Lost in the Sacred*, by 'an unholy alliance between *premodern* conditions still prevalent in the Middle East and an apologetic *postmodern* discourse that has established itself in the West'.⁶⁴ Thus the questions that the polarisation of *ilm* into science and religion has raised in the Islamic context are not concerned essentially with the lost moral guidance of the scientific endeavour or with how to conceptualise the polarity of science and religion and write their intertwined history, but rather with Islam's perplexing ability to sustain both pre- and postmodern modes of thinking and living in the present, and with its compatibility with modernity's non-sacred, humanistic orientation.

NOTES

- 1 See John William Draper, 1875, *History of the Conflict between Religion and Science* (New York: D Appleton and Company); and Andrew Dixon White, 1897/1910, *A History of the Warfare of Science with Theology in Christendom* (New York: D Appleton and Company, vol. I 1897, vol. II 1910).
- 2 Draper, 1875, vi. White described the central thesis of his book as follows: 'In all modern history, interference with science in the supposed interest of religion, no matter how conscientious such interference may have been, has resulted in the direst evils both to religion and to science, and invariably; and, on the other hand, all untrammelled scientific investigation, no matter how dangerous to religion some of its stages may have seemed for the time to be, has invariably resulted in the highest good both of religion and of science'. White, 1897, viii.
- 3 See David Lindberg and Ronald Numbers, 1986, *God and Nature: Historical Essays on the Encounter between Christianity and Science* (California: University of California Press); and David Wilson, 2002, 'The Historiography of Science and Religion', in Gary Ferngren, ed., 2002, *Science and Religion: A Historical Introduction* (Baltimore: Johns Hopkins University Press), 13-29.
- 4 See the following works by Peter Harrison: 2015, *The Territories of Science and Religion* (Chicago: Chicago University Press); and 2007, *The Fall of Man and the Foundations of Science* (Cambridge: Cambridge University Press). See also Harrison's edited volume, 2010, *The Cambridge Companion to Science and Religion* (Cambridge: Cambridge University Press).
- 5 Draper, 1875, 99.
- 6 Draper, 1875, 110.
- 7 Draper, 1875, 110.
- 8 Draper, 1875, 111-12.
- 9 See Harrison, 2015.
- 10 Rifā'a Al-Ṭaḥṭāwī, 2003, *Ṭakhlīṣ al-Ibrīz fī talkhīṣ bārīz* (Beirut: Dār al-Anwār), 185. Unless otherwise stated all translations from Arabic sources are mine.
- 11 John Livingston, 1996, 'Western Science and Educational Reform in the Thought of Shaykh Rifa al-Tahtawi', *International Journal of Middle East Studies* 28(4): 543-64.
- 12 *Al-Jinān*, a bi-monthly journal, was founded by eminent Christian scholar Buṭrūs al-Bustānī (1819-83) and his son Salīm in Syria-Lebanon, covering political, literary, and scientific topics. *Al-Muqṭataf*, a monthly journal, was established by two Christian intellectuals, Ya'qūb Ṣarrūf and Fāris Nimr, first also in Syria-Lebanon before they moved it to Cairo; it was devoted to science and industry. It was the most popular and longest surviving early modern Arabic journal.

- 13 Salīm Ilyās al-Ḥamawī, 1875, *al-Barāhīn al-qaṭ'iyya 'alā 'adam dawarān al-kurā al-arḍiyya* (Alexandria: Maṭba'at al-Kawkab al-Sharqī). The author's surname associates the family with the Syrian city of Ḥamā; however, he indicates that he was 'Damascene by birth and Egyptian by residence': Al-Ḥamawī, 1875, 2.
- 14 *Al-Jinān* was published between 1870 and 1886. Al-Ḥamawī referred to the articles published in the 14th, 15th, and 16th issues of the journal in 1872.
- 15 As a leading figure of the Arab Awakening movement, the editor Buṭrus al-Bustānī was a strong advocate of modern science and a proponent of the new heliocentric astronomy, hence his disinterest in al-Ḥamawī's response.
- 16 Al-Ḥamawī, 1875, 2. He published his ideas in the 12th, 13th, and 14th issues.
- 17 Al-Ḥamawī, 1875, 4.
- 18 Al-Ḥamawī, 1875, 4.
