

Reviews on Religion and Science around the World

with Nidhal Guessoum, "Islam and Science: The Next Phase of the Debates"; and Anindita Niyogi Balslev, "Science-Religion Samvada' and the Indian Cultural Heritage."

ISLAM AND SCIENCE: THE NEXT PHASE OF DEBATES

by Nidhal Guessoum

Abstract. This article reviews the new developments that have occurred in the past ten to fifteen years in the field of Islam and science: (1) the emergence of a "new generation" of thinkers, Muslim scientists who accept modern science's fundamental methodology, theories, and results, and try to find ways to "harmonize" it with Islam; and (2) the exponential increase in the popularity of the *I'jaz 'Ilmiy* "theory," the "miraculous scientific content of the Qur'an" (and, some say, the Hadith) as well as the continuation of the traditionalist school (Iqbal and others, following Nasr) among a section of the Muslim intelligentsia. The author then focuses on the next phase of issues, that is the "challenges" that this "new generation" must address, including the integration of methodological naturalism and evolution (biological and human) in the Islamic worldview, and positions to adopt regarding divine action and miracles. The author also mentions "educational and social issues" where Islam and science interface, and concludes with "the way forward."

Keywords: divine action; evolution; Islam; miracles; methodological naturalism; science

"ISLAM AND SCIENCE" YESTERDAY AND TODAY

The seventies and eighties of the last century witnessed a vigorous, rich, fascinating, and at times entertaining debate on the relationship between Islam and modern science. The protagonists covered a wide spectrum of schools of thought, from perennialist philosophy (Seyyed Hossein Nasr) to secular modernism (Pervez Hoodbhoy), to Islamic ethical science (Zi-uddin Sardar and the Ijmalis), universalist science (Muhammad Abdus Salam), and the Islamization of knowledge (Ismail R. Al-Faruqi and Seyyed Naquib Al-Attas). The thinkers and the nodes of the debates spanned the

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globe, from Malaysia and Pakistan to the United Kingdom and the United States, in an era before email and the Internet existed and mass media was not yet globalized.

But oh what debates they produced through books and articles! The nature and philosophy of knowledge (in general) and modern science (in particular) were dissected with various tools, ranging from Qur'anic exegesis to postmodernism, including most notably the history and philosophy of science and what one might call "Islamic epistemology(ies)." New intellectual programs (e.g., Islamization) and projects (the Ijmali project) and renewed worldviews (sacred science, modernity, etc.) were put forth and debated ad infinitum.

By the early nineties, however, the debates subsided and essentially died down, partly due to events related to the protagonists themselves (Al-Faruqi was killed, the Ijmalis disbanded, others turned to different projects) and partly due to world events (the end of the Cold War, the first Gulf War, globalization, etc.). A few lone great voices appeared in the wilderness, most notably Mehdi Golshani (1986, 1998) and Muzaffar Iqbal (2003a, 2007), but found little echo and interest, neither from the elite nor the general public. For the past twenty years, Iqbal has carried the torch of the "traditionalist" school (2003b, 2005, 2006a, 2006b), starting with a passionate lament on the cultural and intellectual state of the Muslim nation (deeming it still unable to break free from the colonial mindset) and gradually adopting the "sacred science" philosophy of Nasr and his perennialist school (Nasr & Iqbal 2007, 2010). Nowadays, through his regular writings (mostly in his own quarterly journal *Islam and Science*) Iqbal represents a recurring critique of "modernity," at least with regard to the Islamic world, and a continuous appeal to Muslims to go back to their identity, roots, and tradition, in terms of knowledge, education, social-economic-political settings, and so on (Iqbal 2010, 2011).

The new millennium has witnessed an interesting development in the discourse on Islam and science. Stefano Bigliardi, who has spent the past several years scrutinizing the Islam and science discourse, has characterized this new development as the emergence of a "new generation" of thinkers on the subject: Mehdi Golshani, Basil Altaie, Bruno Abd-al-Haqq Guiderdoni, and Nidhal Guessoum (Bigliardi 2011; 2014a; 2014b; 2014c). As Bigliardi himself has noted, this list is not exhaustive or exclusive; indeed, one may readily add to it Usama Hasan (who fully fits the criteria—see below), and perhaps also Rana Dajani, Jamal Mimouni, and others.

This "new generation," which Bigliardi also describes as "harmonizers of Islam and science," is, according to him, defined by the following main features (Bigliardi 2014a): (1) interdisciplinary competence and intercultural education, including the ability to address the subject from the solid basis of competence as practicing scientists; (2) constant appeal to philosophical traditions, both Islamic and non-Islamic; and (3) a "culturally pluralistic

approach toward other religious and cultural traditions.” Bigliardi identifies some challenges that this “new generation” must address, and I shall come back to those.

What is most interesting to note is that Bigliardi originally conducted lengthy and in-depth interviews with six Muslim authors for his monograph *Islam and the Quest for Modern Science* (2014a), but he chose to exclude two (Zaghoul El-Naggar and Adnan Oktar, the latter also known as Harun Yahya) from his definition of “new generation,” not because of age (both Golshani and Altaie are older than Oktar) but because of their views and positions with regard to modern science (particularly the theory of evolution) and their insistence that the Qur’an contains “precise scientific content” that preceded its discovery by fourteen centuries. We are thus left with the Muslim thinkers who accept modern science with its methodologies and results and are only interested in “harmonizing” it with Islam.

Bigliardi thus appears to have concluded that this (un-networked) school of “harmonization” of Islam and science is the only (or at least most) relevant one for today and tomorrow.

Furthermore, even the staunch critics of the concept of bridging Islam and modern science in any way— Pervez Hoodbhoy (2007) to some extent and Taner Edis (2007) most notably— seem to find no serious cause for alarm against this new approach, simply a philosophical disagreement with the theistic standpoint of these “harmonizers” (Edis 2014). Bigliardi (2014a) notes that the “new generation” can be considered as “vaccinated against some of the shortcomings” that had plagued the positions of the great protagonists (Nasr and others) of the previous generation; in fact, he considers the new harmonizers and the anti-harmonizers (Edis and Hoodbhoy) to now have common adversaries, the advocates of an Islamic reshaping of modern science and the proponents of a presumed “miraculous scientific content in the Qur’an.” Edis considers all such bridging approaches as a continuation of the general Islamic attempts to maintain “an illusion of harmony,” and while he notes that the “new generation” of thinkers are “too aware of the details of science to commit themselves to clearly mistaken alternatives to mainstream science such as creationism,” he is unhappy that “they are also convinced that there is something wrong with the materialist character they perceive in modern science” (Edis 2014).

