Studies in the Islam and Science Nexus

Volume 1

Edited by
Muzaffar Iqbal

Islam and Science: Historic and Contemporary Perspectives

Studies in the Islam and Science Nexus

Islam and Science: Historic and Contemporary Perspectives

Titles in the Series:

Studies in the Islam and Science Nexus
Volume 1
Muzaffar Iqbal

Contemporary Issues in Islam and Science
Volume 2
Muzaffar Iqbal

New Perspectives on the History of Islamic Science
Volume 3
Muzaffar Iqbal

Studies in the Making of Islamic Science:
Knowledge in Motion
Volume 4
Muzaffar Iqbal

Studies in the Islam and Science Nexus

Volume 1

Edited by

Muzaffar Iqbal

Center for Islam and Science, Canada

Routledge
Taylor & Francis Group
LONDON AND NEW YORK

First published 2012 by Ashgate Publishing

Published 2016 by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN
711 Third Avenue, New York, NY 10017, USA

Routledge is an imprint of the Taylor & Francis Group, an informa business

British Library Cataloguing in Publication Data
Studies in the Islam and science nexus. – (Islam and science ; v. 1)
1. Islam and science.
I. Series II. Iqbal, Muzaffar, 1954-
297.2'65-dc23

Library of Congress Control Number: 2011935820

ISBN 9780754629153 (hbk)

Contents

Acknowledgements

The editor and publishers wish to thank the following for permission to use copyright material.

Brill for the essay: Marwa Elshakry (2008), 'The Exegesis of Science in Twentieth-Century Arabic Interpretations of the Qur'ān', in Jitse M. van der Meer and Scott Mandelbrote (eds), *Nature and Scripture in the Abrahamic Religions: 1700 to Present*, Vol. 2, Leiden and Boston: Brill, pp. 491–523.

The Center for Islam and Science for the essays: Roshdi Rashed (2003), 'What was Islamic in Islamic Scientific Tradition?', *Islam & Science*, **1**, pp. 153–60. Copyright © 2003 the Center for Islam and Science; Dimitri Gutas (2003), 'Islam and Science: A False Statement of the Problem', *Islam & Science*, **1**, pp. 215–20. Copyright © 2003 the Center for Islam and Science; Osman Bakar (2003), 'Reformulating a Comprehensive Relationship Between Religion and Science: An Islamic Perspective', *Islam & Science*, **1**, pp. 29–44. Copyright © 2003 the Center for Islam and Science; Hamid Parsania (2006), 'Unseen and Visible', *Islam & Science*, **4**, pp. 7–21. Copyright © 2006 the Center for Islam and Science; Seyyed Hossein Nasr (2006), 'The Question of Cosmogenesis – The Cosmos as a Subject of Scientific Study', *Islam & Science*, **4**, pp. 43–59. Copyright © 2006 the Center for Islam and Science; Alparslan Açikgenç (2003), 'Holistic Approach to Scientific Traditions', *Islam & Science*, **1**, pp. 99–114. Copyright © 2003 the Center for Islam and Science; Mohd Zaidi b. Ismail (2008), 'The Cosmos as the Created Book and its Implications for the Orientation of Science', *Islam & Science*, **6**, pp. 31–53. Copyright © 2008 the Center for Islam and Science; 'Adī Setia (2004), '*Taskhīr*, Fine-Tuning, Intelligent Design and the Scientific Appreciation of Nature', *Islam & Science*, **2**, pp. 7–32. Copyright © 2004 the Center for Islam and Science; 'Adi Setia (2005), 'Islamic Science as a Scientific Research Program: Conceptual and Pragmatic Issues', *Islam & Science*, **3**, pp. 93–101. Copyright © 2005 the Center for Islam and Science; 'Adi Setia (2007), 'Three Meanings of Islamic Science: Toward Operationalizing Islamization of Science', *Islam & Science*, **5**, pp. 23–52. Copyright © 2007 the Center for Islam and Science; Mustansir Mir (2004), 'Scientific Exegesis of the Qur'ān – A Viable Project?', *Islam & Science*, **2**, pp. 33–42. Copyright © 2004 the Center for Islam and Science; Muhammad Hashim Kamali (2006), 'Reading the Signs: A Qur'ānic Perspective on Thinking', *Islam & Science*, **4**, pp. 141–64. Copyright © 2006 the Center for Islam and Science; Jalees Rehman (2003), 'Searching for Scientific Facts in the Qur'ān: Islamization of Knowledge or a New Form of Scientism?', *Islam & Science*, **1**, pp. 245–52. Copyright © 2003 the Center for Islam and Science.

Islamic Research Institute for the essays: Mehdi Golshani (2000), 'Islam and Sciences of Nature: Some Fundamental Questions', *Islamic Studies*, **39**, pp. 597–612; Azizan Baharuddin (2000), 'The Significance of Ṣūfī-Empirical Principles in the Natural Theology and Discourse on Science in Islam', *Islamic Studies*, **39**, pp. 613–32.

Journal of Islamic Science for the essays: M. Saidul Islam (2001), 'Towards Developing Islamic Science: A Review and Appraisal', *Journal of Islamic Science*, **17**, pp. 119–36; Masudul Alam Choudhury (1991), 'The "Tawhidi" Precept in the Sciences', *Journal of Islamic Science*, **7**, pp. 19–44; M. Maroof Shah (2006), 'Modern Science and Varieties of Muslim Modernism', *Journal of Islamic Science*, **22**, pp. 141–63; Munawar Ahmad Anees (1986), 'What Islamic Science is Not', *Journal of Islamic Science*, **2**, pp. 9–19; Jamal Mimouni (1987), 'A Reply to "What Islamic Science is Not"', *Journal of Islamic Science*, **3**, pp. 85–9; Munawwar Ahmad Anees (1988), 'What Islamic Science is Not: A Rejoinder', *Journal of Islamic Science*, **4**, pp. 65–73; Shaharir Bin Mohammad Zain (1990), 'Modes of Operations in the Quest of Islamic Science', *Journal of Islamic Science*, **6**, pp. 53–70; Masud Alam Choudhry (1996), 'The Qur'ān and Science', *Journal of Islamic Science*, **12**, pp. 9–25; S. Parvez Manzoor (1990), 'The Unthought of Islamic Science (Part One)', *Journal of Islamic Science*, **6**, pp. 49–63; Ziauddin Sardar (2006), 'Islam and Science: Beyond the Troubled Relationship', *Journal of Islamic Science*, **22**, pp. 63–82.

Kurt Wood for the essay: Kurt Wood (1989), 'The Scientific Exegesis of the Qur'ān: A Systematic Look', Revised from *Journal of Islamic Science*, **5**, pp. 7–22.

Editor's Acknowledgements

The four volumes in this series owe a great deal to the painstaking work of a small group of historians of science who have studied numerous manuscripts, treatises, and instruments over the last four decades and whose work has been instrumental in revising our understanding of the Islamic scientific tradition. This series was made possible by their vigor and insights. It provides new perspectives on Islamic scientific tradition by presenting their work in a certain thematic order. I am grateful to all the authors and researchers whose work is included in this series.

I wish to express my love and thanks to my son, Basit Kareem Iqbal, whose thoughtful critique of the four introductions has been helpful in reformulating certain arguments. His interest in various academic debates on themes related to Islamic scientific tradition and attention to detail and academic rigor has been inspiring.

Needless to say that only I am responsible for the shortcomings in selection or presentation. A work of this nature cannot be free of editorial biases, even though one tries to present a balanced view of the fields. One hopes, nevertheless, that this series provides a broad spectrum of views on various aspects of Islamic scientific tradition and contributes to a richer understanding of the field in some small way.

Wuddistān

9 Dhūl-ḥijja, 1432/5 November 2011

This page intentionally left blank

Introduction

On 29 March 1883, Ernest Renan (1823–92), then at the height of his career and influence, delivered the keynote address at the 'L'Islamisme et la Science' conference held at the Sorbonne. The next day, it was published in its entirety in *Journal des Débats*, the influential Parisian daily read by the Continental elite. The publication of the lecture immediately expanded its readership and sphere of influence. In his lecture, Renan framed the discourse on the relationship between Islam and science in terms which continue to dominate it in many ways to this day. 'What is Arabic in this so-called Arab science?' Renan asked rhetorically, and then answered:

> The language, nothing but the language. The Muslim conquest had carried the language of the Hijāz to the ends of the earth. This happened for Arabic as it had for Latin, which became, in the Occident, the mode of expression for thoughts and sentiments that had nothing to do with old Latium. Averroes [Ibn Rushd], Avicina [Ibn Sīnā], Albéteni [al-Battānī] were not Arabs, just like Alberta le Grand, Roger Bacon, François Bacon, [and] Spinoza were not Latin … Is this science at least Muslim? Has Islam ever lent scholarly support to these rational studies? Oh! Not in the least! … What is really remarkable is that among the supposedly Arab philosophers and scholars, there is but one, al-Kindī, who is originally Arab; all the others are Persian, Transoxian, Spanish, people of Bukhara, Samarkand, Cordoba, and Seville. Not only are they not Arab by blood; but they have nothing of the Arab attitude. They use Arabic; but they're uncomfortable with it, like the thinkers of the Middle Ages who, uncomfortable with Latin, bent it for their use … In reality Islam has always persecuted science and philosophy. It eventually stifled them. (Renan, 1883, p. 15; my trans.)

For Renan and his latter-day intellectual heirs, science in Islamic civilization was never and never will be a prosperous enterprise, because the resources for scientific and critical thought simply do not exist in and are not supported by Islam. Historically, they hold, Islamic civilization could at best only tolerate the natural sciences because of the largesse of a few enlightened ʿAbbāsid Caliphs, who supported the translation of Greek scientific texts into Arabic. For Renan, Ibn Rushd's death in 1198 marked the turning point in Islamic intellectual history, heralding the onset of its dark age that lasts even unto the present.[1]

A second and even more influential taxonomy of the relationship between Islam and science was formulated in 1915 by Ignác (Yitzhaq Yehuda) Goldziher (1850–21). Goldziher nuanced the more explicit racial overtones of Renan's formulation while maintaining its structure by developing a model that pitched an imagined Islamic 'orthodoxy' against 'foreign sciences' (Goldziher, 1981). This divided knowledge into two categories: sciences of the ancients (ʿulūm al-awāʾil or ʿulūm al-qudamāʾ) and sciences of the Arabs. By ancient sciences, he referred to 'the entire range of propaedeutical, physical and metaphysical sciences of the Greek encyclopedia, as well as the branches of mathematics, philosophy, natural science, medicine, astronomy, the theory of music and others' (Goldziher, 1981, p. 185). By sciences of the Arabs, he referred to disciplines related to religion proper, including hadith methodology,

[1] Renan produced an influential study on Ibn Rushd in 1852, *Averroes et l'averroisme*.

exegesis, and theology. Although he acknowledged the extensive interest which the so-called sciences of the ancients 'aroused from the second century AH on[ward] in religious circles loyal to Islam (and encouraged also by the ʿAbbāsid caliphs),' he located them in constant agitation against an orthodoxy which 'always looked with some mistrust on those who would abandon the science of Shāfiʿī and Mālik, and elevate the opinion of Empedocles to the level of law in Islam' (ibid., pp. 185–6).

For Goldziher, those who learned, practised, and advanced the cause of the natural sciences were somehow 'less Muslim' than his imagined 'orthodoxy' – despite the fact that almost all Muslim scientists of the period he referred to were deeply religious, many producing works in both the natural as well as religious sciences.[2] Furthermore, Imām al-Shāfiʿī and Imām Mālik were jurists who specialized in sciences of the Qurʾān, *ḥadīth*, and *fiqh*, while figures such as al-Bīrūnī and Ibn Sīnā specialized in the natural sciences and philosophy. No one went to al-Shāfiʿī to learn physics, just as no one went to al-Bīrūnī to understand a fine point of Islamic law, even though there were many scholars who were consulted for both.

Goldziher's rather tendentious approach to the Islam and science nexus is consistent with his interpretation of the entire intellectual tradition of Islam. A closer examination of the data employed in constructing his 'orthodoxy versus foreign sciences' model discloses the methodological leaps in his approach. In order to support his claims, he relies on exceptions rather than norms and on fatal distortions of the data that are produced by his consistent refusal to historicize. For instance, he states that 'the pious Muslim was expected to avoid these [foreign] sciences with great care because they were dangerous to his faith', based on a report that the Prophet had prayed to God for protection against 'useless science'. Goldziher states that this *ḥadīth* of the Prophet 'was quoted frequently' (1981, p. 186). In the footnote to this statement, instead of copious references to instances of its citation, one finds only a note stating that the *ḥadīth* is to be found in the collection of Muslim (V, 307) and not in that of Bukhārī, and that 'it appears with *special force* in the *Musnad* of Aḥmad, VI, p. 318' (Goldziher, 1981, p. 210 n. 18, emphasis added).

