

# *Nidhal Guessoum's Reconciliation of Islam and Science*

with John Hedley Brooke, "Reconciling Religious Tradition and Modern Science"; Salman Hameed, "Walking the Tightrope of the Science and Religion Boundary"; Rana Dajani, "Evolution and Islam's Quantum Question"; Zainal Abidin Bagir, "Practice and the Agenda of 'Islam and Science'"; and Nidhal Guessoum, "Issues and Agendas of Islam and Science"

## RECONCILING RELIGIOUS TRADITION AND MODERN SCIENCE

by John Hedley Brooke

*Abstract.* The primary purpose of this essay is to review Nidhal Guessoum's *Islam's Quantum Question* from a perspective outside Muslim tradition. Having outlined the main contours and contentions of the book, general issues are raised concerning the reconciliation of religious belief with the sciences. Comparisons are drawn between the resources available to Christian and Muslim cultures for achieving reconciliation, with particular reference to scriptural exegesis and natural theology. Speculative questions are then raised concerning possible differences between the Christian and Islamic experience and whether these may shed any light on the facilitation in Europe of an enduring scientific movement.

*Keywords:* accommodation principle; design; evolution; Nidhal Guessoum; hermeneutics; *I'jaz*; Islamic science; natural theology; Qur'anic exegesis; unity of nature

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Nobody can doubt that the relationship between Islamic culture and modern science is a subject of public concern as well as intense scholarly debate. Toward the end of 2011, British newspapers reported that students, even medical students, were increasingly walking out of lectures on evolution that they believed clashed with the Qur'an. Apparently, even studying evolution could not be tolerated. Sensitive to the damage such reports could do to public perceptions of Islam, Nidhal Guessoum responded with an essay in the *Huffington Post*, stressing the need for discrimination (Guessoum 2012). Conceding that evolution, as a paradigm, is largely

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rejected by Muslims, many highly educated among them, he nevertheless insisted that the subject is studied in countries like Egypt, Iran, Pakistan, and the UAE, where “no case of students boycotting evolution classes . . . has ever been reported.” Acknowledging that theories of human evolution have ignited fierce opposition from fundamentalists, he nevertheless affirmed the historical diversity of Muslim attitudes toward Darwinian theory. By stressing the openness of the Qur’an to reinterpretation, he aimed not only to correct common stereotypes of Muslim tradition but also to reeducate his Muslim brothers and sisters who have succumbed to a literalism in Qur’anic exegesis that obstructs serious science. It is, he writes, “very unfortunate” that Muslims keep claiming that knowledge and science occupy a high place in Islam and then behave with closed minds when faced with a theory that challenges their preconceptions (Guessoum 2012).

I begin with reference to Guessoum’s recent essay because it puts in a nutshell some of the main features of his book, notably his plea that if Muslims are to recover their heritage, they must take science seriously: “Muslims everywhere must open their minds to all new ideas” and “they must be confident that their faith and worldview are robust enough to deal with modernity in its various facets” (Guessoum 2012). In his book, Guessoum takes inspiration from Ibn Rushd (Averroes), who, in his engagement with Aristotelian philosophy, showed how it was possible to unite reason with the core tenets of the Islamic faith (Guessoum 2011, xxi). Reverence for the great thinkers of Islam’s “golden age,” which in many Muslim writers becomes a form of nostalgia, serves a more didactic function here in the presentation of a religion that “not only does not forbid studying evolution or any other theory; it welcomes new knowledge and deals with it objectively” (Guessoum 2012).

For some readers this may sound like an idealistic construction; but in its combination of historical with contemporary scholarship, and its coupling of didacticism with exhortation, Guessoum’s book is as exciting as it is informative. It is written by an astrophysicist who, faithful to his religious tradition, refuses to believe that materialist philosophies are a necessary consequence of scientific knowledge. His book is also courageously written. Having studied the works of prominent Christian writers on science and religion (Ian Barbour, John Haught, Arthur Peacocke, John Polkinghorne, etc.) he contends that Muslims have much to learn from sophisticated Western discussions. There is a lot of catching up to be done.

To return the compliment, *Islam’s Quantum Question* provides for readers outside Muslim tradition a fine, nuanced survey of the principal themes in the Islamic encounter with science. The book is remarkable for its scope, bibliographic range, and scrupulous attention to the qualifications that become necessary in the exposition of almost every point of view. Successive chapters are devoted to Islamic conceptions of God, to epistemologies grounded in Qur’anic exegesis, and to the fate of what the author sees as

moribund attempts to articulate a distinctively “Islamic science.” Popular but misguided apologetic attempts to locate details of modern science in the Qur’an, as a means of authenticating its miraculous origin, are expounded fairly before being firmly rejected. Subsequent chapters address Islamic approaches to cosmology, to the question of “design” in nature, and to anthropic principles of various strength. Finally, the issues raised for Islam by evolutionary biology, and by human evolution in particular, receive careful assessment, spiced by the claim that embryonic evolutionary motifs can be found in classical Islamic literature.