But before we pursue this new development and trace future avenues and agendas for it, we need to examine what has happened to the other trends of “Islam and science,” namely the traditionalist school, the *I’jaz* approach (“miraculous scientific content of the Qur’an” and, some add, of the Sunna), and the Islamization proposal.

As I have noted, the traditionalist school, which used to be led by Seyyed Hossein Nasr, is now mainly carried forward by Muzaffar Iqbal, but one can regularly find articles in the same vein by new or infrequent authors.

The school seems to have lost the ability to fascinate that its previous charismatic and eloquent leader, Nasr, projected. Many highly educated Muslims, strongly anchored in the Qur'an as a miraculous divine text, hope to see all knowledge under the command and control of the Holy Book and long for a bygone era when science constituted no challenge to Islam, whether factually or philosophically. The traditionalist school appeals to them emotionally, giving them hope that the Qur'an's supremacy and Islam's dominance can be brought back.

The *I'jaz* discourse is alive and well, particularly in the Arab world where it originated (several decades ago) and has been strongly active for almost half a century (see Guessoum 2011, 141–65, for a detailed investigation), and now it has spread beyond it to Turkey (where the Harun Yahya group has taken it up and given it a boost with its dissemination power) and to the Indo-Pakistani subcontinent (with populist speakers and preachers such as Zakir Naik).¹ Its most famous and prolific leader, however, remains Zaghoul El-Naggar. The latter told Bigliardi (2014a, 108) that he has published at least three (single-authored) encyclopedias (one of them with 12–13 volumes) and about 80 books on the subject, and that many of them have been translated into several languages. He also mentioned having taken part in hundreds of TV programs. Most importantly, he notes that he has convinced “a large number of universities in the Arab world” to offer a course on *I'jaz*, not to mention the PhD theses that he examines (Bigliardi 2014a, 128). International conferences continue to be organized on the subject, most recently in Turkey² (2011), Tunisia³ (2012), Egypt⁴ (2013), Morocco⁵ (2014), and Algeria⁶ (2014), with more to come.⁷ There are even conferences on “Miraculous Numerical Content of the Qur'an”⁸ now. We may be tempted to dismiss this school as a mixture of pseudo-science and naïve exegesis and theology, but it is unfortunately still alive and kicking in most of the Islamic world, seducing droves of highly educated and lowly educated people alike. Bigliardi does not identify this as such, but I see it as one of the important challenges of the “new generation” in the near future, at least looking internally, that is inside the house of Islam.

The Islamization of knowledge proposal fascinated Islamic intellectuals for some years after it was launched in the late 1970s and early 1980s. Indeed, a number of thinkers have laid claim to it, most notably Al-Attas and Al-Faruqi, but El-Naggar told Bigliardi that he “initiated this trend on the necessity of rewriting science from an Islamic perspective” (Bigliardi 2014a, 110). As evidence, he mentioned a paper that he presented at a conference in Riyadh in 1975, a paper which “al-Faruqi and his group in America were seriously influenced by.” In the past few decades, however, the project has largely died down and disappeared from the cultural and intellectual landscape of most of the Islamic world, except (not surprisingly) from two spots: Malaysia (Al-Attas's home country) and Washington, DC (close to

Philadelphia where Al-Faruqi lived and worked). In Malaysia, a number of universities and institutes have attempted to implement the idea, either fully or partially, such as the Universiti Sains Islam Malaysia (USIM), whose slogan is “Pioneering Islamic Science, Spearheading Knowledge.” Moreover, conferences on the Islamization of knowledge and science continue to be regularly organized in Malaysia. And near Washington, DC is the International Institute of Islamic Thought, which was founded by Al-Faruqi to carry out the Islamization program he had proposed, and which to this day has as its slogan “Towards Islamization of Knowledge and Reform of Islamic Thought.” (For a historical and conceptual review of the above “Islamic science” schools of thought, see Guessoum, 2011, 107–29.)

It is thus not obvious that the field of “Islam and science” discourse can now be equated with the “new generation” of “harmonizers.” Perhaps in terms of ideas that Western intellectuals are willing to debate, the “harmonizers” bring much reasonableness and respectability, by fully taking on board modern science as well as bringing in some philosophical understanding, but judging by popularity and dominance in the Islamic cultural and to some extent intellectual landscape, the other schools (traditionalism, Islamization, *I’jaz*) can certainly not be dismissed or forgotten.

“ISLAM AND SCIENCE”: THE NEXT PHASES OF ISSUES

In his close examination of the “new generation,” Bigliardi has identified several topics as the common key issues (what he calls “challenges”) that those thinkers must address: “more articulated interventions” regarding the compatibility of Islam with biological and human evolution; the interpretation of miracles; divine action and the role of prayers; and the necessity for the “new generation” to effectively communicate its ideas to peer scholars as well as to the general public. Additionally, for each thinker Bigliardi picks up one or two topics that need further work or clarification.

These are indeed important issues, and they need to be addressed clearly and extensively by the various thinkers, each depending on his competency on one topic or another. In some cases, such as Guessoum on evolution, lengthy treatments and interventions have been carried out. In other cases, such as the question of miracles, it is difficult to go beyond a declaration of position (e.g., “I reject the idea of ‘violation’ of any law of nature”). Let us, however, review where the debates currently stand and where they can be expected to go.

Evolution, the new battleground. Recent surveys of Muslims’ views on evolution have found significant variations among respondents (Hameed 2008; BouJaoude et al. 2011a; 2011b; Pew Report 2013), but overall the surveys show that 60–75 percent of Muslims either completely reject or

have fundamental disagreements with the idea of species having evolved from one another, especially for humans.