Today we can ask questions that were not posed when Goldziher published his influential paper: What does it mean for a tradition of the Prophet to appear in the *Musnad* of Aḥmad with *special force*? The *Musnad* of Aḥmad, like all other *Masānīd*, is a collection of sayings and description of various deeds of the Prophet of Islam, arranged systematically and in a uniform manner according to the name of the narrator (*rāwī*), without any special treatment reserved for one *ḥadīth* or withheld from another. Moreover, what would it mean to say that it 'was quoted frequently'? Where? In what context? By whom? Frequently in reference to what? More importantly, in the text of the *ḥadīth*, the word rendered as 'science' is *ʿilm*, that is, 'knowledge' more generally; taken within the context of the Prophetic supplication, it is extremely unlikely that he would be referring to the 'foreign sciences' that had not yet

[2] For instance, Ibn Sīnā's (370–428/980–1037) large corpus includes works on philosophy, medicine, natural sciences, and theology; Ibn al-Nafīs (607–87/1210–88), the celebrated author of a voluminous but unfinished encyclopaedic work on medicine, *al-Shāmil fīl-ṭibb*, famous for being the first to describe the pulmonary circulation of the blood, was an expert in the Shāfiʿī school of jurisprudence. When Jamshīd Ghiyāth al-Dīn al-Kāshī (d. 833/1429), the author of *Sullam al-Samāʾ*, arrived in Samarqand around 1420, he found the 'Sultan [meaning Ulugh Beg] to be an extremely well-educated man in the Qurʾān, in Arabic grammar, in logic, and in mathematical sciences'; see his letter to his father as quoted in Kennedy (1968), p. 11.

been translated into Arabic or reached the Muslim polity. A more historical argument might suggest that this *ḥadīth* was taken up (frequently cited) by later Islamic orthodoxy with a view to suppressing any science that would threaten its hegemony. This argument itself, however, relies on categories of knowledge and power that are borne out by few of the historical sources but that are retrospectively superimposed upon them. It would take almost a century before anyone would deconstruct these categories or problematize Goldziher's approach.[3]

This inauspicious beginning to the discourse on the relationship between Islam and science was not the result of individual failures; rather, it was the outcome of certain historical factors, not least of which was the fact that it emerged at a time when almost the entire Muslim world was under colonial occupation. There were few possibilities then for any Islamic intellectual response to the approach and categories of classic Orientalism. Furthermore, the discourse grew out of a particularly European obsession which sought to pitch religion against science in the wake of the Galileo affair and the other intellectual and religious battles which had defined the history of the European understanding of the relationship between Christianity and science (see Iqbal, 2007, ch. 4). Another important aspect of the imposition of this peculiarly European discourse on Islam was that it was utterly foreign to the tradition to which it was being grafted. The fact that it was unprecedented even during the long centuries when the natural sciences were flourishing in Islamic civilization demonstrates that the Islamic intellectual tradition was animated by a different set of epistemological concerns and primary questions. In other words, the discourse on Islam and science was a foreign idea which was formulated for Islam in Paris and Budapest and into which Muslims were interpolated.

Once formulated in this way, however, the Islamic intellectual tradition had to respond; and thus the discourse on Islam and science was born and continues to flourish. The present volume explores some of the most important contours of this discourse through five sections, covering salient features of the discourse as it has emerged over the last sixty years.

II

It now seems providential that on the day Ernest Renan delivered his keynote address, Sayyid Jamāl al-Dīn al-Afghānī (1838–97) was in Paris.[4] Afghānī wrote a response to Renan's lecture

---

[3] For an insightful critique of Goldziher's hypothesis, see Gutas (1998), pp. 166–75, and Berggren (1996).

[4] According to the report by the Government of India's Thagi and Dakaiti Department (Department of Fraud and Dacoity), Afghānī left India in November 1882 via the SS *India*; see FO 60/594, 'Memorandum' by A.S. Lethbridge, General Superintendent, Thagi and Dakaiti Department, 1896, cited in Keddie (1972), p. 182 n. 1. During his stay in India, he had been under constant secret service surveillance. Afghānī's arrival in Paris coincided with the defeat of the ʿUrābī movement in Egypt, a movement headed by a Colonel Aḥmad ʿUrābī who was influenced by Afghānī's pan-Islamic activities. This defeat resulted in the arrest and exile of many young men, one of whom, Muḥammad ʿAbduh, was exiled to Beirut. Afghānī invited him to Paris, where they launched their most important joint venture: the publication of a newspaper, *al-ʿUrwat al-Wuthqā* (*The Firmest Bond*), of which eighteen issues were published between March and October 1884. Its publication ceased because of a number of reasons, including financial and political ones, but ʿAbduh remained loyal to Afghānī's ideas;

which was published in the *Journal des Débats* as 'Answer to Renan' on 18 May 1883.[5] In his response, Afghānī accepted the 'warfare' model between religion and philosophy but blamed all religions for being intolerant and hindering the development of science and philosophy. In essence, he agreed with the basic teleology of Renan's argument:

> If it is true that Muslim religion is an obstacle to the development of sciences, can one affirm that this obstacle will not disappear someday? How does the Muslim religion differ on this point from other religions? All religions are intolerant, each one in its way … In truth, the Muslim religion has tried to stifle science and stop its progress. It has succeeded in halting the philosophical or intellectual movement and in turning minds from the search for scientific truth. A similar attempt, if I am not mistaken, was made by the Christian religion, and the venerated leaders of the Catholic Church have not yet disarmed so far as I know. They continue to fight energetically against what they call the spirit of vertigo and error. I know all the difficulties that the Muslims will have to surmount to achieve the same degree of civilization, access to the truth with the help of philosophic and scientific methods being forbidden them … but I know equally that this Muslim and Arab child whose portrait M. Renan traces in such vigorous terms and who, at a later age, became 'a fanatic, full of foolish pride in possessing what he believes to be absolute truth,' belongs to a race that has marked its passage in the world, not only by fire and blood, but by brilliant sciences, including philosophy (with which, I must recognize, it was unable to live happily for long). (Keddie, 1968, pp. 182–4)

Renan's condescending rejoinder to Afghānī – 'there was nothing more instructive than studying the ideas of an enlightened Asiatic in their original and sincere form,' he commented in the *Journal des Débats* of 19 May 1883 (Keddie, 1972, p. 196) – found in the response a rationalism that gave him hope: 'if religions divide men, Reason brings them together; and… there is only one Reason'. He reiterated his racial views, even in praising Afghānī: 'Sheikh Jemmal-Eddin is an Afghan entirely divorced from the prejudices of Islam; he belongs to those energetic races of Iran, near India, where the Aryan spirit lives still energetically under the superficial layer of official Islam' (ibid.). Renan then admitted 'he may have appeared unjust to the Sheikh' in singling out Islam for his attack while 'Christianity in this respect is not superior to Islam. This is beyond doubt. Galileo was no better treated by Catholicism than Averroes by Islam' (ibid., p. 197). Renan concludes his rejoinder by stating that Afghānī had 'brought considerable arguments for his [i.e., Renan's own] fundamental theses: during the first half of its existence Islam did not stop the scientific movement from existing in Muslim lands; in the second half, it stifled in its breast the scientific movement, and that to its grief' (ibid.).

The Muslim reformers of the late nineteenth century, as can be gleaned from the historic exchange between Afghānī and Renan, urged on their brethren in faith to acquire modern science and used Islam as a justification for their call. This aspect of the Islam and science nexus was highly determined by the colonial conditions of the Muslim encounter with European armies with superior weapons, European administrative structures, and modern technological products.

---

his modernistic approach to Islam and science as well as his unfinished Qur'ān commentary (*Tafsīr al-Manār*) continue to have a major influence on the discourse.

[5] Perhaps first written in Arabic and then translated into French, it was republished as an 'Annex' to the French translation of one of Afghānī's works, *Refutation des Matérialistes,* trans. A.M. Goichon (1942), pp. 174–185; English translation as 'Answer to Renan' in Keddie (1968), pp. 181–7.

III

The initial casting of the discourse on Islam and science was buttressed by data from the history of science which was used to show that science never really flourished in Islamic civilization. In more generous iterations it was acknowledged that a certain degree of scientific activity did occur, due to the translation of Greek scientific texts into Arabic. When Edward Sachau translated al-Bīrūnī's monumental *Chronology of Ancient Nations* into English in 1879, he marked the tenth century as the 'the turning point in the history of the spirit of Islam,' and made al-Ashʿarī and al-Ghazālī the culprits: 'But for Al Ashʿarī and Al Ghazālī the Arabs might have been a nation of Galileos, Keplers, and Newtons' (al-Bīrūnī, 1879), p. x). George Sarton was more generous in his monumental work, *An Introduction to the History of Science* (1927–48); he set the eleventh century as the end of the vigour of the Islamic scientific tradition and the twelfth and, to a lesser extent, the thirteenth centuries as 'centuries of transition of that vigor to Europe'.[6]

This initial support from the newly emergent field of history of science was considered hard proof for the alleged animosity that existed between Islam and the natural sciences. Scores of works were written on the basis of this 'undeniable proof' and the authors of textbooks formally embedded this notion in their narrative of the development of science. It still remains the mainstay of science books, even though within two decades of the publication of Sarton's work the discovery of new manuscripts and instruments from the Islamic scientific tradition pushed this boundary further. Subsequent works in the history of science set the date of decline much beyond the initial formulations. During the last two decades, the entire question of dating has received renewed attention. Volume III of the present series features some of these discussions.

A variant of the view that Islam and science are preternaturally opposed is the 'marginality thesis', which limits the practice of natural sciences in Islamic civilization to a small group of scientists who had no intellectual, spiritual, and cultural ties with the main body of Islam and who practised their science in isolation from the rest of cultural and religious milieu. In a landmark exposition, Abdelhamid I. Sabra showed the falsity of the marginality thesis by providing an alternative narrative which attempts to make connections between scientific activity and cultural factors and forces (Sabra, 1987). Sabra, nevertheless, accepted the 'two-track thesis' – the cornerstone of the marginality thesis – which views scientific activity in opposition to, or at least in competition with, Islamic religious sciences. This fortified the binary mode of discourse on Islam and science and it was not until recently that this was seriously challenged, when scholars started to ask fundamental questions about the framework of discussion on the relationship between Islam and science (Iqbal, 2002, pp. 129–30).

---

[6] Sarton's magisterial work was the first large-scale effort to document the history of Islamic science. His work does not deal with the questions concerning the relationship of Islam and science, but has been used to 'prove' both the existence of vigorous scientific activity by the proponents of Islamic science and an early decline by opponents. For the discussion on dating, see his vol. 2, pp. 131–48.

IV

Muslim contributions and responses to the discourse on Islam and science have been a long time developing. This started with the nineteenth-century reformers, most of whom were neither scientists nor religious scholars; none of them had any training in history of science, and all of them were ill-equipped to pinpoint some of the fundamental flaws in the initial casting of the discourse. These included the Indian educationist and reformer Sayyid Ahmad Khan (1817–98), the aforementioned Jamal al-Din al-Afghānī and his contemporary, the Egyptian scholar Muḥammad ʿAbduh (c. 1850–1905),[7] ʿAbduh's Syrian student and later colleague Rashīd Riḍā (1865–1935), the Turkish writer Namik Kemal (1840–1935), and his countryman Bedīʿuzzamān Saʿīd al-Nūrsī (1877–1960), the founder of an important intellectual and religious movement in Turkey which has been continuously gaining adherents since his death. In Iran, the initial discourse was shaped by the contributions of Sayyid Muḥammad Ḥusayn Ṭabāṭabāʾī (1892–1981), the author of the major commentary on the Qurʾān *al-Mīzān fi Tafsīr al-Qurʾān*, Mortezā Moṭahharī (1920–79), and Ayatollah Hasan-Zadeh Āmolī (1929–).

In general, the reformers' discourse was premised on a rather blunt syllogism with the following structure: Islam supports the acquisition of knowledge, as in the hadith making it an obligation on all believers; modern science is knowledge; Muslims must, therefore, acquire modern science. Furthermore, they argued, 'science' cannot contradict Islam because science studies the 'Work of God' while the Qurʾān is the 'Word of God'; God's Work and His Word cannot logically contradict each other. The religious call to 'acquire science' has remained a rallying cry to this day.

What the modernist reformers truly desired, however, was neither modern science nor its approach to the study of nature per se but a more instrumental acquisition of modern science, which they considered a sine qua non for progress. Sayyid Ahmad Khan, for instance, concluded that Muslims were backward because they lacked modern education in general and modern science in particular. He established a Scientific Society with four specific goals:

(i) to translate into such languages as may be in common use among the people those works on arts and sciences that, being in English or other European languages, are not intelligible to the natives;
(ii) to search for and publish rare and valuable oriental works (no religious work will come under the notice of the Society);
(iii) to publish, when the Society thinks it desirable, any [periodical] which may be calculated to improve the native mind;
(iv) to have delivered in their meetings lectures on scientific or other useful subjects, illustrated, when possible, by scientific instruments.[8]

---

[7] For useful biographical information on ʿAbduh, see Badawi (1978), pp. 35–95; also see Kedourie (1966) and, more recently, Haj (2008), ch. 3.

[8] The first meeting of the Society was convened on 9 January 1864. In 1867, Ahmad Khan and the Society moved to Aligarh, where he procured a piece of land from the British government to establish an experimental farm. The Duke of Argyll, the Secretary of State for India, became the Patron of the Society and the Lt Governor of the NW Province its Vice-Patron. Ahmad Khan was the secretary of the Society as well as member of the Directing Council and the Executive Council; see Malik (1980), ch. 4.

An ardent believer in the utility of modern science, Khan also established another organization, 'The Aligarh British Indian Association to Promote Scientific Education' in May 1866. Khan's preoccupation with modern science and Islam led him to believe that a new science of *Kalām* was needed which would either combat the philosophical foundations of modern science or demonstrate that they conformed to the articles of Islam. Personally, however, he was convinced that Islam and modern science were perfectly aligned, and that all that was needed was reinterpretation to show that the work of God (nature and its laws) was in conformity with the Word of God (the Qur'ān). To prove his views, Khan decided to write a new commentary on the Qur'ān, even though he lacked the most basic qualifications (scientific or religious) to write such a work. His unfinished commentary attempted to rationalize all aspects of the Qur'ān that could not be proved by modern scientific methods. These included matters such as the nature and impact of supplications, which he tried to explain as psychological phenomena. Khan, however, was not alone in making such an effort (see below).