Guessoum’s evident gifts as a teacher are displayed in an epilogue, which records a conversation with his students, one of whom makes a point reminiscent of moves made in the sixteenth and seventeenth centuries by astronomers in the Christian tradition who, like Kepler and Galileo, argued that the Bible should not be used to prohibit a moving Earth. As a revelation, it was not to be understood as a technical scientific resource because it had been written in such a way that its spiritual message could be comprehensible even to the common man. It is sometimes said that this principle of the “accommodation” of a sacred text to human needs and limitations was more fully developed in Christian than in Islamic discourse (Van der Meer and Mandelbrote 2008, 28), which is why Guessoum’s student Mohammad caught my eye with his remark that verses in the Qur’an that refer to facts in nature were “not revealed so that only those with scientific knowledge could understand them; they could be understood by the people who were contemporary to the Prophet and those who lived in earlier times” (Guessoum 2011, 350). By such reasoning, whether applied to the Bible or to the Qur’an, attempts to confer scientific authority on the sacred text either as a refutation or an anticipation of scientific theory could be disqualified, with a consequent liberation for scientific innovation.

With appropriate transposition, Guessoum’s main topics would enjoy prominence in Christian literature on science and religion. Given the existence of comparable exegetical problems, it may be helpful to consider some of the resemblances and differences between the two traditions in their engagement with the sciences. This can be a delicate subject because there have been conflicting metanarratives concerning the role of religious belief in the emergence of modern science. There used to be a tendency in Western scholarship to minimize the scientific originality of the Muslim philosophers who, from the ninth to the thirteenth centuries, are now known to have corrected and transcended the Greek heritage that they were once supposed merely to have preserved (Dallal 2010; 2011). Conversely, there has been a tendency in Muslim scholarship, happily not represented by Guessoum’s study, to claim such a special relationship between Islam and the cultivation of scientific knowledge that the scientific innovators of sixteenth- and seventeenth-century Europe are treated almost as plagiarists

and as victims of a more repressive religion (think Galileo). At one extreme it is claimed that without Christianity there would have been no modern science; at the other one finds a disinclination to believe that the scientific enquiries of sixteenth- and seventeenth-century European thinkers might have been stimulated or underwritten by Christian values and beliefs.

One of the most attractive features of Guessoum's study—a refusal to accept unsubstantiated claims—is nicely illustrated by his impatience with a physics professor who, at a conference on Islam and science held in December 2006, loudly proclaimed that “Copernicus stole his theory from Ibn al-Shatir” (Guessoum 2011, 342). One hopes that, with the advance of historical scholarship, the high tides of cultural chauvinism may begin to subside. The claim that Christianity alone could provide the foundations of modern science has been downgraded to one of many myths concerning science and religion (Efron 2009). And there are signs of at least a partial recognition among Muslim scholars (e.g., Sardar 2011, 353) that the image of Christian churches typically and consistently hostile to science is something of an illusion that has served partisan interests. It is, however, an interesting question of how far the revisionist scholarship of those who have reassessed the place of science in the Christian tradition (Lindberg and Numbers 1986; Brooke 1991; Harrison 1998 and 2007; Cantor 2010) has penetrated Muslim discourse. A prime target of this revisionism, John Draper's *History of the Conflict between Religion and Science* (1874), initially created apprehension among Muslim scholars, but with its diatribe against the Roman Catholic Church and its lesser strictures against Islam, it may have helped to seal in the Muslim world comparisons favorable to Islam (İhsanoğlu 2011, 165).

Given the monotheism of both religious cultures and given that, in both Christianity and Islam, the world is understood as a creation in which a transcendent divine will is expressed, it would be surprising if there were not striking resemblances in their respective dialogues with scientific knowledge. When adherents of Islam say that there cannot be a conflict between science and the Qur'an, it is important to remember that much the same was said of science and the Bible by Christian scholars who used the two books in an analogy to argue their case for compatibility. Because the book of God's word and the book of His works had the same author, they could not possibly conflict. Guessoum's Quantum Question “how to reconcile religious tradition with rational and scientific modernity, and how to be dual . . . without being schizophrenic” (Guessoum 2011, xxi) has become particularly urgent in Muslim societies today, but it has had a long history and is not peculiar to Islam.

The ideal of a transparent harmony between science and religion has been common to Islam and Christianity, but has often been difficult to realize because of dissonance between the harmonizers. Bernard Lightman's study

of discord among those seeking to harmonize science and religion in the post-Darwinian debates offers a striking example from nineteenth-century Britain (Lightman 2001). From the outset of his book, Guessoum makes clear his dissatisfaction with several schemes put forward by influential Muslim scholars whose harmonizing he sees as flawed and in some cases dangerous. He politely differentiates his moderate position from that of “secularists” (Pervez Hoodbhoy and Taner Edis), “mysticists” (S. H. Nasr and Osman Bakar), and “neotraditionalists” such as Muzaffar Iqbal (Guessoum 2011, 13).