- 19 Abdullah Fikrī, 1876, *Risala fī muqārān ba'd mabāhith al-hay'ā bi-l-wārid fī al-nuṣūl al-shar'iyya* (Cairo: Maṭba'at al-Madāris al-Malakiyya).
- 20 Fikrī, 1876, 12.
- 21 Although 19th-century Christian scholars were, generally speaking, more inclined to accept Western ideas and advocate for modern science, in this case it was the reverse: Fikrī was a Muslim while al-Ḥamawī was a Christian. This shows that the reaction to the radical ideas of modern science was not predetermined by one's religion. Lewis Sheikḥū (1859-1927), for example, strongly criticised Shiblī Shumayyil's (1850-1917) zealous support for modern natural science and considered his ideas to be heretical. Both were Christians.
- 22 The debate of the heliocentric versus the geocentric systems intensified only in the second half of the 19th century. For a long time before that, religious scholars were debating whether the earth was round or flat. Even Rafā'a al-Ṭaḥṭāwī (1801-73), who was exposed to and fascinated by modern science and who was expected to have an explicit view on modern astronomy, was coy about heliocentrism and referred only to the round-or-flat-earth debate among Muslim scholars. See Ṭaḥṭāwī, 2003, 50.
- 23 It was the first year of this monthly newspaper, which was founded in Beirut in June 1876 by two Christian Syrian-Lebanese intellectuals, Ya'qūb Ṣarrūf and Fāris Nimr. Later the newspaper moved to Egypt.
- 24 *Al-Muqtataf*, 1877a, 1(8): 169.
- 25 *Al-Muqtataf*, 1877b, 1(8): 171-4.
- 26 *Al-Muqtataf*, 1877c, 1(10): 217-20.
- 27 See Alper Yalcinkaya, 2011, 'Science as an Ally of Religion: A Muslim Appropriation of "the Conflict Thesis"', *The British Journal for the History of Science* 44(2): 161-81. Whereas Midḥat used the Arabic term *nizā'* for 'conflict', 'Ināyat and Maḥzar used *niḍāl*, literally 'struggle', 'resistance'. Today, *ṣirā'* 'fight', is most commonly used.
- 28 See Faraḥ Anṭūn, 1903, *Ibn Rush wa falsafatuhu* (Alexandria: al-Jāmi'a); and Mohammad 'Abdu, n.d., *Al-islām wa-l-naṣrāniyya ma' al-'ilm wa-l-madaniyya* (Alexandria: al-Manār).
- 29 In their highly emotional responses, both 'Abduh and Riḍā clearly misread Anṭūn's rational critique of religion, which was presented in the true spirit of the Enlightenment; they accused Anṭūn of promoting misconceptions of Islam. The debate resulted in a bitter fallout between the once-close Christian and Muslim colleagues, who grew up in the same Syrian town of Ṭarāblus and travelled together on the same ship to Egypt to pursue their shared ambitions in journalism.
- 30 Rashīd Riḍā's compilation of 'Abduh's responses to Anṭūn are published under 'Abduh's name. See Muhammad 'Abduh, n.d., *Al-islām wa-l-naṣrāniyya ma' al-'ilm wa-l-madaniyya* (Alexandria: al-Manār).
- 31 'Abduh, n.d., 16-19.
- 32 Ismā'īl Maḥzar, 1928, *Al-Uṣūr* 4: 125-6.
- 33 See the introduction to his Arabic translation of White's book: Ismā'īl Maḥzar, 2014, *Bayn al-'ilm wa-l-dīn: ṭarīkh al-ṣirā' baynahuma fī al-qur'ān al-wuṣṭā* (Cairo: Hindāwī).
- 34 Maḥzar, 2014. Maḥzar's re-presentation of White's book in Arabic was liberal, interpretive, and selective rather than being a literal translation. It also has a different title to White's.
- 35 Yalcinkaya, 2011.
- 36 Halil Inalcık, 1973, *The Ottoman Empire: The Classical Age 1300-1600*, trans. Norman Itzkowitz and Colin Imber (London: Weidenfeld and Nicholson), 179-85.

- 37 Inalcık, 1973, 179.
- 38 See Sevim Tekili, 1980, 'The Observational Instruments of Istanbul Observatory,' in M Dizer, ed., *Proceedings of the International Symposium on the Observatories in Islam* (Istanbul), 33-43.