Al-Afghānī's contemporary, the Turkish nationalist leader and poet Namik Kemal, who also wrote a (less successful) response to Renan,[9] inaugurated the Islam and science discourse in Turkey and may have been a catalyst in the major role later played there by Bedī'uzzamān Sa'īd al-Nūrsī. Unlike Kemal, Sa'īd Nūrsī opposed the secular ideas of the Turkish strongman Mustafa Kemal, was exiled to western Anatolia in 1925 along with thousands of others, and spent twenty-five years in exile and imprisonment. During these long years, he metamorphosed into what he called the 'new Nūrsī'. Most of his works were composed in remote regions of Turkey, without any books available or other references. He was to make a very deep impression on the next generation of Turks and the movement he started has gained new converts in recent decades.[10] His writings, which have now been published as collected works as well as several individual books after remaining in clandestine circulation for decades, attempt to show that dissonance between the Qur'ān and modern physical sciences is impossible (Nursi, 1996).[11] He considered modern science a useful tool for conveying the message of the Qur'ān. Nūrsī's impact on the making of the new Islam and science discourse was twofold: he set the stage for direct analogies between Qur'ānic verses and modern technological inventions, and his profound spiritual insights led many of his countrymen and other Muslims back to their religion against a state-sponsored effort at secularization that had all but erased Islam from the Turkish public sphere. Nūrsī uses rhetoric to awaken his readers to the Qur'ānic message, frequently alluding to modern science and even such utilitarian inventions as the steam engine and electricity. His message-driven works demand that his readers should learn to use insights from the Qur'ān to gain access to scientific knowledge that can be helpful in this world.[12]

---

[9] 'He defended the thesis that "nothing in Islamic doctrine forbade the study of the exact sciences and mathematics," but he used an anti-utilitarian and strongly moralistic–religious approach and failed to grasp Renan's attack…He wanted Renan to explicitly state that by "science" he meant mathematics and natural sciences and, if he were to do so, then Kemal would agree that "Islamic culture had thwarted the growth of science"' (Mardin, 2000, pp. 324–5).

[10] For a biography of Nūrsī, see Vahide (1992); also see Markham and Birinci (2011), Abu-Rabi (2003) and Vahide (2005).

[11] Several selections have also been published as individual books, both in Turkish and in translation in other languages.

[12] For a detailed exposition of Nūrsī's views on science, see Mermer and Ameur (2004; included in Volume II of this series).

Though he attempts to interpret Qurʾānic verses in the style of *tafsir*, Nursi did not write a full-scale scientific *tafsīr* of the Qurʾān. That challenge was left to an Egyptian physician.

V

Muḥammad ibn Aḥmad al-Iskandarānī may not have known it, but his *The Unveiling of the Luminous Secrets of the Qurʾān in which are Discussed Celestial Bodies, the Earth, Animals, Plants, and Minerals* (1297/1880), and its sequel, *Divine Secrets in the World of Vegetation and Minerals and in the Characteristics of Animals* (1300/1883), defined a new aspect of the Islam and science discourse. In both works, al-Iskandarānī explains Qurʾānic verses in a manner that shows that they contain references to specific scientific data. This trend reached a high point in 1931 with the publication of a twenty-six-volume *tafsīr* by Ṭanṭawī Jawharī (1870–1940), *al-Jawāhir fī Tafsīr al-Qurʾān al-Karīm* (*Pearls from the Tafsīr of the Noble Qurʾān*), which appeared with illustrations, drawings, photographs, and tables. In his introduction to the work, Ṭanṭawī says that he prayed to God to enable him to interpret the Qurʾān in a manner that would include all sciences attained by humans so that Muslims could understand the cosmic sciences.

In the due course of time scientific exegesis made its way into the main body of *tafsīr* literature, as many religious scholars began to comment on science in relation to Qurʾānic verses. At times, a writer would formally divide his commentary into several parts separately devoted to genres such as linguistic exegesis and scientific interpretation. Scientific *tafsīr* was also sometimes integrated into more general *tafsīr* literature. A work of this kind is Farīd Wajdī's (1878–1954) *Ṣafwat al-ʿIrfān* (*The Best of Cognition*), a Qurʾān commentary with an elaborate introduction now commonly known as *al-Muṣḥaf al-Mufassar* (*The Qurʾān Interpreted*) (Wajdī, n.d). This commentary, printed in the margin of the text of the Qurʾān, is divided into two parts. The first part, *Tafsīr al-Alfāẓ* (*Explanation of the Words*) explains difficult and rare words; the second, *Tafsīr al-Maʿānī* (*Explanation of the Meaning*) 'translates' the text of the Qurʾān into contemporary Arabic with interpolated commentary. It is in these remarks that Wajdī inserts his scientific explanations, often with exclamations placed in parentheses: for instance, 'you read in this verse an unambiguous prediction of things invented in the nineteenth and the twentieth centuries' and 'modern science confirms this literally' (ibid., pp. 346 and 423). Wajdī's commentary is not exclusively devoted to scientific explanations, but since then other works have been written specifically for this purpose (for instance, Aḥmad, 1954 (repr. 1960 and 1968); Ismāʿīl, 1938; al-Harāwī, 1361/1942; ʿAtiyya, 1992; al-Khatīb, 1415/1994; Nawfal, 1409/1989; Shāhīn, 1369/1950). By now, the genre seems to have exhausted the verses of the Qurʾān that putatively contain scientific knowledge.

In addition to scientific *tafsīr*, a large amount of secondary literature (books, articles, television productions, and audiovisual and web-based material) has popularized this trend.

Some authors have produced lists of all 'scientific verses'; others have classified these verses according to their applicability to various branches of modern science, such as physics, oceanography, geology, and cosmology (Qurashi et al., 1987; Nurbakī, 1993). According to Ṭanṭawī Jawharī, the number of such verses is 750 out of a total 6,216 verses of the Qurʾān.[13] In addition to his *tafsīr*, he also published a book in 1925, *al-Qurʾān wal-ʿUlūm al-ʿAṣriyya* (*The Qurʾān and the Modern Sciences*), in which he prescribed two remedies for freedom from foreign rule: unity and scientific development. Part V of the present volume is devoted to this aspect of the discourse.

In recent decades, the trend of writing scientific *tafsīr* has abated, but secondary literature on the Qurʾān and science has seen a rapid increase in all languages and from all countries (among others, Al-Bārr, 1986; Barq, n.d; Mahmood, 1991; Naqvi, 1973; El-Naggar, 1991). In addition to attempts to correlate scientific knowledge to the Qurʾān, some of these works have also created a sub-branch of scientific exegesis, *al-iʿjāz al-ʿilmī*, the scientific miracles of the Qurʾān. Works of this type treat the 'scientific content' of the Qurʾān in much the same way as classical *tafsīr* literature dealt with the theme of the inimitability of the Qurʾān (*iʿjāz al-Qurʾān*).[14] The 'inimitability of the Qurʾān' topos emerged on the basis of the Qurʾānic challenge to unbelievers: *Or do they say he* (i.e. the Prophet) *invented it* (i.e. the Qurʾān)*? Say: then bring forth a sūra like unto it ... if you are truthful* (Q 10:38). This challenge, repeated in the Qurʾān in various forms (see Q 2:23–24, 11:16, and 17:90), gave rise to a fully differentiated branch of exegesis which explored and defined, in precise terms, what is meant by the inimitability (*iʿjāz*) of the Qurʾān. The new 'scientific inimitability' patterned itself after and grafted itself onto this textual tradition of classical exegesis.[15] During the last three decades of the twentieth century, a number of social, political, and economic factors contributed to the spread and popularity of this literature. Various state-sponsored institutions organized conferences and seminars in which scientists linked specific verses of the Qurʾān to specific data and theories of modern science to prove (i) that the Qurʾān is really a book of God revealed to the Prophet of Islam, because such specific scientific information was unknown during his life, and (ii) that the Qurʾān contains all scientific knowledge. This approach is invested with psychological and political baggage, but its mass popularity remains uncontestable.

The scientific exegesis of the Qurʾān has not been without opposition, often built upon the principles of jurisprudence (*uṣūl al-fiqh*, described by some as the queen of the Islamic sciences) and regarding it a groundless innovation in exegesis. Certain contemporary scholars base their criticism of modern scientific exegesis on the work of the eminent fourteenth-century *uṣūlī*

---

[13] The total number of verses of the Qurʾān are said to be 6,000, 6,216, or 6,616; the total number of letters that make up its 114 suras is given as 323,671. See Jalāl ad-dīn al-Suyūṭī's (849–911/1445–1505) *al-Itqān fī ʿUlūm al-Qurʾān*, 2 vols. (Cairo: Maṭbaʿat Amīr, 1967), pp. 225–43. The classification of verses into legal or scientific is not a simple matter as many verses address more than one topic. Jawharī also uses a very loose definition of the word 'science'.

[14] The word *iʿjāz*, from the root *ʿ-j-z*, has various meanings, including 'to disable, to incapacitate, to be impossible, to be inimitable'.

[15] Many works have been written on this aspect: see, for example, Muṣṭafā (1999).

scholar al-Shāṭibī,[16] who dealt with the question of *bidʿa* (innovation) in his *Kitāb al-Iʿtiṣām*[17] and his doctrinal work *al-Muwāfaqāt fī Uṣūl al-Sharīʿa*.[18] Referring to those who introduce such elements into *tafsīr*, al-Shāṭibī said: 'And among them are those who transgress the bounds in their claims about the Qurʾān by saying that the Qurʾān contains all knowledge of the ancients and the moderns in branches [such as] physics, geometry, mathematics, logic, and linguistics' (al-Dhahabī, n.d., vol. 2, p. 342). Critics of scientific exegesis argue that the Qurʾān is not a compendium of medicine, astronomy, geometry, chemistry, or necromancy, but should be regarded as primarily a book of guidance, sent down by God to bring humanity out of darkness and usher it into light. They reject the scientific exegetical use of Qurʾānic verses such as *We have ignored nothing in the Book* (Q 6:38) by arguing that although the word *farraṭa* in the verse literally means 'to neglect, to overlook, to leave out of calculation', it should not be interpreted as claiming that the Qurʾān contains detailed knowledge of all things; rather, it should be understood to mean only that it contains general principles of those matters important for human beings to know that they might act in accordance with Divine Will and attain the reward of an Everlasting life in His Mercy. That is, the Qurʾān leaves the door open for human beings to figure out and elucidate, to the extent possible in a given age, details of different disciplines of knowledge, without claiming to contain them within itself. This is the position of al-Dhahabī in his seminal work *al-Tafsīr wal-Mufassirūn* (*Exegesis and Exegetes*), which devotes a full chapter to *al-tafsīr al-ʿilmī* (scientific exegesis) (al-Dhahabī, n.d., vol. 2, ch. 8). He also lists other scholars who rejected scientific exegesis, including such authorities as Maḥmūd Shaltūt, Muḥammad Muṣṭafā al-Marāghī, and Amīn al-Khūlī, the last of whom produced a detailed and systematic refutation of the project.[19] Al-Khūlī's arguments against scientific exegesis are multifaceted, including that Qurʾānic words do not bear a correspondence with the terms and vocabulary of modern sciences; that scientific exegesis is philologically unsound because the Qurʾān was first addressed to the contemporaries of the Prophet and was bound to be intelligible to them, which modern science was not; that scientific exegesis is theologically unsound because the main intent of the Qurʾān is guidance by establishing a worldview based on certain doctrines, not scientific principles; and that it is logically absurd to assume that the finite Qurʾānic text should contain and affirm the everchanging views of nineteenth- and twentieth-century scientists.

---

[16] Abū Isḥāq Ibrāhīm bin Mūsā al-Shāṭibī al-Andalūsī (d. 790/1388), the *uṣūlī* scholar from al-Andalus, not to be confused with Abūʾl Qāsim b. Firruh b. Khalaf b. Aḥmad al-Ruʿaynī al-Shāṭibī (538–590/1144–1194), the eminent Qurʾānic scholar also from al-Andalus famous for his mnemonic techniques in the discipline of Qurʾānic recitation.

[17] Edited by Rashīd Riḍā in his influential periodical *al-Manār*, xvii (1333/1913), reprinted several times.

[18] First published in Tunis (1302/1884), and later in Cairo (1341/1923); for a contemporary study of al-Shāṭibī's life and thought, see Masud (1977), reprinted with additions as *Shāṭibī's Philosophy of Islamic Law* (1995).

[19] Amīn al-Khūlī taught Qurʾān exegesis at the Egyptian University at Giza. He never published a commentary but his various works on the relationship between philology and Qurʾānic exegesis have been influential in setting the principles of modern Qurʾān interpretation. A collection of his previously published articles appeared in 1961 as *Manāhij Tajdīd fil-Naḥw wal-Balāgha wal-Tafsīr wal-Adab* (1961); also important in this respect is his work *al-Tafsīr: Maʿālim Ḥayāti Minhaj al-Yawm* (1944).

A similar critique was written in the Indian subcontinent by Mawlānā Ashraf ʿAlī Thānvī (d. 1943), who pointed out various errors involved in subjecting the Qurʾānic verses to scientific interpretation. 'As soon as people hear or see any new finding of science by the Europeans,' he wrote in *al-Intibāt al-Mufīda ʿan al-Ishtibāhāt al-Jadīda*, 'they try in one way or the other to posit such finding as a connotation of some verse of the Qurʾān. They reckon this as a great service to Islam, a cause of pride for the Qurʾān, and a sign of their own ingenuity' (cited in al-Ghazali, 2001, pp. 333–4).

VI

Inauspicious as its genesis was, the discourse on Islam and science has come a long way from its initial casting in the nineteenth century, even though some scholarship continues to use the binary categories of that discourse. The thirty thematically arranged essays in this volume explore important facets of the relationship between Islam and science as it has emerged in the course of a century. Divided into five sections, these articles represent broad trends, rather than individual voices. Studies on major contributors to the discourse can be found in Volume II of this series.