Problems associated with the quest for compatibility arise not simply from the fact of diversity in the philosophical options available, but from much deeper divisions that may run through a religious tradition. Guessoum himself notes how the famous clash between Ibn Rushd and al-Ghazzali still dominates discussion of various issues related to Islam. On such crucial issues as the nature of causality, the authority of Aristotle, and the eternity of the world, compatibility achieved by Ibn Rushd was abhorrent to al-Ghazzali. Because of his fideism and occasionalism, al-Ghazzali has often been held responsible for stifling the further development of science within Islam—a view that Guessoum rightly dismisses as simplistic. Nevertheless, he clearly laments the fact that it is al-Ghazzali who still enjoys the following of “every conservative and orthodox Muslim,” whereas Ibn Rushd’s respectful approach to the science of his day claims the minds of “the (few) Muslims who try to uphold reason as an essential tool of analysis” (Guessoum 2011, xix).

The dichotomy is visible again in Guessoum’s critique of the metaphysics of Seyyed Hossein Nasr, whose concept of compatibility demands recognition of a deeply spiritual “science” peculiar to Islam. In his study of *Science and Civilization in Islam* (1987), Nasr drew a sharp contrast between “Islamic science” and that of the West. Whereas Western science is associated with the quantitative aspects of things and with technological applications, “Islamic science, by contrast, seeks ultimately to attain such knowledge as will contribute toward the spiritual perfection and deliverance of anyone capable of studying it.” Admitting that the fruits of this science are “inward and hidden” and its values more difficult to understand, Nasr suggested that to gain the necessary understanding “requires placing oneself within its perspective, and accepting as legitimate a science of Nature which has a different end, and uses different means, from those of modern science” (Nasr 1987, 39). But this is harmony bought at a price because, as Guessoum is keenly aware, it encourages a polarity between “Western” science and a more mystical “Islamic” science in which spiritual intuition plays an important role. Because, for Nasr, this Islamic science is steeped in a perennial philosophy articulated long ago by Sufi mystics, it becomes particularly reactionary when addressing the implications of evolutionary biology. Nasr has continued to assert that “modern science is not the only

legitimate science of the natural order, but *a* science of nature.” In his view what is needed is a “positive Islamic critique of modern science” (Nasr 2006, 74). For Guessoum, this is just what is not needed if by “science,” we mean the cognitive content of scientific theories approved by experts in their disciplines and empirically grounded. It is a measure of the difficulty he has to overcome that his paradigmatic philosopher, Ibn Rushd, according to Nasr, “should be studied more as a great member of the tradition of Western philosophy than as an integral part of Islamic intellectual life” (Nasr 1987, 35).

Guessoum has no more sympathy for reductive materialist philosophies than Nasr, but he refuses to stigmatize modern science as intrinsically materialist. His point, with which I have great sympathy, is that scientific knowledge does not entail metaphysical conclusions. When cultural meanings are elicited from science, levels of interpretation are interposed and these, *de facto*, may or may not be informed by religious or metaphysical preferences. As Darwin himself pointed out, theories of evolution are not intrinsically atheistic. Guessoum finds no incompatibility between the science of evolution and Islamic faith because hermeneutic strategies are available both for theistic readings of the science and for nonliteralistic readings of the Qur’an. There are obvious parallels here with those liberal Christian commentators who, for 150 years, have shown receptivity to evolutionary science. Guessoum is as insistent as they that “to take one conservative viewpoint (Muslim, Christian or others) and present it as ‘the religious view’ is simply wrong” (Guessoum 2011, 320).

With his nuanced recourse to hermeneutic principles, Guessoum manages to avoid many of the traps into which those seeking compatibility between scientific knowledge and religious belief have fallen. He notes how easy it has been for those using scientific knowledge to enhance their understanding of the Qur’an to slide from that practice into a fanciful interpretation of verses that are claimed to have miraculously anticipated radio and relativity, space exploration, and black holes. It is impossible not to sympathize with the distinction he draws between respect for the general principles in the Qur’an that affirm God’s existence, creative power, and sustenance of the universe and the *I’jaz* theory, of recent origin, whose goal is to prove the divine origin of the book from its miraculous prescience. As Ahmad Dallal has also argued, this reactionary and misguided enterprise, largely emanating from a 1976 text of the French surgeon Maurice Bucaille, has no precedent among the great Muslim thinkers of the medieval period (Dallal 2011). It is tempting to recall the aphorism that “a text out of context is a pretext.”