The compatibility between Islamic doctrine and the theory(ies) of biological and human evolution is one of the most challenging topics facing Islam today. Indeed, this issue relates to several important dimensions of today's Islamic culture: (1) the status and authority of scriptures (particularly the Qur'an) over scientific knowledge; (2) the role and place of scientific evidence in Islamic theology and Muslim culture; and (3) the principles (and consequently the content) of the education that Muslims are receiving (or should receive) today. These multiple facets of the subject not only determine how a Muslim thinker considers the acceptability of evolution but also govern the debates that have become more vigorous and frequent around the topic in recent years.

Debates have multiplied, but scholarly writings on Islam and evolution are still rather rare, and most of them, especially in the "native" languages of Muslims (Arabic, Bahasa Indonesia, Farsi, Turkish) betray either an utter lack of understanding of the scientific aspects of the question, by the traditionalists in particular, or a superficial view of Islamic dogmas and theology by some modernists and secularists. Very few well-informed, insightful, and coherent articles can be found on the subject in those languages, and fewer books still. Moreover, a demagogic, populist tone can be read in most writings on the subject, authors considering it too controversial and touchy for any views to be expressed on it other than what the public has always heard, namely that evolution is an atheistic "theory" that is far from scientifically solid and clearly opposes well-known tenets of the Islamic creed and must thus simply be rejected and ignored. A few scholars, however, have tackled the issue seriously on theological grounds.

There are indeed obvious theological implications to Darwin's theory of evolution and to the scientific evidence that has been collected on human evolution during the past several decades. The general theological implications were realized as soon as Darwin published his historic book (in 1859), and they became even more pressing when scientists understood the mechanisms of evolution (assuming they are more or less established, with random mutations playing a central role) and the evidence for biological and human evolution (thousands, perhaps millions, of species have gone extinct in the long history of life; close genetic resemblance between humans, apes, and other animals; etc.).

To my knowledge, the only detailed treatment of the subject by the "new generation" thinkers is the long chapter on Islam and biological and human evolution in Guessoum's *Islam's Quantum Question* (2011), plus an upcoming review article on "Islamic Theological Views on Darwinian Evolution." Other members of this "new generation" have expressed views on evolution rather succinctly.

Altaie refers to the Qur'an both in accepting the facts of evolution (including for humans) and in rejecting the randomness of mutations that the standard theory is built upon. He also rejects Intelligent Design, but he adopts the anti-evolutionists' argument that random mutations would not produce the extraordinary organisms that we observe in nature, giving the eye and the chromosome as examples (Bigliardi 2014a, 79). Also, when challenged (Bigliardi 2014a, 91) about the famous hadith which describes Adam as having been 60 cubits (30 meters) tall, Altaie admits not knowing whether science has ruled that out (it certainly has, both from the fossil record and from simple biophysical arguments) and states that the hadith would have to be deemed false if science contradicts it. To alleviate Muslims' and other believers' concerns about the random aspects of evolution, I should also point out that Elliott Sober, a (non-believing) philosopher of biology has argued that evolutionary theory, including random mutations, does not exclude God-guided scenarios; he wrote: "what biologists mean, or ought to mean, when they say that mutations are unguided says nothing about whether God ever causes a mutation to occur." To make things very clear, he adds, in conclusion: "Atheists who think that evolutionary theory provides the beginning of an argument for disbelieving in God should make it clear that their arguments depend on additional [philosophical] premises that are not vouchsafed by scientific theory or data" (Sober 2014).

Golshani acknowledges that Islam (more specifically the Qur'an) does not necessarily reject evolution "with certainty," but he deplores the biologists' closed-mindedness and unwillingness to address the critiques of "the so-called creationists and the proponents of [I]ntelligent [D]esign," who "have not always fought the evolutionists properly" (Bigliardi 2014a, 62–63). Most acutely, Golshani highlights the (deliberate) infusion of atheism into the Darwinian paradigm, which leads to a confusion, particularly in the West.

Finally, Guiderdoni fully accepts evolution, which he sees as a beautiful scenario of a changing world constantly being recreated, including the random mutations scheme, though he also considers as possible the idea that biological forms were preset in the cosmic blueprint. He adopts the "theistic evolution" standpoint, as "all causal chains ultimately come from God," thus "it is just a way in which God is acting in nature" (Bigliardi 2014a, 148). He too deplores the materialistic overtones that are often imposed upon the evolutionary paradigm.

It thus becomes clear that not all the "new generation" thinkers have expressed equally clear and robust views on evolution. Some still carry some misunderstandings; others focus more on the distinction to be made between the science of evolution and the philosophical interpretations that are made here or there; few have explored the theological implications. For instance, instead of the largely rebutted idea of random mutations not being capable of producing the design we see around us and in ourselves,

Altaie would more fruitfully explore what randomness might mean for the concept of creation, indeterminacy in nature, and so on, which in fact are topics that used to be central to the Kalam tradition, which is dear to him.

Methodological naturalism. The concept of methodological naturalism (MN) is a crucial and largely under appreciated pillar of modern science, one which explicitly or implicitly leads to conflicts, or at least friction and difficulties, in the “harmonization” with Islam and religion. But it is important to distinguish it from “philosophical” or “metaphysical” naturalism, which is the atheistic claim of non existence of supernatural entities altogether; and which is synonymous with and variously referred to as “philosophical materialism,” “metaphysical naturalism,” or “metaphysical materialism.” The latter is a position that many philosophers and a number of scientists adopt, but it is *not* a principle of science.

Paul Draper (2005, 279) defines the terms simply and clearly:

Methodological naturalism = df. Scientists should not appeal to supernatural entities when they explain natural phenomena.
 Metaphysical naturalism = df. Supernatural entities do not exist.

As Phil Stilwell states:

Most academics stipulate that MN, also known as scientific naturalism, does not deny the possibility of supernatural entities. . . . MN is a provisional epistemology and ontology that provides a framework upon which to do science. These parameters are merely provisional. MN does not entail philosophical naturalism, but instead entails out of pragmatics and precedent that science begin each particular inquiry with the assumption that any explanation will fall within the existing matrix of established material definitions and laws. . . . MN also implies that, if a natural explanation does not immediately emerge from the inquiry, we do not default to a declaration of a supernatural cause.” (Stilwell 2009, 229)

(See also Pigliucci 2010, 178–80; Forrest 2000).