Part I of the volume (Chapters 1–7) is devoted to essays which attempt to frame the discourse. The reader will find among them opposing voices as well as those which resonate with one another. The discourse saw the most intense debates among scholars during the 1980s, when the primary concern was to articulate major questions on the relationship between Islam and science. The main difficulty in this regard was, as it still is, the absence of a living Islamic scientific tradition. Thus, when scholars attempted to define Islamic science, they had either to rely on the past or look to the future for the possible re-emergence of a scientific tradition based on what they were attempting to outline. The former received the charge of a nostalgic return to an idealized past, while the latter was considered a dream without any possibility of realization. In an extreme case, the entire effort to formulate a relationship between Islam and science was considered spurious, as – according to such critics – it essentialized a reified and ahistorical Islam. For others, the fundamental tenets expressed in a stable revealed text, the Qurʾān, form the basis for historically elucidating a distinctively Islamic concept of science. The underlying concepts and principles upon which this articulation is to proceed include *tawḥīd* (divine unicity), God's creative and sustaining action, and divine sovereignty, knowledge, custom, power, and will, by all of which is established the order of nature. Thus, in addition to the social, political, and economic aspects of the historical enterprise of science, these scholars explore the theoretical relationship by developing an Islamic cosmology.

In Part II of the present volume (Chapters 8–16), readers will find explorations of the questions posed in many of the chapters in Part I. The nine essays collected in this section are unique and wide-ranging in their approaches to the relationship between the fundamental principles of Islam and the various contours of relationships between them and science, the systematic study of the natural world. Together, they break new ground in advancing our understanding of the role played by meta-scientific dimensions of the scientific enterprise.

Part III (Chapters 17–21) highlights what Islamic science is through a exploration of what it is not. It further compares the basic principles of Islamic science with those of modern science.

As mentioned above, there was a heightened concern with the definition of 'Islamic science' during the 1980s; three essays in this section feature important aspects of those debates.

Part IV (Chapters 22–4) is devoted to the latest development in the discourse on Islam and science: a quest for concretely developing what has been expounded over the last sixty years by various scholars. What is required for the realization of a scientific enterprise based on Islamic principles? How can this alternative perspective be operationalized? What are the major differences between this vision and the existing social, economic, and political considerations which define modern science? What kind of institutional structure is needed for this effort? These are questions at the boundary of the discourse on Islam and science and they may open new paths forward in the decades to come. Such questions are not only at the root of a quest for revival of Islamic science, they are also positive contributions by Muslim scholars to the broader discourse on the role of religion in the modern world, especially in the enterprise of science.

The final section of the volume examines and analyzes various views on the scientific exegesis of the Qurʾān. The six essays in Part V (Chapters 25–30) provide a general survey of historical trends through various subthemes. The viability of Qurʾānic hermeneutics in reference to science is discussed in one chapter, while another provides a sample of scientific exegesis. A reflective essay attempts to build bridges between scientific data present in the Qurʾān and cognitive processes.

The essays presented here in the first volume of the series *Islam and Science: Historic and Contemporary Perspectives* complement those in the other volumes. They explore theoretical formulations as they have emerged over the last fifty years through heated debates which help to push the boundaries of how Islam and science can be related, often challenging established historiographies. These essays enrich our understanding of a complex relationship which involves a living religion, a thriving global community, and over a millennium of history of interaction between fields that today are as far apart as astronomy and exegesis of a revealed text.

Wuddistān
6 Shawwāl 1432/4 September 2011

References

Abu-Rabi, I.M. (ed.) (2003), *Islam at the Crossroads: On the Life and Thought of Bediuzzaman Said Nursi*, New York: State University of New York Press.

Al-Afghānī (1942), *Refutation des Matérialistes,* trans. A.M. Goichon, Paris: Paul Geuthner, pp. 174–85; translated into English as 'Answer to Renan' in N.R. Keddie (1968), *An Islamic Response to Imperialism*, Berkeley: University of California Press, pp. 181–7.

Aḥmad, Ḥ. (1954), *Muʿjizāt al-Qurʾān fī Waṣf al-Kāʾināt*; reprinted in 1960 and 1968 as *al-Tafsīr al-ʿIlmī lī Āyāt al-Kawniyya* (*Scientific Exegesis of the Cosmic Verses*), Miṣr: Maṭbaʿat Lajnat al-Bayān al-ʿArabī.

ʿAtiyya, Ḥ.Ḥ. (1992), *Khalq al-Samāwatī wal-Arḍ fī Sittati Ayyāmin fīl-ʿIlm wal-Qurʾān* (*Creation of the Heavens and the Earth in Six Days in Science and in the Qurʾān*), Tunis: Nashr wa-Tawzīʿ Muʾassasāt ʿAbd al-Karīm b. ʿAbd Allāh.

Badawi, M.A.Z. (1978), *The Reformers of Egypt*, London: Croom Helm.

Barq, G.J. (n.d.), *Dô Qurʾān* (*Two Qurʾāns*), Lahore: Shaykh Ghulam Ali.

Al-Bārr, M.A. (1986), *Khalq al-Insān bayn al-Ṭibb wal-Qurʾān* (*The Creation of Human Being in Medicine and the Qurʾān*), Jeddah: al-Dār al-Saʿūdiyya.

Berggren, J.L. (1996), 'Acquisition of the Foreign Sciences: A Cultural Approach', in J.F. Ragep and S.P. Ragep (eds), *Tradition, Transmission, Transformation*, Leiden: E.J. Brill, pp. 270–83.

Al-Bīrūnī, A.R. (1879), *al-Athār al-Bāqiya*, translated by Edward Sachau as *The Chronology of Ancient Nations*, London: W.H. Allen.

Al-Dhahabī, M.Ḥ. (n.d.), *al-Tafsīr wal-Mufassirūn*, 3 vols, Beirut: Sharika Dār Arqam bin Ābī al-Arqam.

Al-Ghazali, M. (2001), Review of Maurice Bucaille's *The Bible, the Qur'an and Science: The Holy Scriptures Examined in the Light of Modern Knowledge*, *Islamic Studies*, **40**, pp. 330–35.

Goldziher, I. (1916), 'Stellung der alten islamischen Orthodoxie zu den antiken Wissenschaften', *Abhandlungen der Königlich Preussischen Akademie der Wissenchaften*, Jahrgang 1915, Philosophisch-historische Klasse, no. 8, Berlin: Verlag der Akademie, pp. 3–46; translated as 'The Attitude of Orthodox Islam Toward the Ancient Sciences,' in M.L. Swartz (ed. and trans.) (1981), *Studies on Islam*, New York: Oxford University Press, pp. 185–215.

Gutas, D. (1998), *Greek Thought, Arabic Culture*, London: Routledge.

Haj, S. (2008), *Reconfiguring Islamic Tradition: Reform, Rationality, Modernity*, Stanford: Stanford University Press.

Al-Harāwī, Ḥ. (1361/1942), *al-Naẓariyyā al-ʿIlmiyya fīl-Qurʾān* (*Scientific Theories in the Qurʾān*), Cairo: al-Hay'at al-Miṣriyyat al-'āmat al-kitāb.

Iqbal, M. (2002), *Islam and Science*, Aldershot: Ashgate.

Iqbal, M. (2007), *Science and Islam*, London: Greenwood Press.

Al-Iskandarānī, M. (1297/1880), *Kashf al-Asrār ʿan al-Nūrāniyya al-Qurʾāniyya fī-mā yataʿallaqu bil-Ajrām as-Samāwiyya wal-Arḍiyya wal-Ḥaywanāt wal-Nabāt wal-Jawāhir al-Maʿdaniyya*, 3 vols, Cairo: Maktabat al-Wahba.

Al-Iskandarānī, M. (1300/1883), *Tibyān al-Asrār al-Rabbāniyya fīl-Nabāt wal-Maʿādin wal-Khawāṣṣ al-Haywaniyya* (*The Demonstration of Divine Secrets in the Vegetation and Minerals and in the Characteristics of Animals*), Damascus: n.p.

Ismāʿīl, ʿA.ʿA. (1938), *al-Islām wal-ṭibb al-Ḥadītha* (*Islam and Modern Medicine*), Cairo: Maṭbaʿ al-Iʿtimād.

Keddie, N.R. (1968), *An Islamic Response to Imperialism*, Berkeley: University of California Press.

Keddie, N.R. (1972), *Sayyid Jamāl ad-Dīn 'al-Afghānī': A Political Biography*, Berkeley: University of California.

Kedourie, E. (1966), *Afghānī and ʿAbduh: An Essay on Religious Unbelief and Political Activism in Modern Islam*, London: Frank Cass.

Kennedy, E.S. (1968), 'Ulugh Beg', in *Cambridge History of Iran*, Cambridge: Cambridge University Press, p. 11.

Al-Khatīb, M. (1415/1994), *Min Dalāʾil al-Iʿjaz al-ʿIlmi fil-Qurʾān wal-Sunna al-Nabawiyya* (*Signs of the Scientific Miracles of the Qurʾān and the Prophetic Sunna*), Cairo: Muʾassasāt al-Khalīj al-ʿArabī lil-Ṭibāʿa wal-Nashr.

Al-Khūlī, A. (1944), *al-Tafsīr: Maʿālim Ḥayāti Minhaj al-Yawm*, Cairo: Dār al-Maʿrifa.

Al-Khūlī, A. (1961), *Manāḥij Tajdīd fil-Naḥw wal-Balāgha wal-Tafsīr wal-Adab*, Cairo: Dār al-Maʿrifa.

Mahmood, Bashir ud-Din (1991), *Doomsday and Life after Death*, Islamabad: Holy Qurʾān Research Foundation.

Malik, H. (1980), *Sir Sayyid Ahmad Khan and Muslim Modernism in India and Pakistan*, New York: Columbia University Press.

Mardin, S. (2000), *The Genesis of Young Ottoman Thought: A Study in the Modernization of Turkish Political Ideas*, Syracuse: Syracuse University Press.

Markham, I.S. and Birinci, S. (2011), *An Introduction to Said Nursi*, Farnham: Ashgate Publishing.

Masud, M.K. (1977), *Islamic Legal Philosophy: A Study of Abū Iṣhāq al-Shāṭibī's Life and Thought*, Islamabad: Islamic Research Institute; reprinted in 1995 with additions as *Shāṭibī's Philosophy of Islamic Law*. Islamabad: Islamic Research Institute.

Mermer, Y. and Ameur, M. (2004), 'Beyond the "Modern": Saʿīd al-Nūrsī's View of Science', *Islam & Science*, **2**, pp. 119–60.

Muṣṭafā, M. (1999), *Mabāḥith fī Iʿjāz al-Qurʾān*, Damascus: Dār al-Qalam.

Naqvi, S.S.N. (1973), *Islam and Contemporary Science*, Karachi: World Federation of Islamic Missions.

Nawfal, ʿA. (1409/1989), *Min al-Ayāt al-ʿilmiyya* (*On the Scientific Verses*), Cairo and Beirut: Dār al-Shurūq.

El-Naggar, Z.R. (1991), *Sources of Scientific Knowledge: The Geological Concept of Mountains in the Qurʾān*, Herndon: The Association of Muslim Scientists and Engineers and The International Institute of Islamic Thought.

Nurbakī, H. (1993), *Verses from the Glorious Koran and the Scientific Facts*, 3rd edn, Ankara: Türkiye Diyanet Vakfi.

Al-Nūrsī, B.S. (1996), *Risale-i Nur Kulliyati*, Istanbul: Nesil Basim Yayin.

Qurashi, M.M., Bhutta, S.M. and Jafar, S.M. (1987), *Quranic Ayaat Containing References to Science and Technology*, Islamabad: Sh. Sirri Welfare & Cultural Trust and Pakistan Science Foundation.

Renan, E. (1883), *L'Islamisme et la science*, Paris: Ancienne Maison Michel Levy Freres.

Sabra, A.I. (1987), 'The Appropriation and Subsequent Naturalization of Greek Science in Medieval Islam: A Preliminary Statement', *History of Science*, **25**, pp. 223–43; reprinted in A.I. Sabra (1994), *Optics, Astronomy and Logic: Studies in Arabic Science and Philosophy*, Aldershot: Variorum, pp. 1–20.

Sarton, G. (1927–48), *Introduction to the History of Science*, 3 vols, Baltimore: Williams & Wilkins.

Shāhīn, ʿA. (1369/1950), *Iʿjāz al-Qurʾān wal-Iktishāfāt al-Ḥadītha* (*The Inimitability of the Qurʾān and Modern Discoveries*), Cairo: Dār Nashr.

Al-Suyūṭī, J. (1967) *al-Itqān fī ʿUlūm al-Qurʾān*, 2 vols, Cairo: Maṭbaʿat Amīr.

Ṭanṭawī Jawharī (1931), *al-Jawāhir fī Tafsīr al-Qurʾān al-Karīm* (*Pearls from the Tafsīr of the Noble Qurʾān*), Cairo: Maṭbaʿat Muṣṭafa al-Bābī al-Ḥalbī wa awlāduhu bil-Miṣr.

Vahide, S. (1992), *Bediuzzaman Said Nursi*, 2nd edn, New York: Sozler Publications.

Vahide, S. (2005), *Islam in Modern Turkey: An Intellectual Biography of Bediuzzaman Said Nursi*, ed. I.M. Abu-Rabi, New York: State University of New York Press.