- 39 My Arabic book on the Istanbul Observatory examines the events and significance of the destruction in greater details, focusing on the development of the ethos of science in the Arab-Ottoman context in the post-Copernican period. See Samer Akkach, 2017, *Marşad Istanbul: hadm al-raşd wa raşd al-hadm. Taṭawwur thaqāfat al-ʿulūm fī al-Islām ba'd Copernicus* (Doha: Arab Centre for Research and Policy Studies).
- 40 See Khaled El-Rouayheb, 2015, *Islamic Intellectual History in the Seventeenth Century: Scholarly Currents in the Ottoman Empire and the Maghreb* (Cambridge: Cambridge University Press); and 2008, 'The Myth of "The Triumph of Fanaticism" in the Seventeenth-Century Ottoman Empire', *Die Welt des Islams* 48(2): 196-221.
- 41 Kātip Çelebi, 2010, *Sullam al-Wuṣūl ilā Tabaqāt al-Fuḥūl*, Ekmeleddin Ehsanoğlu, ed. (Istanbul: Research Centre for Islamic History, Art and Culture).
- 42 From today's perspective, however, *ʿallāma* can mean 'highly distinguished scientist'.
- 43 Tunç Şen, 2017, 'Practicing Astral Magic in Sixteenth-Century Ottoman Istanbul: A Treatise on Talismans Attributed to Ibn Kemāl (d. 1534)', *Magic, Ritual, and Witchcraft* 12(1): 66-88.
- 44 Ṭāshkubrīzāda (Ahmad bin Mustafa), 2002, *Miftāḥ al-sāda wa mişbāḥ al-siyāda fī mawḍūʿāt al-ʿulūm*, vol. 1 (Beirut: Dār al-Kutub al-ʿIlmiyy), 3-70. The two parts of the treatise, which was published in three volumes, are prefaced by a lengthy four-part introduction: the first part presents knowledge as a virtue; the second discusses the learner's or student's moral attributes; the third discusses the teacher's moral attributes; and the fourth compares two modes of acquiring knowledge, through active thinking and passive self-refinement.
- 45 See Chapter 7 of this volume for more details.
- 46 Kātip Çelebi, 1835, *Kaṣṣh al-zunūn ʿan asāmī al-kutub wa l-funūn* (Beirut: Dār Şadir, rep. London: Bentley ed).
- 47 Çelebi, 1835, vol. 1: 24-5.
- 48 Çelebi, 1835, vol. 1: 94-5.
- 49 Çelebi, 1835, vol. 1: 94-5.
- 50 Çelebi, 1835, vol. 1: 96.
- 51 Çelebi, 1835, vol. 1: 96.
- 52 After mastering the Arabic language and religious sciences with the help of his father, al-Tahānawī writes, he studied philosophy, divine sciences, and natural sciences, including mathematics, geometry, astronomy, the astrolabe, and other subjects, all on his own through available books and glosses. This is how he managed to achieve the wide encyclopaedic scope of his dictionary, which embraces all sciences. See Muhammad A'āl al-Tahānawī, 1996, *Kaṣṣh al-iṣṭilāḥāt al-ʿulūm wa l-funūn* (Beirut: Maktabat Lubnān Nāshirūn).
- 53 Al-Tahānawī, 1996, 43.
- 54 Al-Tahānawī, 1996, 43-65. Two sciences were mentioned twice in the published edition, medicine (*ʿilm al-ṭibb*) and astrology (*ʿilm al-nujūm*). The repetition was omitted in the list provided here.
- 55 Al-Tahānawī, 1996, 43.
- 56 Al-Tahānawī, 1996, 43.
- 57 Draper, 1875, Chapter XI, 286.
- 58 Draper, 1875, 325.
- 59 Draper, 1875, 326.
- 60 Anṭūn, 1903, dedication page.
- 61 Anṭūn, 1903, 84.
- 62 Although many Christians belonged in this camp, the positions that Christian intellectuals assumed varied remarkably. The liberal-minded — like Fikrī, Anṭūn, and Maḡhar, for example — promoted this view, whereas conservative figures — like al-Hamawī, ʿAbduh, and Riḍā — sided with each other to mount a united religious front against the doubtful findings of new science.
- 63 ʿAbduh, n.d., 176.
- 64 Dan Diner, 2009, *Lost in the Sacred: Why the Muslim World Stood Still*, trans. Steven Rendall (Princeton: Princeton University Press), 3, emphases in the original.