Niles Eldredge (1982, 82) put it even more strongly: “If there is one rule that makes an idea scientific, it is that it *must* invoke naturalistic explanations for phenomena, and those explanations must be testable solely by the criteria of our five senses.” (In a famous article published in 1997, Richard Lewontin expressed the same idea strongly, for example saying “we cannot allow a Divine Foot in the door,” but his usage of “materialism” instead of “naturalism” led to misunderstandings and attacks, so we will leave his statements aside.)

Maarten Boudry and others (Boudry, Blancke, and Braeckman 2010; 2012; Fishman and Boudry 2013) have distinguished between “Intrinsic MN” (IMN) and “Provisional or Pragmatic MN” (PMN): IMN refers to the rejection of any possible supernatural phenomena and explanations (e.g., people are struck by lightning when they blaspheme). PMN keeps to

natural explanations because they have so far worked perfectly well and are in line with the principle of parsimony (why invoke supernatural agents when natural causes can explain the phenomenon?). These authors insist that science must remain open-minded and not *in principle* rule out the possibility of supernatural phenomena, thereby admitting a materialistic ideological bias; it must thus adopt only the provisional or pragmatic form of MN.

Why has methodological naturalism become a pillar of modern science? As a number of philosophers, including Massimo Pigliucci, have insisted, the main reason is pragmatism and efficacy: this approach has proved itself efficient in advancing scientific exploration and discoveries, and it is a reasonable, minimalist assumption, in accord with “Occam’s razor” or “the principle of parsimony,” by which scientists always adopt the explanation with the simplest and fewest assumptions. With this principle, it is then superfluous to call upon supernatural agents when material causes can explain the phenomenon. Indeed, during the emergence of modern science, the assumption of supernatural factors as explanations was quickly identified as a “science stopper,” an end to the explanatory process and thus a non-productive—or even counter-productive—approach for progress (progress in finding further truths about nature and devising useful applications). For example, if a doctor explains some mental disorder as the work of demons, s/he will not be able to understand the deeper brain processes at work, nor will any medication be prescribed, one which might alleviate the troubles of the patient.

Philip Clayton (1997, 172) highlights the centrality of methodological naturalism to the discussions between science and religion (most generally): “Perhaps more than anything else, the discussion between theology and science today is concerned with the presumption of naturalism; where it is not, it perhaps ought to be.” Clearly such a framework for science poses a challenge to at least some Islamic conceptions of the world and nature, given that often Muslims claim and insist that God acts physically and directly in the world, in cases of miracles or in everyday events, either at large scales (earthquakes, floods, etc.) or small, individual, personal scales (in responses to prayers, in particular). More generally, methodological naturalism keeps God “out of the picture,” looking at the world and nature as if God does not exist. This “cutting off of God’s hands” is indeed the main issue that Nasr has regularly brought forward in rejection of the current naturalistic philosophy of modern science.

Other thinkers, from Ibn Rushd to Polkinghorne and Peacocke, have insisted on the regularity that God has put in the world (God’s “faithfulness,” or “reliability,” or “consistency”), without which we cannot make predictions or have any trust in “established” knowledge.

Even opponents of methodological naturalism, most notably Alvin Plantinga, have seen in its universality an important advantage for

science (to be common to all, regardless of anyone's beliefs, and thus make much more progress). Plantinga (1996, 1997) thus advocates the adoption of "Duhemian science" (universal, naturalistic), but insists on allowing various groups to pursue science "that includes the metaphysical or religious principles specific to that group" (what he calls "Augustinian science"). In his view, evolutionary biology and "vast stretches" of human sciences fall in that domain.

None of the critics and opponents of methodological naturalism propose its full rejection. They all see it has some advantages, even as they identify its disadvantages (constraining the theistic view of the world, limiting one's pursuit of explanations, etc.). Thus Draper (2005, 296) tells us that "even William Dembski (1994, 132), a leading critic of methodological naturalism, claims that one should appeal to the supernatural only when one has good reason to believe that what he calls one's 'empirical resources' are exhausted." Draper (2005, 297–198) concludes with a proposal of "modest methodological naturalism": "scientific explanations may appeal to the supernatural only as a last resort." He adds: "Very strong reasons to believe there is no *hidden* naturalism explanation would be required as well" (*italics in the original*). To illustrate the question, Draper cites one example given by Dembski. Imagine we discover a pulsar sending us a Morse-coded message from a faraway galaxy asking us to answer a scientific question, one which we determine would require more computational power than the universe could provide, but then we receive the answer a short time later, won't we conclude that there is no natural explanation to this phenomenon? Yes, but we can see how extreme the example is by which methodological naturalism is supposed to be constrained.

This is the first area of challenge, contention, and friction between modern science and theology (Islamic, or theistic, more generally): how to reconcile a naturalistic study and explanation of the world/nature and the belief in a present or even personal God; does He act in the world, and if so, does this conflict with modern science, or does He not act (at least not physically) in the world? In my view, this is the biggest question facing the "new generation"; with it, a number of topics can be addressed, as detailed below.

Miracles. Belief in miracles constitutes one of the most contentious issues in the debates on religion, science, and modernity. They are not as fundamental to some religions as to others, but in their direct connection to the important issue of direct divine action in the world they are essential to address. Indeed, a search within academic databases produced 681 papers on one aspect or another of miracles since 2000. Recently, Isra Yazicioglu published a monograph titled *Understanding Qur'anic Miracle Stories in the Modern Age* (2013).

One must start with fundamental questions to define and delineate the concept of miracles and the extent of their manifestation. (1) Are miracles “violations of the laws of nature” or are they simply striking events that are impressive happenings that probably point to God or supernatural agents but are scientifically only improbable? (2) Do miracles occur only at the hands of prophets or do they also happen with saints and ordinary people (today)? (3) Did the prophet Muhammad perform (physical) miracles? The definition of miracles is crucial to the discussion, and we shall see in the positions of the members of the “new generation” and other thinkers a reflection of how the concept is defined.

To start the discussion, let us define miracles as “phenomena which seem to contradict nature’s laws or course” (something that would imply divine action or intervention), not phenomena which cannot be explained by science today. For example, if you let go of an object in your hand and, instead of dropping to the ground, it hangs in the air or even moves upward, the well established course of nature (here, downward motion under gravity) will have been “violated.” “Violations of the laws of nature” was David Hume’s definition of miracles, and this then led him to declare them impossible; needless to say, this reasoning has been attacked by numerous thinkers in more recent times, essentially judging it as circular thinking.