Part I
Framing the Discourse

This page intentionally left blank

[1]

Three Views of Science in the Islamic World

Ibrahim Kalin

There is hardly any subject as vexed and vital for the contemporary Islamic world as the question of modern science. Since its earliest encounter with modern Western science in the 18th and 19th centuries, the Islamic world has had to deal with science for practical and intellectual reasons. At the level of practical needs, modern science was seen as the *sine qua non* of the advancement and defense of Muslim countries in the field of military technology. The Ottoman political body, which unlike the other parts of the Islamic world was in direct contact with European powers, was convinced that its political and military decline was due to the lack of proper defense mechanisms against the European armies. To fill this gap, a number of massive reforms were introduced by Maḥmūd II with the hope of stopping the rapid decline of the Empire, and a new class of military officers and bureaucrats, who became the first point of contact between the traditional world of Islam and the modern secular West, was created.[1] A similar project, in fact a more successful one, was introduced in Egypt by Muḥammad Ali whose aspirations were later given a new voice by Ṭāhā Ḥūssain and his generation. The leitmotif of this period was that of extreme practicality: the Muslim world needed power, especially military power, to stand back on its feet and new technologies powered by modern science were the only way to have it.[2] The modern conception of science as a medium of power was to have a profound impact on the relations between the Muslim world and modern science, which was then already equated with technology,

progress, power, and prosperity – a mode of perception still prevalent among the masses in the Islamic world.

The second level of encounter between traditional beliefs and modern science was of an intellectual nature with lasting consequences, the most important of which was the re-shaping of the self-perception of the Islamic world. Using Husserl's analysis of *Selbstverständnis*, a key term in Husserl's anthropology of "Western man", von Grunebaum takes the reception of modern science to be a turning point in the self-view of traditional Islamic civilization and its approach to history.[3] One of the recurring themes of this epochal event, viz. the incompatibility of traditional beliefs with the dicta of modern science, is forcefully stated in a speech by Atatürk (the founder of modern Turkey), who was as much aware of the practical urgencies of the post-independence war Turkey as he was passionately engaged in creating a new identity for Turkish people:

> We shall take science and knowledge from wherever they may be, and put them in the mind of every member of the nation. For science and for knowledge, there are no restrictions and no conditions. For a nation that insists on preserving a host of traditions and beliefs that rest on no logical proof, progress is very difficult, perhaps even impossible.[4]

On a relatively smaller scale, the clash between the secular premises of modern science and the traditional Islamic worldview was brought home to many Muslim intellectuals with the publication of Rènan's famous lecture "L'Islamisme et la science" given in Sorbonne in 1883. In this lecture, he strongly argued for the irrationality and inability of Muslim peoples to produce science. Today, Rènan's quasi-racist attack on the Islamic faith and crude promulgation of positivism as the new religion of the modern world makes little sense. Nevertheless, it was an eye opener for the Muslim intelligentsia about the way in which the achievements of modern Western science were presented. Spearheaded by Jamāl al-Dīn Afghānī in Persia and Nāmik Kemāl in the Ottoman empire, the Muslim men of letters took upon

themselves the task of responding to what they considered to be the distortion of modern science at the hands of some anti-religious philosophers, and produced a sizable discourse on modern science with all the fervor and confusion of their tumultuous times.[5] As we shall see below, Afghānī, *inter alia*, came to epitomize the mind-set of his time when he based his historical apology against Rènan on the assumption that there could be no clash between religion and science, be it traditional or modern, and that modern Western science was nothing other than the original true Islamic science shipped back, via the Renaissance and Enlightenment, to the Islamic world. By the same token, there is nothing essentially wrong with modern science, and it is the materialistic representation of science that lies at the heart of the so-called religion-science controversy.[6] Nāmik Kemāl joined Afghānī with a rebuttal of his own in his *Rènan Mudāfānāmesi* (*The Defense against Rènan*), focusing on the scientific achievements of the Arabs, namely the Muslim countries of the past.[7] In contrast to these Muslim intellectuals who sought to place modern science within the context of an Islamic worldview, a number of prominent Christian writers in the Arab world, including Jurjī Zaydān (d. 1914), Shiblī al-Shumayyil (d. 1916), Faraḥ ʿĀntūn (d. 1922), and Ya'qūb Ṣarrūf (d. 1927), began advocating the secular outlook of modern science as a way of joining the European path of modernization – hence taking a primarily philosophical and secular stance on the ongoing debate between religion and science.[8]

These two positions are still with us today and continue to represent the ambitions as well as failures of the Islamic world in its elusive relationship with modern science. Islamic countries spend billions of dollars every year for transfer of technology, science education, and research programs. The goal set by the Ottomans in the 19th century has remained more or less the same: gaining power through technological advancement. Furthermore, the financial wedding between science and technology, begun with the industrial revolution, makes it ever harder to search for "pure science", and the bottom line for the Muslim as well as the Western world becomes

technology rather than science. The willingness of Islamic countries to participate in the modernization process through transfer of technology obscures the philosophical dimension of the problem, leading to the kind of simplistic and reductionist thinking upon which we will touch shortly.

As for the intellectual challenge posed by modern science, it can hardly be said to have dwindled or disappeared in spite of the diminishing sway of positivism and its allies among the learned. There is a peculiar situation in the wake of the rise of new philosophies of science with new developments in scientific research, extending from the ousting of positivism and physical materialism to quantum mechanics and anti-realism. The postmodernist wave has shaken our confidence in science and ripple effects can be felt far beyond the scientific field. As a result, many young Muslim students and intellectuals see no problem with adopting the relativist and anti-realist stances of a Kuhn or Feyerabend. With the dike of modern science broken, it is assumed that religion and science can now begin talking to each other; the truth is that neither has a firm standing because both of them have been deprived of their truth-value by the anti-realist and relativist philosophies of our time. The popularity of the current discussions of philosophy of science in Muslim countries is indicative of the volatile nature of the subject as well as its long history among the Muslim intelligentsia.[9]

It would not be a stretch to say that the contemporary Islamic world is gripped by the challenges of these two divergent yet related points of view, which shape its perception of science in a number of fundamental ways. On the one hand, the governments and ruling elite of Islamic countries consider one of their highest priorities keeping up with the global race of technological innovation, from communications and medical engineering to weapon industry and satellite technology.[10] Arguments to the contrary are seen as a call for resisting the irreversible process of modernization, or for backwardness, to say the least. On the other hand, it has become common wisdom that the consequences of the application of modern, natural sciences to fields

that have never been encroached upon before pose serious threats to the environment and human life. This is coupled with the threat of modern science becoming the pseudo-religion of the age, thereby forcing religion to the margins of modern society or at least making it a matter of personal choice and social ethics. This creates a bitter conflict of consciousness in the Muslim mind, a conflict between sacred and worldly power, between belief and scientific precision, and between seeing nature as the cosmic book of God and seeing nature as a source of exploitation and domination.

When we look at the current discourse on science in the Islamic world, we see a number of competing trends and positions, each with its own claims and solutions. Without pretending to be exhaustive, they can be classified under three headings: ethical, epistemological, and ontological/metaphysical views of science. The ethical/puritanical view of science, which is the most common attitude in the Islamic world, considers modern science to be essentially neutral and objective, dealing with the book of nature as it is, with no philosophical or ideological components attached to it. Such problems as the environmental crisis, positivism, materialism, etc., all of which are related to modern science in one way or another, can be solved by adding an ethical dimension to the practice and teaching of science. The second position, which I call the epistemological view, is concerned primarily with the epistemic status of modern physical sciences, their truth claims, methods of achieving sound knowledge, and function for the society at large. Taking science as a social construction, the epistemic school puts special emphasis on the history and sociology of science. Finally, the ontological/metaphysical view of science marks an interesting shift from the philosophy to the metaphysics of science. Its most important claim lies in its insistence on the analysis of the metaphysical and ontological foundations of modern physical sciences. As we shall see below, it is this school, represented *inter alia* by such Muslim thinkers as Seyyid Hossein Nasr and Naquib al-Attas, that the concept of Islamic science goes back to, a concept

which has caused a great deal of discussion as well as confusion in Islamic intellectual circles.

Science as the Servant of God: The Dimension of Social Ethics

The most common attitude towards science in the Islamic world is to see it as an objective study of the world of nature, namely as a way of deciphering the signs of God in the cosmic book of the universe. Natural sciences discover the Divine codes built into the cosmos by its Creator, and in doing so, help the believer marvel at the wonders of God's creation. Seen under this light, science functions within a religious, albeit overtly simplistic, framework. The image of science as the decoder of the sacred language of the cosmos is certainly an old one, going back to the traditional Islamic sciences whose purpose was not just to find the direction of the *qiblah* or the times of the prayers but also to understand the reality of things as they are. Construed as such, science is seen as a noble enterprise. It was within this framework that the Muslim intellectuals, when they encountered the edifice of modern science in the 18th and 19th centuries, did not hesitate to translate the word *'ilm* (and its plural *'ulūm*) as "science" in the sense of modern physical sciences.[11]

This attitude can best be seen among the forerunners of Islamic modernism, especially among those who addressed the question of science as the most urgent problem of the Islamic world. Jamāl al-Dīn Afghānī in his celebrated attack on the "materialists", i.e. *Haqiqat-i mazhab-i naichīrī wa bayān-i ḥāl-i nachīrīyān*, translated into Arabic by Muḥammad ʿAbduh as *al-Radd 'ala'l-dahriyyin*, was engaged in a self-proclaimed battle of saving science from the positivists, a battle for which he derived support from the history of both Islamic and modern sciences. He had the following to say in his celebrated response to Renan:

> If it is true that the Muslim religion is an obstacle to the development of sciences, can one affirm that this obstacle will not disappear someday? How does the Muslim religion differ on this point from other religions? All religions are intolerant, each one in its way. The Christian religion, I mean the society that follows its inspirations and its teachings and is formed in its image, has emerged from the first period to which I have just alluded; thenceforth free and independent, it seems to advance rapidly on the road of progress and science, whereas Muslim society has not yet freed itself from the tutelage of religion. Realizing, however, that the Christian religion preceded the Muslim religion in the world by many centuries, I cannot keep from hoping that Muhammadan society will succeed someday in breaking its bonds and marching resolutely in the path of civilization after the manner of Western society? No I cannot admit that this hope be denied to Islam.[12]

Afghānī's voice, which was carried on by such figures as Muḥammad ʿAbduh, Sayyid Aḥmad Khān, Rashid Riḍā, Muhammad Iqbal, Mehmet Akif Ersoy, Namik Kemal, Said Nursi, and Farid Wajdi, was the epitome of the sentiments of the time: modern science is nothing but Islamic science shipped back to the Islamic world via the ports of the European Renaissance and Enlightenment. In other words, science is not a culture-specific enterprise, and as such it is not the exclusive property of any civilization. Afghānī puts it in the following way:

> The strangest thing of all is that our ulama these days have divided science into two parts. One they call Muslim science, and one European science. Because of this they forbid others to teach some of the useful sciences. They have not understood that science is that noble thing that has no connection with any nation, and is not distinguished by anything but itself. Rather, everything that is known is known by science, and every nation that becomes renowned becomes renowned through science. Men must be related to science, not science to men ...
>
> The father and mother of science is proof, and proof is neither Aristotle nor Galileo. The truth is where there is proof, and those who forbid

> science and knowledge in the belief that they are safeguarding the Islamic religion are really the enemies of that religion. The Islamic religion is the closest of religions to science and knowledge, and there is no incompatibility between science and knowledge and the foundation of Islamic faith.[13]

For this generation of Muslim thinkers, Western science was clearly and categorically distinguishable from Western values, the underlying assumption being that the secular worldview of the modern West had no inroads into the structure and operation of the natural sciences. The task is therefore not to unearth the philosophical underpinnings of modern science but to import it without the ethical component that comes from Western culture, which is alien to the Islamic ethos. The best example of this attitude was given by Mehmet Akif Ersoy, the famous intellectual of the Ottoman empire and the poet of the national anthem of Turkey. Akif, who lived at a time when the Ottoman empire and parts of the Islamic world were being divided and fiercely attacked by European powers, made a clear-cut distinction between Western science and European life-style, calling for the full-fledged adoption of Western science while totally rejecting the manners and mores of European civilization.

The idea of locating modern science within the framework of Islamic ethics is an attitude that is still with us today. Most of the practitioners of science in the Islamic world, namely engineers, doctors, chemists, and physicists, believe in the inherent neutrality of the physical sciences; therefore, the questions of justification, domination, control, etc., simply do not arise for them. Since science is a value-free enterprise, the differences between various scientific traditions, if such a thing is allowed at all, come about at the level of justification, not experimentation and operation. Thus when a scientist, be he or she a Muslim, Hindu, or simply non-believer, looks at the chemical components of the minerals he or she sees the same thing, operates on the same set of elements under the same set of conditions, and arrives presumably at the same or commensurable conclusions. It is the practical application of these findings to various

fields and technologies that makes the difference, if any, between a Ptolemy, an Ibn al-Haytham, and a F. Bacon.

It is not difficult to see the imagery of the torch of science inherent in this view. Being the most prevalent attitude towards the history of science both in the Islamic and Western world, this view considers the history of science as progressing along a linear trajectory of discoveries and heuristic advancements. The torch of science transmitted from one nation to another, from one historical period to another, signifies the constant progress of scientific research, relegating such facts as religious convictions, philosophical assumptions and/or social infrastructure to a set of preparatory conditions necessary for the advancement of science. Thus the only difference between the science of the 13th century Islamic world and that of 19th century Europe turns out to be quantitative, that is, in terms of the accumulation and further specialization of scientific knowledge about the physical world. By the same token, the scientific revolution of the 17th and 18th centuries was a revolution not in the outlook of the modern man concerning nature and the meaning of scientific investigation but in the methodological tools and formulations of the natural sciences. This is how the majority of the 19th century intellectuals would have interpreted the history of science and the rise of modern natural sciences, and this is how the subject is still taught today in schools in the Islamic world.[14]

A logical result of this view of science is the incorporation of scientific findings as confirmations of the Islamic faith. In the pre-modern era when the religious worldview was strong, no scientist deemed it necessary to subject the Qur'ānic verses to a "scientific" reading, thereby hoping (perhaps) to improve one's faith in religion or showing the religious basis of scientific investigation. However, a trait of the modern period is that many believers of different religions and denominations look for possible confirmation from the sciences for their religious belief, confirmations that will, it is hoped, both increase the truth-value of the sacred book and ward off the hegemonic onslaught of the positivists. A good example of this approach in the

Islamic world is without doubt Said Nursi (1877-1960), the famous scholar, activist, and founder of the Nurcu movement in Turkey.