But the problem is not nearly as simple as clear phenomena that go against the course of nature. What about spontaneous remission, the sudden shrinking and disappearance of a well-developed and sometimes advanced cancerous tumor; does that contradict the course of nature? Is that a miracle? Probably not, for one may still explain it as some physical (natural) or scientific process we have yet to understand. Then what about Jesus curing a man of his blindness by simply rubbing some mud over his eyes and asking him to wash it in some water source? Does that contradict the laws of nature? Is that a miracle (as it has most often traditionally been declared)? With all of these unanswered questions, how does one then declare an event to be a miracle? This obviously is a gray area.

In September 2002, *Zygon* devoted a large section of an issue to miracles; in December 2004, a poll⁹ among 1,100 physicians in the United States found that 74 percent of them believe in miracles¹⁰; in September 2006, the French popular science magazine *Science et Vie* (known for its rationalist approach) published a special issue fully (162 pages) devoted to the question. Surprisingly enough, at least in the area of medicine, *Science et Vie* acknowledged both the existence of countless cases of unexplained (though not necessarily unexplainable) medical cases and the important, yet often downplayed, role of the mind. The magazine, however, gingerly suggested (Vaudaine 2006) several leads or investigation tracks— if not yet explanations—for the “miraculous” healings that doctors witness much more often than is usually known or admitted: (1) powers of the immune

system; (2) induction of death (apoptosis) of tumor cells; (3) the role of the mind. The immune system, in particular, seems to be the best bet for a future understanding of spontaneous remissions.

Some Christian theologians have proposed interesting ideas in addressing the question of miracles. Terence Nichols (2002) views them as events that are “consistent with, but transcend, natural processes.” He suggests two approaches for dealing with miracles: (1) the phenomenon may be an extreme, singular case of natural processes, akin to black holes (with gravity) and superconductivity (with electricity); (2) the event can only be explained by divine action/intervention, and for this he invokes either the indeterminacies of quantum mechanics or chaos theory. Nichols speculates that “in some extreme circumstances, such as the presence of great faith, the laws of nature, while not changed, behave differently from the way they do in ordinary contexts.”

Keith Ward (2002) adopts a similar position. He suggests that “laws of nature . . . are best seen not as exceptionless rules but as context-dependent realizations of natural powers.” But he leaves open the possibility that miracles may not “fall under formulable scientific laws;” he adds that “there is every reason for a theist to think that there are higher principles than laws of nature.” He concedes, however, that “it is for competent scientists in the appropriate field to say whether a given event transcends the normal operation of the laws of nature. If it does not, however statistically improbable the event may be, it is not a miracle.”

In Islam, the existence and nature of miracles is a question on which schools of thought differ. One of the most common positions declares that only the Qur’an and possibly a few events in Muhammad’s life (e.g., the Night Journey and Ascension and the famous “splitting of the Moon” “event” mentioned in one verse of the Qur’an) constitute miracles, though the latter events could be explained spiritually, allegorically, or even naturally (in the case of “Moon splitting”). Another frequent position is the belief that only prophets, being inspired, supported, and possibly empowered by God, could produce miracles, but not lay people. A third position one encounters, especially among Sufi-inclined people, is that miracles are reserved to prophets, but “saints” (*awliya*) are given “gifts” by God (*karamat*), divine largesses that allow the saint to minister largesses onto others. It should be noted, however, that saint stories abound with the most astounding unnatural events and feats that can only be defined as miracles according to our discussion above.

In modern times, several famous Muslim scholars and thinkers have adopted rationalistic or even naturalistic views with regard to miracles. Muhammad Abduh’s modernist exegesis of the Qur’an is famous for presenting naturalistic explanations for events that were often considered direct interventions by God. Shibli Nu’mani proposed scientific interpretations of miracles. Sir Seyyed Ahmad Khan is famous for having rejected miracles

(as violations of natural laws) because God has established a covenant (or “trust”) with humans by having set up laws in the entire universe. Muhammad Asad’s commentary on the Qur’an coherently included rationalistic reinterpretation of miracles.

But the question of miracles cannot be addressed without a substantial and solid reference to modern science. One must be fully cognizant of the conservation principles (energy, momentum), of the laws of thermodynamics (closed or open systems), and the like. Indeed, if a miracle involves an external (supernatural) intervention, will conservation principles and laws not be violated, starting with Newton’s first law (of inertia)? Besides causality, how is a scientist to account for that, not to mention other scientific objections to supernatural actions (see Stoeger 1995, McDermid 2008, and Larmer 2009 for opposite views on this issue).

Clearly this is far from a trivial or settled question, and Muslim theologians need to enter into dialogue with scientists, philosophers, and thinkers from various corners, in order to present coherent views on the question. Also, the Islamic heritage can be constructively tapped for instance, the old rationalist Mu‘tazzilite theology, which insists on the concept of divine laws, could be revived to help resolve this area of contention. Similarly, Altaie has found in Ghazali’s views some richness and fruitfulness that could be exploited (Bigliardi 2014a, 72–76), and it would be very useful to see those ideas unpacked (using Ghazali or other sources).

I think that one important element in the treatment of miracles must be the full consideration of the polysemy of the Text, which Ibn Rushd (and others) had (have) insisted speaks differently to people of different intellectual capabilities and different eras. Thus the idea of “real” miracles may (or must) be upheld for the commoners, while the philosophers and the scientists must ensure that causality and the laws of nature are never violated, lest we lose our ability to understand the world and to ascertain knowledge.

The other members of the “new generation” of thinkers on Islam and science have also expressed interesting views on the question of miracles.

Golshani (Bigliardi 2014a, 57–60) considers “miracles” as only specific occurrences that fall under different laws, or a combination of laws (a magnetic field cancelling out gravity and making an object float in the air, in the example he gives). There is no violation of the laws of nature. However, even though he regards “miracles” as not central to our religiosity, he does not advocate metaphorical interpretations of any of the Qur’anic miracle stories, keeping open the possibility of their being explained in the future by new knowledge about nature.