Said Nursi's views on the relation between faith and science were formulated at a time when the rude positivism of the late 1900s was made the official ideology of the newly established Turkish republic. Unlike many of his contemporaries, Nursi had considerable knowledge of the scientific findings of his time. His method in confronting Western science was a simple yet highly influential one: instead of taking a position against it, he incorporated its findings within a theistic perspective, thus preempting any serious confrontation between science and religion. Nursi – like many of his contemporaries – was acutely aware of the power of modern natural sciences and, as we see in his great work *Risāle-i Nūr*, he certainly believed in the universal objectivity of their discoveries.[15] For him, reading the verses of the Qur'ān through the lens of modern physical sciences had not only an instrumental value for protecting the faith of the youth who were coming under the sway of 19th century positivism and empiricism; it was also the beginning of a new method of substantiating the Islamic faith on the basis of the certainties of modern physical sciences, and reading the cosmic verses of the Qur'ān within the matrix of scientific discoveries.

As a religious scholar well grounded in traditional Islamic sciences, Nursi was aware of the apparent discrepancy between traditional cosmology articulated by Muslim philosophers and Sufis, and the Newtonian world-picture which contained no religious terms. Instead of rejecting the mechanistic view of the universe presented by modern science, Nursi saw an interesting parallel between it and the *kalam* arguments from design (*nizām*). In his view the classical arguments from design – used profusely by Muslim and Christian thinkers alike – were meant to prove the eternal order and harmony built into the texture of the cosmos by the Divine creator and as such do not contradict Newtonian determinism. If the mechanistic view of the universe presents a world-picture in which nothing can remain scientifically unaccounted for, then this proves not the fortuitous

generation of the cosmos but its creation by an intelligent agent, which is nothing other than the Divine artisan.[16] Therefore, the depictions of the universe as a machine or clock, the two favorite symbols of the deists of the 19th century, do not nullify the theistic claims of creation. On the contrary, rationality as regularity, harmony, and predictability, Nursi would wholeheartedly argue, lies at the heart of the religious view of the cosmos. Thus the mechanistic view of the universe, which was hailed by the secularists and positivists of the 19th century as the indisputable triumph of reason over and against religion, poses no threat to the theistic conception of the universe. As Mardin points out, this attitude was so influential among Nursi's followers that vocabulary taken from 19th century thermodynamics and electricity became household terms of the Nurcu movement. Thus the physical world is described as 'a *fabrika-i kāinat* (factory of the universe) (*Lem'alar*, 287); life is a machine of the future from the exalted bench work of the universe (*hayat kainatin tezgah-i azaminda ... bir istikbal makinesidir*) (*Lem'alar*, 371). Sabri, one of the first disciples of Bediuzzaman, speaks of "machines which produce the electricity of the Nur factory" when speaking of the work of disciples.[17]

Nursi's approach to modern science has been interpreted in a number of variant and, sometimes conflicting, ways. There are those who take his coping with science as a powerful way of deconstructing its metaphysical claims by using the language of Newtonian physics, chemistry, and astronomy.[18] The opposite side of the controversy is represented by those who tend to emphasize the influence of modern science and positivism on Nursi – an influence visible in the entire generation of 19th century Muslim scholars, intellectuals, and activists. Even though one can easily detect an apparent incongruity between what Nursi had intended by his so-called "scientific commentary" (*al-tafsīr al-ilmī*) and what his followers made out of it,[19] the roots of his theistic scientism, one may claim, are ultimately traceable to his *Risāle-i Nūr*.[20] A few examples will suffice to illustrate this point. When discussing the miracles of the prophets mentioned in the Qur'ān, Nursi identifies two main reasons for their dispensation by the Divine

authority. The first reason pertains to the veracity of the prophets of God, viz. they have been sent with an undeniable truth (*burhān*) to summon people to God's eternal word. The second reason, and this is what concerns us here, is that the prophetic miracles contain in them the seed of the future developments of human civilization. The story of the Prophet Sulayman (Solomon) mentioned in the Qur'ān (Saba' 34:12) for instance, predicts the invention of modern aviation systems. As Nursi interprets it, the fact that God has given the wind under Sulayman's command to travel long distances in a short period of time points to the future possibility of traveling in the air in general, and to the invention of aircraft (*teyyāre*) in particular.[21] Another example is the Prophet Moses' miracle to bring out water from the earth, as mentioned in the Qur'ān (Baqarah 2:60), when he and his followers were searching for water in the middle of the desert. According to Nursi, this event predicts the development of modern drilling techniques to dig out such indispensable substances of modern industry as oil, mineral water, and natural gas. Following the same line of thinking so typical of his generation of Qur'ānic commentators, Nursi explains the mention of iron and "its being softened to David" (Saba' 34:10) as a sign of the future significance of iron and, perhaps, steel for modern industry.[22] Another striking example of how Nursi was deeply engaged in scientific exegesis is his interpretation of the verse of the light (Nur 24:35), upon which such colossal figures of Islamic history as Ibn Sina and Ghazzali have written commentaries. Among many of the other profound and esoteric meanings of the light verse, which depicts God as the "light of the heavens and the earth", is the allusion to the future invention of electricity whose continuous diffusion of light is compared to the Qur'ānic expression "light upon light" (*nūrun 'alā nūr*) mentioned in the verse.[23]

These examples, the number of which can easily be multiplied, and the way they are justified were in tandem with a presiding idea, which Nursi adopted and elaborated with full force. This he called the "miracle of the teaching of Divine names to Adam" (*talim-i esmā mucizesi*). The Qur'ān tells us in Baqarah 2:31 that God, after creating

Adam as his viceregent on earth – to which the angels had objected for fear of corruption on earth – taught him "all the names" (or according to another reading "the names of all things", *asmā'a kullahā*). Throughout Islamic intellectual history, this verse has been interpreted in a myriad of different ways ranging from the most literalist to the most esoteric readings. In a daring statement, Nursi takes this miracle of Adam, the father of humanity, as greater and more perfect than those of all the other prophets after him because (according to Nursi) it embodies and comprises the entire spectrum of "all the progress and perfection human beings will ever achieve in the course of their history".[24] It is essentially on the basis of this principle that Nursi justifies his scientific and "progressive" exegesis of various verses of the Qur'ān. True, interpretations of this kind can be found in traditional commentaries on the Qur'ān or among the Sufis. What is peculiar about Nursi's new hermeneutics, if we may use such an appellation here, is the scientific and modern context in which it is articulated and carried out.

In its vulgarized version, Said Nursi's encounter with modern science has led to a torrent of one-to-one correspondences between new scientific findings and Qur'ānic verses, generating unprecedented interest in the natural sciences among his followers. Moreover, his position on science as the decoder of the sacred language of nature influenced a whole generation of Turkish students, professionals, and lay people with repercussions outside the Turkish-speaking world. Today, his followers are extremely successful in matters related to the sciences and engineering, and they continue Nursi's method of integrating the findings of modern physical sciences into the theistic perspective of Abrahamic religions. They are, however, extremely poor and unprepared when it comes to the philosophical aspects of the subject. The pages of the journal *Sizinti*, published by Nursi's followers in Turkish, and its English version *Fountain*, are filled with essays trying to show the miracle of creation through comparisons between the cosmological verses of the Qur'ān and new scientific discoveries. Not surprisingly, every new discovery from this point of view is yet another

proof for the miracle and credibility of the Qur'ān. In this sense, Nursi's progeny is the father of what we might call "Bucaillism" in the Islamic world. The idea of verifying the cosmological verses of the Qur'ān via the scrutiny of the science of the day is a highly modern attitude by which it is hoped to confront and overcome the challenges of modern secular science. The fact that the same set of scientific data can be used within different contexts of justification and thus yield completely different and incommensurable results does not arise as a problem, neither is the overtly secular nature of the worldview of modern science considered to be a threat to the religious view of nature and the universe. The deliberate ignorance of the problem is seen as the solution, and the most poignant result of this approach is the rise of a class of Muslim scientists and engineers who pray five times a day but whose concepts of science are largely determined by the postulates of the modern scientific worldview.

This, however, does not prevent the proponents of this view from seeing the problems inflicted upon the world of nature and human life by modern science. The environmental crisis, hazards of genetic engineering, air pollution, rapid destruction of countless species, and the nuclear and chemical weapons industries are all admitted as problems we have to deal with. Yet the proposed remedy is an expected one: inserting a dimension of social and environmental ethics will put under control, if not completely solve, the problems mentioned. In other words, science should be subjected to ethics at the level of policy decisions. Accordingly, the aforementioned problems of modern science can be overcome by better management and advanced techniques in environmental engineering. Reminiscent of Habermas' defense of the project of modernity, which he considers incomplete as of yet, this view looks for the solution in the problem itself: further advancement in scientific research and technologies will create new methods of controlling the environmental crisis and all the problems associated with modern science. In short, we need more science to overcome its misdeeds.

The great majority of people in the Islamic as well as Western world share the sentiments of the above view of science that we have just summarized. Many people from all walks of life believe in the necessity of upholding an ethical framework within which scientific investigation should be carried out and controlled. This certainly has important policy implications for scientific research funded by federal governments and business corporations in many parts of the world. The point that is inevitably obscured, however, is much more crucial than having an influence at the policy decision-making level. To limit ethics to policy implementations is to make it a matter of personal preference for the scientific community, whose political and financial freedom against that of the governments and giant corporations is highly questionable. The fact that the scientists who approve of human cloning and genetic alteration believe in theistic evolution does not change the course of modern science. The conflict of consciousness to which we referred above resurfaces here in the form of people whose hearts and emotions are attached to the mandates of their respective religions but whose minds are empty of the religious view of the universe.

The Epistemic View of Science: For and Against the Method

An important channel through which the contemporary Islamic world, especially in the last three decades of the 20th century, has come to terms with modern science is the philosophy of science as developed in the West. The impact of the deconstruction of the epistemological hegemony of 19th century positivism, together with the critique of Newtonian physics and scientific objectivism and realism, on the Islamic world has been stupendous and caused a torrential release of intellectual energy among students and intellectuals. Needless to say, the influx of ideas associated with such names as Kuhn, Feyerabend, Popper, and their current students continues almost unabated in spite of the fact that the post-antirealist thinking on science seems to have

come to a serious stalemate. Being on the receiving end of this debate, many Muslim students and intellectuals are still experimenting with these ideas but with little success – as we shall see shortly – in extrapolating their full implications. Before analyzing the current research being done by Muslim students and intellectuals, a few words of clarification about the scope of the contemporary field of the philosophy of science are in order.

The primary concern of contemporary philosophy of science is to establish the validity, or lack thereof, of the truth claims of modern, natural sciences. Theory-observation dichotomy, fact-value distinction, experimentation, objectivity, scientific community, history and sociology of science, and a host of other problems stand out, *inter alia*, as the most important issues of the field, a field which leaves no aspect of the scientific enterprise untouched. What concerns us here, however, is the emphasis in the philosophy of science on epistemology to the point of excluding any ontological or metaphysical arguments. The majority of contemporary philosophers of science, including such celebrated vanguards as Kuhn, Popper, and Feyerabend, construe science primarily as an epistemic structure that claims to explain the order of physical reality within the exclusive framework of the scientific method. Scientific realism, anti-realism, instrumentalism, and empiricism are all, needless to say, anchored in different notions of knowledge with profound implications for both the natural and human sciences. Given its exclusive concern with the epistemic claims involved, contemporary philosophy of science can be equated with the epistemology of science. In this regard, the epistemic view of science is surely a respected member of modern philosophy, for which any concept other than the knowing subject and its paraphernalia is no foundation for a proper understanding of the world.

Thinking about the question of being in terms of how it is known, to use Heideggerian language, is the leitmotif of modern philosophy, including its prima facie foes: rationalism and empiricism.[25] Whether we consider the knowing subject as a rationalist, empiricist, structuralist, or deconstructionist, an anthropocentric ethos

runs through the veins of how we perceive the world around us, how we interact with it, and how we position ourselves vis-à-vis the other human beings with whom we share the intentional as well as physical space of our life-world. Here the eternal paradox of all subjectivist epistemologies is brought into clarity: to put the subject before the world, of which he or she is a part, is to claim the square inside the circle to be larger than the circle. Said differently, to ground the intelligibility of the world in the discursive constructions of the knowing subject is to see the world, or rather anything outside the subject, as essentially devoid of intrinsic meaning and intelligibility.[26] The Muslim critique of modern science – based on the premises of modern epistemology – has usually lost sight of this crucial fact as we see in the otherwise commendable literature produced by Ismail Faruqi and his protégée, the International Institute of Islamic Thought (mentioned hereafter as IIIT).

There is no denying the fact that Kuhn's radical anti-realism or Popper's concept of verisimilitude cannot be interpreted as lending support to the epistemic hegemony of modern science. On the contrary, they are meant to destroy it once and for all. The anti-realist component of their positions, however, reinforces the anthropocentric imagery: it is the knowing subject who is willing to deny science its self-proclaimed objectivity and appeal to credibility.[27] It is this aspect of contemporary philosophy of science, I believe, that has been totally mistaken and ignored by its adherents in the Islamic world. Today we can hardly come across a book or article written in English, Arabic, Turkish, or Bahasa Malaysia that does not have recourse to Foucault, Kuhn, Feyerabend, or Lyotard in order to denounce the philosophical underpinnings of modern science. From the academic papers of Muslim graduate students to the writings of the so-called "ijmalis" led by Ziauddin Sardar, the names of numerous philosophers of science sweep through the literature, including additions indigenous to the Islamic point of view. To put it mildly, this has led to the overemphasis of epistemology and methodology among many Muslim thinkers and young scholars while questions of ontology and metaphysics have been

either left out or taken for granted. The concept of Islamic science, in this point of view, is centered around a loosely defined epistemology, or rather a set of discrete ideas grouped under Islamic epistemology whose content is yet to be determined. In many ways, the idea of Islamizing natural and social sciences has been equated with producing a different structure of knowledge and methodology within what we might call the epistemological fallacy of modern philosophy. The crucial issue has thus remained untouched: to reduce the notion of Islamic science to considerations of epistemology and methodology – which are without doubt indispensable in their own right – is to seek out a space for the Islamic point of view within, and not outside, the framework of modern philosophy.

Ismail Faruqi's work known under the rubric of "Islamization of knowledge" is a good example of how the idea of method or methodology ("manhaj" and "manhajiyyah", the Arabic equivalents of method and methodology, which are the most popular words of the proponents of this view) can obscure deeper philosophical issues involved in the current discussions of science. Even though Faruqi's project was proposed to Islamize the existing forms of knowledge imported from the West, his focus was exclusively on the humanities, leaving scientific knowledge virtually untouched. This was probably due to his conviction that the body of knowledge generated by modern natural sciences is neutral and as such requires no special attention. Thus, Faruqi's work and that of IIIT after his death concentrated on the social sciences and education.[28] This had two important consequences. First, Faruqi's important work on Islamization provided his followers with a framework in which knowledge (*al-'ilm*) came to be equated with social disciplines, thus ending up in a kind of sociologism. The prototype of Faruqi's project is, we may say, the modern social scientist entrusted as arbiter of the traditional *'ālim*. Second, the exclusion of modern scientific knowledge from the scope of Islamization has led to negligent attitudes, to say the least, toward the secularizing effect of the modern scientific worldview.[29] This leaves the Muslim social scientists, the ideal-types of the Islamization program,

with no clue as to how to deal with the questions that modern scientific knowledge poses. Furthermore, to take the philosophical foundations of modern, natural sciences for granted is tantamount to reinforcing the dichotomy between the natural and human sciences, a dichotomy whose consequences continue to pose serious challenges to the validity of the forms of knowledge outside the domain of modern physical sciences.[30]

A similar position, with some important variations, is to be found in the works of Ziauddin Sardar and a number of closely associated scholars known as the "ijmalis". Although the ijmalis do not accept the appellation of being "merely Kuhnian", one can hardly fail to see the subtext of their discourse – based on Kuhn, Feyerabend, and others – in their critique of modern Western science.[31] Sardar's definition of science shares much of the instrumentalist and anti-realist spirit of the Kuhnian definition of science. For him, science is "a basic problem-solving tool of any civilization. Without it, a civilization cannot maintain its political and social structure or meet the basic needs of its people and culture".[32] The ijmalis' socio-cultural point of view certainly points to an important component of scientific activity, viz. the social setting in which the sciences are cultivated and flourish. It should be noted, however, that the relegation of physical sciences, or any scholarly activity for that matter, to social utility is bound to have serious consequences insofar as the philosophical legitimacy of the sciences is concerned. As we see in the case of Van Fraassen and Kuhn, the instrumentalist definition of science entails a strong leaning towards anti-realism, a position whose compatibility with the concept of Islamic science is yet to be accounted for.

Yet, there is another paradox involved here. The most common critique of modern science has been to present it as a culturally conditioned and historical endeavor with claims to universality and objectivity. Kuhn's philosophy of paradigm, which has become the single most fashionable buzz word in the Islamic world, Feyerabend's defense of society against science, and Van Fraassen's scientific instrumentalism are all used profusely to show the utter historicity and

relativity of modern science. Since every scientific and, by extension, human activity is embedded in a historical and cultural setting, we can no longer speak of the sciences in isolation from their socio-historical conditions. This implies that no account of science, be it Western or Islamic, is possible without the history and – more importantly – sociology of science, the task of which is to deconstruct the historical formation and genealogy of the sciences. Furthermore, this approach has been applied to the humanities with almost total disregard to the implications for what is proposed in its place, i.e. Islamic science and methodology.

At this point, philosophy of science becomes identical with sociology of science and any appeal to universal validity and objectivity for the physical sciences is rejected on the basis of their utter historicity, ideology, cultural bias, and so on. Even though these terms are used as household terms by many Muslims writing and thinking about modern science, they rarely appear in their defense of Islamic science, which is proposed as an alternative to the Western conceptions of science. If science is culture-specific with no right to universal applicability, as the advocates of this view seem to imply, then this has to be true for all scientific activity whether it takes place in 11th century Samarqand or 20th century Sweden. This is what is so clearly stated and intended by all the major expositors of the philosophy of science. If modern secular science is culturally and historically constructed, then Islamic science – as understood by this group of scholars – has to explain how and why it is entitled to universal validity and applicability. It would be short of logical consistency to say that Kuhn's language of paradigms is an adequate tool to explain the history of Western but not Islamic science.

What I have called the epistemic view of science, which has taken the form of an extremely common tendency rather than a single school of thought, has certainly raised the consciousness of the Islamic world about modern science and contributed to the ongoing discussion of the possibility of having a scientific study of nature based on an Islamic ethos. However, we can hardly fail to see the contradictions in

this point of view, especially when it is most vulnerable to the temptations of modern epistemology. The emphasis put on epistemology to the point of excluding ontology and metaphysics has grave consequences for any notion of science, and it is for this reason that we do not see any serious study of philosophy, metaphysics, or cosmology among the followers of this point of view. Furthermore, there is a deliberate resistance to these disciplines in spite of the fact that traditional Islamic philosophy and metaphysics had functioned as a gateway between scientific knowledge and religious faith. At any rate, it remains to be seen whether or not the adherents of the epistemic view of science will be able to overcome the subjectivist fallacy of modern philosophy, i.e. building an epistemology without articulating an adequate metaphysics and ontology.

The Sacred versus the Secular: The Metaphysics of Science

The last major position on science, of which we can give here only a brief summary, is marked off from the other two positions by its emphasis on metaphysics and the philosophical critique of modern science. Represented chiefly, *inter alia*, by such thinkers as Rene Guenon, Seyyed Hossein Nasr, Naquib al-Attas, Osman Bakar, Mahdi Golshani and Alparslan Acikgenc, the metaphysical view of science considers every scientific activity operating within a framework of metaphysics whose principles are derived from the immutable teachings of Divine revelation. In contrast to philosophy and sociology of science, metaphysics of science provides the sciences with a sacred concept of nature and cosmology within which to function.[33] At this point, the sacred view of nature taught by religions and ancient traditions takes on a prime importance in the formation and operation of physical sciences and all of the traditional sciences. Regardless of the historical and geographic settings the sciences were cultivated in, they were based on principles that enabled them to produce highly advanced scientific disciplines and techniques while maintaining the

sacredness of nature and the cosmos. The traditional natural sciences, Nasr and others argue, derived not only their work-ethics and methodology but also metaphysical and ontological *raison d'etre* from the principles of Divine revelation because they were rooted in a conception of knowledge according to which the knowledge of the world acquired by man and the sacred knowledge revealed by God were seen as a single unity. As a result, the epistemological crisis of the natural and human sciences – that we try to overcome today – did not arise for the traditional scientist who did not have to sacrifice his religious beliefs in order to carry out a scientific experiment, and vise versa.

Traditional, western metaphysics claims that reality is a multi-layered structure with different levels and degrees of meaning. The polarity between the Principle and Its manifestation, which is translated into the language of theology as God and His creation, gives rise to a hierarchic view of the universe because manifestation already implies a domain of reality lower than its sustaining origin. Moreover, since reality is what it is due to the Divine nature it cannot be seen as a play-thing or the product of a series of fortuitous events. On the contrary, the cosmos, as the traditional scientists firmly believed, is teleological throughout, displaying a remarkable order and purposiveness. Nature, depicted by modern science as a ceaseless flow of change and contingency, never fails to restore itself into an abode of permanence and continuity with the preservation of species and self-generation.[34] Seen under this light, nature, which is the subject matter of the physical sciences, cannot be reduced to any one of these levels. With reductionism out, the traditional metaphysics of science uses a language built upon such key terms as hierarchy, *telos*, interconnectedness, isomorphism, unity, and complexity. These qualities are built into the very structure and methodology of traditional sciences of nature, which can be taken to be one of the demarcation lines between the sacred and modern secular views of science.[35] It is therefore impossible, the proponents of this view would insist, to create or resuscitate the traditional Islamic sciences of nature

without first articulating its metaphysical framework. Any attempt to graft Islamic ethics and epistemology to the metaphysically blind outlook of modern science is bound to be a failure.

The philosophical underpinnings of Islamic science, as defined by Nasr, Attas, and others are derived from the metaphysical principles of Islam. Just as the Islamic revelation determines the social and artistic life of Muslim civilization, it also gives direction to its understanding of the natural environment and its scientific study.[36] The doctrine of *tawḥīd*, the most essential tenet of Islamic religion, affirms the unity of the Divine Principle and it is projected into the domain of the natural sciences as the essential unity and interrelatedness of the natural order. A science can thus be defined as Islamic, Acikgenc states, to the extent that it conforms to and reflects the cardinal principles of the Islamic worldview.[37] In a similar way, Nasr insists that "the aim of all the Islamic sciences – and more generally speaking, of all the medieval and ancient cosmological sciences – is to show the unity and interrelatedness of all that exists, so that, in contemplating the unity of the cosmos, man may be led to the unity of the Divine Principle, of which the unity of Nature is the image".[38] Thus the Islamic sciences of nature function in a two-fold way. First, they look at nature as a single unity with all of its parts interconnected to each other. Second, they are meant to lead both the scientist and the layman to the contemplation of Nature as the sacred artifact of the Divine. For Nasr, the sacred cosmology of the Sufis, which is grounded in metaphysics and inspiration rather than physical sciences per se, is related to the second function of the sciences of nature, and maintains its validity even today because it is based on the symbolic significance of the cosmos. This brings us to the other important feature of the Islamic sciences of nature, i.e. their intellectual function.

Nasr uses the word "intellect" in its traditional sense, viz. as related to contemplation. The modern connotation of the words "intellect" and "intellectual" as logical analysis or discursive thinking is the result of the emptying of their metaphysical and mystical

content. Having rejected the usage of the word "intellect" as abstract analysis or sentimentality, Nasr seeks to regain its medieval and traditional usage.

> 'Intellect' and 'intellectual' are so closely identified today with the analytical function of the mind that they hardly bear any longer any relation to the contemplative. The attitude these words imply toward Nature is the one that Goethe was to deplore as late as the early nineteenth century – that attitude that resolves, conquers, and dominates by force of concepts. It is, in short, essentially abstract, while contemplative knowledge is at bottom concrete. We shall thus have to say, by way of establishing the old distinction, that the gnostic's relation to Nature is 'intellective', which is neither abstract, nor analytical, nor merely sentimental.[39]

Defined as such, the Islamic sciences of nature do not lend themselves to being a means of gaining power and domination over nature. Their contemplative aspect, rooted in the Qur'ānic teachings of nature as well as in traditional cosmologies, ties them to metaphysics on the one hand, and to art on the other.

By the same token, the function of philosophy cannot be confined to being a mere interpreter of the data produced by natural sciences. In sharp contrast to the Kantian notion of philosophy, which has turned philosophy into a handmaid of Newtonian physics, Nasr gives to philosophy an important role in establishing a harmonious relation between the givens of religion and the demands of scientific investigation. In the post-Kantian period, philosophy was gradually reduced to a second-order analysis of the first-order facts of physical sciences, and this assigned the philosophical pursuit to a completely different task. In contrast to this new mission, Nasr insists on the traditional meaning and function of philosophy. On the one hand philosophy is related to the life-world in which we live, including the physical environment, and as such it cannot remain indifferent to a veritable understanding of the universe and the cosmos. On the other hand it is closely related to metaphysics and wisdom and as such

cannot be reduced to a branch of physical sciences. In fact, this is how the relationship between philosophy and science was established in classical classifications of knowledge both in the West and the Islamic world. The scientist and the philosopher were united in one and the same person, as we see in the case of an Aristotle or Ibn Sīnā, and this suggests that the scope of philosophical thinking could not be relegated to quantitative analyses of natural sciences. Thus, in Nasr's concept of science, philosophy – in addition to metaphysics and aesthetics – plays a crucial role that cannot be substituted by any other science.[40] Moreover, the sciences of nature always function within a definite framework of ontology and cosmology, which is articulated primarily and essentially by philosophy in the traditional sense of the term. This is why philosophy is an integral part of Nasr's metaphysical concept of science.