A similar view is adopted by Altaie who first insists that “God does not rule this world miraculously but according to well-defined laws” (Bigliardi 2014a, 81), but further stresses that the quantum world has shown that extraordinary events (a person going through a door without opening

it) can happen albeit exceedingly rarely. He thus considers “miracles” as extremely rare events that fall under the laws of nature, even though in some cases we may not yet have the knowledge to explain them.

Guiderdoni, having first presented the Qur’an as *the* miracle of Islam, goes on to address “miracles” in the world. He distinguishes between “divine providence,” events that are extraordinary coincidences, though they obviously violate no laws, and which Muslims consider as divine intervention (or providence), “small miracles,” so to speak, and between the events that are described in the Qur’an as apparently supernatural (e.g., a clay bird becoming alive and flying off), and which Guiderdoni tends to interpret spiritually (Bigliardi 2014a, 145–46). For instance, the famous splitting of the moon he interprets as “the splitting of the heart of the believer,” the unveiling of the secrets hidden in one’s heart on Doomsday. He concludes that “the laws of nature are constantly valid” because seeing God as an agent, an actor, simply “lowers our idea of God.”

Divine action. The question of divine action is another important topic that theologians and specialists of science–religion questions must address (though it is intimately related to the previous two): How does God act in the world—whether in extraordinary (miraculous) situations or in everyday circumstances, such as in prayers? In fact one must first ask: Does God act in the world, or does He let things work out naturally? (In principle only deists believe that God created the world and then withdrew to only observe; theists believe that God does act . . . somehow.) And if God does indeed act, does He do so only through the normal processes of nature or, at least sometimes, by some direct interventions, going beyond the laws of the universe?

Again, Draper provides two simple and clear definitions to distinguish between theistic and deistic supernaturalism in consideration of divine action or relation with/to the world:

Theistic supernaturalism (theism) = df. There exists a supernatural person who (timelessly or temporally) creates and sustains the natural world, acts in it, and is omnipotent, omniscient, and morally perfect.

Deistic supernaturalism (deism) = df. There exists a supernatural person who created the natural world but does not act in it. (Draper 2005, 280)

Furthermore Draper and others make the important distinction between “direct” and “indirect” divine acts, the former being ones where God “acts outside of the ordinary course of nature” (i.e., “without using natural causes to do so”), and the latter being ones where God “uses natural causes to bring about an effect” (Draper 2005, 281). Draper likens the latter to a “quasi-deistic God” (p. 282), but this is only if we ignore other modes of divine action, through the spirit, most particularly.

Draper also asks whether direct divine action violates a commitment to methodological naturalism (284), and his answer is that this depends on the frequency of such direct action: if God's acts are rare (e.g., limited to miracles "for the purposes of authenticating a divine message"), then no serious conflict arises between the naturalistic approach to the world (science) and theism and a belief in a God who acts (or can act). But even if such acts are rare, then the accusations of a capricious or uncaring God (why didn't He stop the Holocaust and other genocides?!) become valid (if God acts in favor of some people, e.g. His messengers, and not others, i.e., laymen).

Searching for ways by which God could act using natural causes, observers noted early on that the intrinsic indeterminism of quantum mechanics could be a doorway for God's action in nature, since one would normally assume that God (the Omniscient and Omnipotent) is able to set the outcome of the "wave function collapse process" to one particular choice among those that the physics of the situation allows. If God then can determine the outcomes of any quantum mechanical process, which will always appear indeterministic to us (according to standard Quantum Theory), then He can "steer" events in one direction or another, provided that He acts on each and every particle/atom/molecule in a "coordinated" manner. The main proponent of this approach to divine action has been Robert J. Russell (1997, 2006, 2009). Acting in this way, however, God would look too much like the infamous "God of the gaps."

The second, somewhat more fruitful proposal of physical divine action is the non linear processes that lead to chaos: tiny effects in the initial conditions of a system, whether microscopic or macroscopic, lead to hugely amplified results. Here again, since tiny interventions and changes are essentially impossible to notice, God could take such an approach for His actions, but he would still be a "God of the gaps." A perfect example of this effect would be the parting of the Red Sea by the "strong east wind" (the Bible's words). However, this would also be grounds for believing in God's intervention in natural catastrophes, which many lay people believe are God's punishing acts, a viewpoint which more liberal and humanistic people abhor.

I have elsewhere (Guessoum 2011, 338) suggested an alternative approach, one based on a computer game analogy, where the game (real life for us) can run throughout on preset values that determine the various developments, but which also allows the player to enter different values at specific points or use certain joker cards according to one's needs and wishes; such cards could at the start be given to the player (who would be born with such capacities) or be won during the game (through good deeds). Now, in our world/game, one would have to add an active element (God) who, instead of the automatized software code, would decide upon each request (e.g., prayer) whether the wish will be granted, or whether

the game shall proceed naturally. The whole game, with the preset laws, initial conditions, limitations (some wishes are by default rejected), and (inter)active parts, must be looked at together. There is then no contradiction between the laws as they continue to operate and the “interventions” which occur as part of the game.

I have also expressed my preference for another viewpoint: that God acts only on minds/spirits, whether one adopts a dualistic or a monistic conception of mind and body (see Polkinghorne 1998, 54–55). The “spirit,” which is sometimes but not always identified with the “mind,” which itself is rather abstractly defined or understood as the human “element” representing the mental processes (reasoning, perception, consciousness, etc.), is a controversial concept. The “spirit” tends to have a religious connotation, being associated with religious belief and activity, including perception of and even perhaps communication with God.

In the Islamic tradition, there is a general understanding that the spirit is *the* communication channel and connection between God and humans as well as *the* fundamental “driving force” that God infused in humans. More recently, with debates of reductionism in relation to mind and consciousness, the idea that a top-down causation from mind/spirit to the brain, leading from ideas to physical acts which carry on into nature, has become quite reasonably acceptable. George Ellis (1995) has also supported this approach, adding that top-down causation from mind/spirit to the brain could be envisioned via the afore mentioned quantum processes. And finally, Clayton (2008) has adopted and expounded upon the idea of divine action through human influence or mental causation via the spirit.