The metaphysical view of traditional civilizations concerning nature and its scientific study has been lost in modern science, whose philosophical foundations go back to the historical rupture of Western thought with its traditional teachings. The rise of modern science, Nasr and others would insist, was not simply due to some ground-breaking advancements in scientific methods of measurement and calculation.[41] On the contrary, it was the result of a fundamental change in human outlook concerning the universe.[42] This outlook is predicated by a number of premises, among which the following five are of particular significance. The first is the *secular view of the universe*, which allows no space for the Divine in the order of nature. The second is the *mechanistic world-picture* presented by modern science, which construes the cosmos as a self-subsisting machine and/or a pre-ordained clock. The third is the *epistemological hegemony of rationalism and empiricism* over the current conceptions of nature. The fourth is the *Cartesian bifurcation*, based on Descartes' categorical distinction between *res cogitans* and *res extensa*, which can also be read as the ontological alienation of the knowing subject from his or her object of knowledge. The fifth and the final premise of the modern scientific worldview, which can be seen as the end-result of the preceding points, is the

exploitation of the natural environment as a source of global power and domination.[43] This is coupled with the hubris of modern science, which does not accept any notion of truth and knowledge other than that which is verifiable within the context of its highly specialized, technical, and hence restricted means of verification.

The metaphysical view of science, which points to an interesting shift from the philosophy to the metaphysics of science, takes aim at the intellectual foundations of modern science and, unlike the other two views of science, proposes a well-defined philosophy of nature and cosmology based on the principles of traditional Islamic sciences. Its critique of modern science is not confined to ethical considerations or methodological amendments as it claims to restore the religious view of the universe. In this regard, the metaphysical view of science, as formulated by Nasr and others, is part of the larger project of deconstructing the modernist worldview of which science is considered to be only an offshoot.

Conclusion

The three views of science presented here testify to the vibrancy of the ongoing debate over science in the present world of Islam. Needless to say, there are many aspects to this debate, and many borderline cases and crisscrossings have to be admitted as part of the continuous struggle of the Muslim world to come to terms with the problem of science both in its traditional-Islamic and modern Western senses. It is nevertheless certain that the growing awareness of the Islamic world concerning its scientific tradition, on the one hand, and the ways in which it tries to cope with the challenges of modern Western science, on the other, are among the momentous events of the history of contemporary Islam. The kind of interaction that will play out between the three positions analyzed above remains to be seen. Be that as it may, the future course of the debate on science in the Islamic world is

more than likely to be shaped by these positions with all of their ambitions and promises.

Notes

[1] Among those who were sent to Europe as the reconnoiterer of the Islamic world was Yirmisekiz Mehmet Çelebi (Chalabi). He arrived at Paris as the Ottoman ambassador in 1720 and became one of the first Ottomans to give a first-hand report of "modern" Europe, especially France. When compared with the accounts of earlier Muslim travelers to Europe, such as that of Evliya Çelebi, his reports and letters show in an unequivocal way the psychology of the 18th century: a proud Muslim soul torn between the glory of his history and the mind-boggling advancement of the "afranj", the infidels of Europe. Mehmet Çelebi's reports published under the title of *Sefāretnāme* became a small genre of its own to be followed by later Ottoman envoys to Europe. His *Sefāretnāme* has also been translated into French by Julien Galland as *Relation de l'embassade de Mehmet Effendi a la cour de France en 1721 ecrite par lui meme et traduit par Julien Galland* (Constantinople and Paris, 1757). For a brief account on Mehmet Çelebi in English, see Bernard Lewis, *The Muslim Discovery of Europe* (New York: W.W. Norton & Company, 1982), 114-116.

[2] See, among others: Lewis, *The Muslim Discovery of Europe*, 221-238; and H.A.R. Gibb and Harold Bowen (eds), vol 1, parts 1 and 2 of *Islamic Society and the West: A Study of the Impact of Western Civilization on Moslem Culture in the Near East* (Oxford: Oxford University Press, 1957).

[3] G. E. Von Grunebaum, *Modern Islam: The Search for Cultural Identity* (Connecticut: Greenwood Press, 1962), 103-111.

[4] *Atatürk'ün Söylev ve Demeçleri* (Ankara, 1952), II, 44, from a speech given in October 27, 1922; quoted in Von Grunebaum, *Modern Islam*, 104.

[5] Although the most celebrated responses to Rénan belong to J. Afghānī and N. Kemāl, a number of other refutations have been written. The Turkish scholar Dücane Cündioglu lists 12 major refutations, 10 of which are by Muslims, and the list comprises such names as Sayyid Amir Ali, Rashīd Riḍā, Celal Nuri, Louis Massignon, and Muhammad Hamidullah. For an excellent survey of the subject, see Ducane Cundioglu, "Ernest Renan ve 'Reddiyeler' Baglaminda Islam-Bilim Tartişmalarina Bibliyografik Bir Katki", in vol. 2, *Dīvān* (Istanbul, 1996), 1-94.

[6] The full text of Afghānī's rebuttal "Refutation of the Materialists" is translated by Nikki R. Keddie in *An Islamic Response to Imperialism, Political and Religious Writings of Sayyid Jamal al-Din al-Afghani* (Berkeley: University of California Press, 1983), 130-174.

[7] Namik Kemāl's *Defense* has been published in Turkish many times. For a brief account of his political thought in general and apology in particular, see Şerif Mardin, *The Genesis of Young Ottoman Thought: A Study in the Modernization of Turkish Political Ideas* (Syracuse: Syracuse University Press, 2000; originally published in 1962), 283-336.

[8] For the radical positivism of Shumayyil and ʿAntūn, see Albert Hourani, *Arabic Thought in the Liberal Age: 1798-1939* (Cambridge: Cambridge University Press, 1993), 245-259; Hisham Sharabi, *Arab Intellectuals and the West: The Formative Years 1875-1941* (Washington DC: The Johns Hopkins Press, 1970). See also Osman Bakar's "Muslim Intellectual Responses to Modern Science" in his *Tawhid and Science: Essays on the History and Philosophy of Islamic Science* (Kuala Lumpur: Secretariat for Islamic Philosophy and Science, 1991), 205-207.

[9] Turkey is a case in point. The growing literature on the philosophy of science in Turkish, with translations from European languages and indigenous contributions of Turkish scholars, is far beyond the other Islamic languages both in quality and quantity. Interestingly enough, the Muslim intellectuals have been more vocal in this debate, carrying the heritage of the Islamic sciences of nature into the very center of the current discourse on science. In addition to philosophical discussions, there is now serious work done on the history of Islamic and especially Ottoman science, which was begun some years back under the direction of Ekmeleddin Īhsanoglu, head of the department of the history of Ottoman science at the University of Istanbul.

[10] See the remarks of the Nobel laureate Abdus Salam in C.H. Lai, ed., *Ideals and Realities: Selected Essays of Abdus Salam* (Singapore: World Scientific, 1987).

[11] Osman Amin, one of the prominent figures of the Egyptian intellectual scene of the last century and perhaps the most outspoken vanguard of the 19th century Islamic modernism represented by Afghānī, ʿAbduh, and ʿAbd al-Rāziq, interprets ʿAbduh's vision of modern science as a veritable attempt to revive the traditional concept of knowledge (*ʿilm*). He has the following to say: "Islam has been accused of being hostile to the development of science and culture. For ʿAbduh there is nothing more false than such hasty or partial judgements. In the search for truth, Islam prescribes reasons [sic.], condemns blind imitation and blames those who attach themselves without discernment to the habits and opinions of their forefathers. How then can Islam, based on the requirements of human nature and reason, and itself urging its faithful to seek, and reason to develop their knowledge and to perfect their understanding–how can such a faith be incapable of satisfying the demands of science and culture? ... Did not the Prophet of Islam say: 'Seek to learn science even though you have to find it in China'. ... undoubtedly the religion which declared that 'the ink of a scholar is as precious as the blood of martyrs' cannot be accused of obscurantism in its essential nature". Osman Amin, *Lights on Contemporary Moslem Philosophy* (The Renaissance Bookshop: Cairo, 1958), 140-141; cf. 105-106.

[12] Afghānī's "Letter to Rénan", first published in *Journal de Débats* (May 18, 1883), translated in Kiddie, *An Islamic Response to Imperialism*, 183.

[13] Afghānī, "Lecture on Teaching and Learning" in Keddie, *An Islamic Response to Imperialism*, 107.

[14] Perhaps the most notable exception, albeit in a rather negative sense, was Sayyid Aḥmad Khān who had called for the complete rejection of the traditional notions of nature under the name of "new theology" (*'ilm-i kalām-i jadīd*). Afghānī was well aware of the perils of this point of view and thus did not hesitate to include Ahmad Khān among the "materialists", whom he called "neicheri", namely the naturalists. For Afghānī's response see his "The Materialists in India" in *al-'Urwa al-Wuthqā'* (August 28, 1884), translated in Keddie, *An Islamic Response to Imperialism*, 175-180.

[15] In one of his famous aphorisms, Nursi stresses the importance of the unity of the heart and reason for the future of humanity. But he qualifies reason (*akil, 'aql* in Arabic) as "the sciences of modern civilization" (*fünūn-u medeniye*): "The light of the heart (*vicdan, wijdān* in Arabic) are the religious sciences whereas the light of reason are the modern sciences. The truth emerges out of the blend of the two. When they are separated, the former causes dogmatism and the latter deception and suspicion", in Said Nursi, *Münāzarāt* (Istanbul: Tenvir Nesriyat, 1978), 81.

[16] Nursi's works, especially the *Sözler* (Istanbul: Sinan Matbaasi, 1958), are replete with references to God as the Great or Absolute Artisan (*sāni-i mutlak*) of the universe. It goes without saying that Nursi was not alone in approaching the deterministic and orderly universe of modern science from this peculiar point of view. In fact, this was a common attitude among the forerunners of what is called the "scientific method of commenting upon the Qur'ān" (*al-tafsīr al-'ilmī* and/or *al-tafsīr al-fannī*) such as Muḥammad 'Abduh, Muḥammad ibn Aḥmad al-Iskandarānī, Sayyid Abd al-Raḥman al-Kawākibī, and Muḥammad 'Abdullah Draz. Like Nursi, these figures were passionately engaged in reconciling the scientific findings of 19th century physical sciences with the cosmological verses of the Qur'ān and, in some cases, the sayings (*ḥadith*) of the Prophet of Islam. For these figures and the concept of scientific commentary, see Ahmad Umar Abu Hijr, *al-Tafsīr al-'Ilmī li'l-Qur'ān fi'l-Mīzān* (Beirut, 1991), and Muḥammad Ḥusayn al-Dhahabi, *al-Tafsīr wa'l-Mufassirūn*, 2 vols (Beirut, 1976).

[17] Şerif Mardin, *Religion and Social Change in Turkey: The Case of Bediuzzaman Said Nursi* (New York: SUNY Press, 1989), 214. Mardin also makes interesting remarks concerning Nursi's ambivalent relation to Sufi cosmology represented especially by Ibn Arabi in Mardin, *Religion and Social Change*, 203-212.

[18] Without exception, all of Nursi's followers appeal to the first view, rejecting any association with positivism. For a defense of this position, see, among others, Yamine B. Mermer, "The Hermeneutical Dimension of Science: A Critical Analysis Based on Said Nursi's *Risale-i Nur*", in *The Muslim World* vol. LXXXIX, Nos. 3-4

(July-October, 1999): 270-296. Mermer's essay is also interesting for making a case for occasionalism on the basis of Nursi's views.

[19] I am grateful to Drs. Ali Mermer and Yamine B. Mermer for drawing my attention to this incongruity, which should perhaps be more emphasized than I can do here. I will be dealing with Nursi's position on science in full detail in a separate study.

[20] The ambiguity, for want of a better term, of Nursi's position on modern science is illustrated by an interesting incident which Nursi narrates in his *Kastamonu Lâhikasi* (Ankara: Dogus Matbaasi, 1958), p. 179. According to the story, a Naqshibandi darwish, a member of the Naqshibandiyyah order, had read a section of the Risâle-i Nûr on the meaning of 'ism-i Hakem (the Divine name of the Arbiter) dealing with the sun and the solar system, and concluded that "these works [i.e. the *Risaleler*] deal with scientific matters just like the scientists and cosmographers". In response to this "delusion" (*vehim*), Nursi had the same treatise read to him in his presence, upon which the darwish admitted his misunderstanding. This incident is narrated by Nursi, we may presume, as a preemptive act to separate Nursi's "scientific exegesis" from the method of modern physical sciences.

[21] Nursi, *Sözler* (Istanbul: Sinan Matbaasi, 1958), p. 265; and *Ishârât al-i'jâz fi mazânni'l-ijâz* (Istanbul: Sinan Matbaasi 1994), p. 311.

[22] Nursi, *Sözler*, 266.

[23] Ibid., 263; cf. *Sikke-i Tasdik-i Gaybî* (Istanbul: Sinan Matbaasi 1958), p. 76.

[24] Nursi, *Sözler*, 272-273; Nursi, *Isharat*, 310.

[25] Heidegger makes his case in two of his famous essays "The Question Concerning Technology", and "The Age of the World Picture". These essays have been published in *The Question Concerning Technology and Other Essays*, trans. William Lowitt (New York: Harper Colophon Books, 1977). See also, in the same collection of essays, his "Science and Reflection", 155-182.

[26] Charles Taylor puts it in the following way: "Is the expression which makes us human essentially a self-expression, in that we are mainly responding to our way of feeling/experiencing the world, and bringing this to expression? Or are we responding to the reality in which we are set, in which we are included of course, but which is not reducible to our experience of it?". See Charles Taylor, *Human Agency and Language: Philosophical Papers*, vol. 1 (Cambridge: Cambridge University Press, 1985), 238.

[27] Heidegger calls this "projection", through which the world of nature is made the subject-matter of mathematico-physical sciences: "What is decisive for its development [viz. the development of mathematical physics] does not lie in its rather high esteem for the observation of 'facts', nor in its 'application' of mathematics in determining the character of normal processes; it lies rather in the way in which Nature herself is mathematically projected. In this projection, something constantly present-at-hand (matter) is uncovered beforehand, and the horizon is opened so that one may be guided by looking at those constitutive items