Finally, MacKay (1997) (followed by Berry 2002) has suggested an artistic (impressionistic) analogy for divine action: humans in particular (but other creatures and objects as well) would have two complementary ways of interacting, a physical one and a non material one, both being sustained by God, whom MacKay describes as more of a Cosmic Artist than a Cosmic Mechanic.

On the Muslim side, there have been very few, if any, fully argued proposals for viewing God’s action in the world.¹¹ It is indeed a very sensitive issue, and one runs the risk of diverging too much from orthodoxy and thus being labeled a heretic. One article that has tackled the subject is Abdelhakim Al-Khalifi’s “Divine Action between Necessity and Choice” (1998), which explored the views of classical philosophers (Al-Farabi and Avicenna) as well as the two main theological schools of Islam: Mu’tazilism and Ash’arism. The author contrasts the Ash’arites’ (traditional, orthodox) views that God’s action is totally free and unconstrained with the Mu’tazilites’ (rational theology) position that God’s act of creation was free (contrary to Avicenna’s view) but that God has constrained himself by being Just and Good and rewarding/punishing for following/disobeying divine directives to us to be just and good.

EDUCATIONAL AND SOCIAL ISSUES

In Bigliardi's interviews with the six Muslim thinkers (Oktar, Golshani, Altaie, El-Naggar, Guiderdoni, and Guessoum), he was mainly interested in conceptual issues (science and the Qur'an, the mutual effect between faith and science, the evolutionary view of nature, miracles and divine action, etc.), but also asked almost everyone about two issues that don't usually come up in scholarly writings on the Islam and science scene: the Golden Age and the state of science education in the Muslim world. Indeed, I have previously stressed that "Islam and Science" in the Muslim culture can be represented as a three-dimensional space: one axis being the above-mentioned conceptual issues; another axis being the historical narrative; and a third one represented by the practical, social issues where science and Islam interrelate.

The historical narrative axis may sound like just giving in to the nostalgic tendency of many Muslims to recall the "Golden Age," both to tell the world that today's "Western" science only came after centuries of glorious Islamic science and perhaps even built many of its discoveries on Islamic science, and to comfort and reassure the Muslim public that since we have been great in the past we can be great again in the future.

But as far as I am concerned, the historical dimension is important in only two ways: (1) we need to correct much misinformation that circulates within the Muslim culture both in the West and in the East about what was achieved during the "Golden Age"; and (2) we need to examine the way science was then related (or not) to Islam, whether scholars looked in the Qur'an for information and direction or not, whether they (implicitly) adopted a form of methodological naturalism, whether they understood the laws of nature (God's laws) as immutable or not (they always apply or they "usually" apply), and so on.

The first problem is exemplified in the many conferences and exhibitions that have been organized in recent years and where unfortunately either wrong claims are propagated or opportunities are missed to enlighten the public about the real scientific developments and achievements during that glorious period (Guessoum 2008; Edis and Brentjes 2012). More work needs to be done in this regard, mainly for educational reasons.

The second problem (with the philosophy of science during the "Golden Age") is rarely touched upon by Muslim scholars, though we find it raised by a few clairvoyant thinkers such as Mohammed Basil Altaie (2010), Ahmad Dallal (2010), and Towfic Shomar (2010). There is much richness and usefulness in extracting the philosophy(ies) of science that Muslim scholars adopted during that glorious era that can indeed help both in formulating a modern "harmonized" relation between Islam and science and to make it perhaps more "presentable" to a wider audience, having the "stamp" of history and of Islamic civilization.

The “practical” axis of Islam and science can be seen in the recurring topics of Islamic astronomy (determination of holy days and months, construction of an Islamic calendar, calculation of prayer times at high latitudes—see Guessoum & Odeh 2007, 2011) as well as in the growing field of bioethics (from abortion and euthanasia to cloning, stem-cell research, genetic “engineering,” “transhumanism,” and “artificial life”—see, most recently, Drees 2013 and Ghaly 2013).

To address the latter issues coherently and consistently and move away from a “reacting” position (Muslim jurists are called upon piecemeal whenever a new bioethical issue comes up), we must develop an Islamic philosophy of nature, life, the cosmos, and humans’ place and relation to it. Otherwise, we will keep on having to react to new developments that will challenge our limited traditional views; indeed, these traditional views were not built on a larger worldview that takes modern scientific discoveries and paradigms fully into consideration.

And to fully solve the other “practical” issues of Islamic astronomy, we likewise need to develop a general methodology where scientific theories and results (in this case astronomical calculations) become the reference and the solid ground upon which all such matters are discussed. Muslim jurists can decide whether an Islamic calendar should be unified or bi-zonal, but once they have made that choice, whatever dates the astronomers produce must be adopted and implemented without further discussions and controversies. Muslim jurists can decide whether the prayers times of Mecca can be adopted in Stockholm (where the “classical” criteria for prayer times cannot apply in the summer) or whether another rule (e.g., some averaging) should be adopted, but once that choice is made, the results presented by the astronomers must be adopted. Clearly, there is an issue of both authority and methodology to be worked out in today’s Islamic culture: who decides this matter or that and how. The “new generation,” by virtue of being highly competent and respected scientists and having shown some substantial knowledge of Islam, its theology, philosophy, and jurisprudence, can help the *ummah* make progress on this front.

THE WAY FORWARD

In this review, I have commented on the current landscape of debates on Islam and science. I have highlighted Bigliardi’s focus on the “new generation” that has emerged (according to him), a group of independent thinkers whose views distinguish them from those of the older generation (Nasr, Sardar, Al-Faruqi, Al-Attas, Bucaille) mainly by the fact that they accept modern science, with its general methodology and all of its established results.

Indeed, rejections of major scientific theories, such as biological evolution and Big Bang cosmology (“theories” here being understood as major

agreed-upon frameworks of laws and results that have established themselves), as strongly and openly expressed by Muslim thinkers such as Seyyed Hossein Nasr, are not a viable option. The evidence supporting those theories and many others in modern science is much too strong for any such stand. Of course, any scientific theory remains open to modification and improvement, but the major results in those fields can only remain and be considered as established. No biological theory will be constructed in the future (even centuries from now) that overturns evolution, at least in its fundamental elements (empirical and theoretical). Likewise, the major elements of modern cosmology (the size and age of the universe, its expansion, the interactions of matter and radiation, the evolution of elements and structures, etc.) will remain true, no matter what cosmological theory will dominate in the twenty-first century or in the thirtieth.

This is not the end of the story, however. First, because I have noted that while the “new generation” may be more attractive and reasonable to non-Muslim intellectuals in its discussion of Islam and science, as well as (hopefully) to the growing well-educated class of Muslims around the world that is seeking a harmonious model of integration of faith/tradition and reason/modernity, it is far from the dominant movement in today’s debates, particularly within the Islamic world. I have (briefly) given evidence that the *I’jaz* phenomenon is stronger than ever, with courses being taught on the “miraculous” scientific content in the Qur’an (and sometimes, it is claimed, in the Sunna) at many universities of the Arab-Muslim world, countless TV shows and popular writings, and regular international conferences organized around the world. The Islamization of knowledge/science program has died down in much of the Islamic world, but it is still alive and well in Malaysia and at the International Institute of Islamic Thought (in the United States) and its affiliates. And the traditionalist camp still produces articles and books and exerts a certain pull on Muslim scientists and intellectuals who still believe that a return to the “classical” view of knowledge and religion is possible, desirable, and achievable.

Second, even if we see the emergence of a “new generation” of thinkers as an important development or perhaps even a turning point in the Islamic intellectual landscape, with great potential to move the theological discourse (not to mention the cultural and educational agendas) forward, clear positions still need to be expressed on various issues, including the most fundamental one, that is, methodological naturalism (in my view) and others that stem from it (e.g., miracles, divine action, and prayers). And while the “new generation” has by and large expressed its acceptance of evolution, some clarifications are still needed in a few cases (e.g., what does it mean when someone rejects random mutations?).

Third, the “new generation” needs to explain how it sees its “theistic science” meshing with “science” (with no adjectives). Indeed, this sometimes

leads to some confusion both for some Muslim readers and for secular or atheistic Western intellectuals.

To clarify my view, I will first note that this idea of a “theistic interpretation” of science (results, theories, and general description of nature and of the universe) is not new, both in Western and Islamic debates. It can be found, most notably, in the writings of Alvin Plantinga and of Mehdi Golshani. The latter has recently argued for a theistic science and called for a careful distinction between the “factual” part of science and the “metaphysical” aspects of science. The general idea can also be found in the positions of some Western thinkers, most notably *vis-à-vis* the theory of evolution; indeed, the views of Robert J. Russell, Holmes Rolston, III, John Haught, and others on evolution have been described as “theistic evolution.”

I must stress that by “theistic science,” I only mean a theistic *interpretation* of modern science, one which is rigorous in every way, but enveloped in a theistic worldview. Critics of this standpoint could see some risks in it, namely the possible resurgence of variations of the Islamic science proposals (Nasr’s “sacred science,” Faruqi’s “Islamization of knowledge/science,” etc.). But then the interpretation from an atheistic perspective, which is usually allowed or carried out without anyone’s objection, carries similar risks of running amuck, as in the over-generalizations of Richard Dawkins and other “new atheists.”

Is there a contradiction then between suggesting a theistic worldview and a thoroughly rigorous pursuit of science with its naturalistic methodology and its established results and theories? I believe not. Methodological naturalism, contrary to philosophical naturalism, is a neutral standpoint and approach, and it has proven to be fruitful in science. In my view, it has no metaphysical implications. On the other hand, theologies that are fully consistent with modern science and methodological naturalism are far from trivial and require some sophisticated work. But they can be constructed. As long as the exploration of the world remains “evidentiary-based,” everyone should be satisfied.

To sum up, the members of the “new generation” need to clearly state their positions *vis-à-vis* methodological naturalism and explain how they conceive of an Islamic/theistic science and view of nature and God’s relation to it.

There is still much work to be done in the “harmonization” of Islam and modern science, but I hope the road is a bit clearer now.

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NOTES

1. To be accurate, *I'jaz* did exist in Turkey and other non-Arab Muslim cultures earlier in the twentieth century, but it now has become a prime feature of the Islamic discourse, due to the huge media efforts and presence of Harun Yahya and Zakir Naik.
2. Organized by the World Agency for Scientific Miracles of the Qur'an and Sunnah, March 11–14, 2011: <http://www.eajaz.org/index.php/Authority/The-most-important-achievements>. The papers can be found here: <http://quran-m.com/container2.php?fun=artview&cid=1170>.
3. Co-organized by the "Palace of Science" in Monastir (Tunisia), March 21–24, 2012: <http://quran-m.com/container2.php?fun=artview&cid=1170>.
4. (1) Conference organized by the University of Beni Soucif (Egypt), March 2–3, 2013: http://www.gomhuriaonline.com/main.asp?v_article_id=73792; (2) Conference organized by the University of Mansoura and the World Agency for Scientific Miracles of the Qur'an and Sunnah, April 7–8, 2013: <http://el-wasat.com/portal/News-55707076.html>.
5. Co-organized by the College of Science at the University of Tetouan (Morocco), April 25–27, 2014: <http://www.prestetouan.com/news8920.html>.
6. Organized by the University of Bordj Bou-Arredj (Algeria) under the title "Promoting Scientific Research through Qur'anic Inspiration," November 26–27, 2014: <http://www.elhayat.net/article10784.html>.
7. An international conference has been announced by the World Agency for Scientific Miracles of the Qur'an and Sunnah and the Qatari Ministry for Religious Affairs for 2014, but no date has been given: <http://www.eajaz.org/index.php/component/content/article/11318>.
8. The third conference was co-organized by the International Commission for Numerical Miraculousness of the Qur'an and the Center for Qur'anic Studies of Universiti Malaya (Malaysia), September 22–23, 2012: <http://vb.tafsir.net/tafsir31444/#.VJ-TOsAA>.
9. Poll conducted by HCD Research and the Louis Finkelstein Institute for Religious and Social Studies of the Jewish Theological Seminary in New York, December 2004.
10. In fact, 55% of the doctors said "they have seen treatment results in their patients that they would consider miraculous" (http://www.worldnetdaily.com/news/article.asp?ARTICLE_ID=42061).
11. A search through the aforementioned electronic library database for "divine action" and "Islam" or "Islamic" in the title turned up no results.

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