Guessoum also wisely counsels against too facile a conflation of what is understood by knowledge in the Qur’an and the concept of science in the modern sense. The latter “cannot easily be found in the Qur’an or even

in most of the classical Muslim heritage” (Guessoum 2011, 174). As with reflection in the Christian traditions, one has to be prepared for subtlety here. Guessoum does not deny the relevance of Qur’anic principles to the regulation of scientific thinking. He agrees with Muzaffar Iqbal that the three Qur’anic concepts of *tawheed* (unicity), *qadr* (measure), and *mizan* (balance) are immensely important for understanding the relationship between Islam and science. Guessoum’s disagreement is with attempts to make the meaning of a particular text coalesce with, and depend on, a specific (and often transient) state of scientific knowledge, which, when superseded, then damages the authority of the text. This was a lesson learned the hard way within Christianity, despite Augustine’s early warning of the trap. As James Clerk Maxwell observed in the nineteenth century, scientific ideas tend to change more rapidly than religious ones, making this approach embarrassing as well as misconceived. Guessoum (2011, 41) reminds us that the Quaker physicist Arthur Eddington advised his religious readers that he had not offered them a “God revealed by the quantum theory, and therefore liable to be swept away in the next scientific revolution.” Within a Christian culture, close harmonization of specific biblical verses with conclusions from the historical sciences, which during the first half of the nineteenth century promised conciliation between *Genesis* and geology, proved virtually impossible to sustain as the fossil record increasingly failed to match the order of creation in the biblical narratives—a discrepancy on which T. H. Huxley eagerly capitalized in his controversy with the scholar and statesman William Gladstone (Huxley 1886; Brooke 2009). Just as Christian scholars had to find ways of reinterpreting the salient biblical texts figuratively, symbolically, and existentially, the way forward for Guessoum, still in tune with Ibn Rushd, is to propose multiple meanings of Qur’anic verses that can be symbolic as well as literal.

This raises the question “Who controls the meanings?” The problem that Galileo faced with the Roman authorities is a salutary reminder that, despite finding ways of rendering a heliostatic astronomy compatible with biblical texts suggesting a stationary Earth, he nevertheless faced the censure of Cardinal Robert Bellarmine for subverting hermeneutic principles that Bellarmine claimed had been made sacrosanct by the Council of Trent. And there was the final censure from Pope Urban VIII when Galileo was judged to have overstated the case for Earth’s real motion in an act of disrespect and disobedience.

There may not have been a Galileo affair within Muslim societies, but Guessoum has no illusions about the control that can be effected by religious authorities wary of the theologizing of a layman. He ends his book with reference to a contemporary problem that afflicts religious thought in Islam: the refusal of the *ulemas* (religious scholars) to grant others, whose specialties may lie in a nonreligious field, the right to propose ideas on any

issue that is perceived to have an impact on religion in any way (Guessoum 2011, 354).

One of Galileo's arguments in his *Letter to the Grand Duchess Christina* (1615) was that the Creator was no less excellently revealed in nature than in Scripture—a striking appeal to natural theology as a possible means of mediation. By appearing to place nature on a par with Scripture as a source of information about the Creator, Galileo was doubtless giving natural theology a far greater scope than it enjoyed in contemporary Catholic or Protestant theology. But finding in nature what William Whewell in the nineteenth century called *indications* of the Creator became a prominent motif in Christian theology from the mid-seventeenth to the mid-nineteenth centuries, and claims for its renewal are not uncommon today. Drawing inferences to the attributes of a Creator from examples of providence and design in nature was to become one of the most enduring means of achieving compatibility between a religious worldview and openness to (even encouragement of) scientific research. During the European Enlightenment, the great Swedish botanist Linnaeus spelled out the rhetoric:

If the Maker has furnished this globe, like a museum, with the most admirable proofs of his wisdom and power, if this splendid theatre would be adorned in vain without a spectator; and if man the most perfect of all his works is alone capable of considering the wonderful economy of the whole; it follows that man is made for the purpose of studying the Creator's works that he may observe in them the evident marks of divine wisdom (Linnaeus 1754).

The many functions, fortunes, and limitations of natural theology in Christian apologetics have been explored in recent literature (e.g., Brooke 1991; 1997; Brooke and Cantor 1998; and McGrath 2011). But what of natural theology in Islam, where the revelation in Scripture has such unquestionable primacy? Because the sacred text itself points to signs of God in the natural world, the significance of this for a Muslim understanding of nature is a deeply absorbing subject (Schimmel 1994). Having been critical of writers who distort the history of science in their quest to maximize the number of Arabic precursors of later science, Guessoum has no inhibition about attacking historians who go to the other extreme in their omission of all reference to classical Muslim proponents of the design argument. He wishes to reinstate them because, as with Christian natural theology, they created a resource that promised conciliation with the sciences. Ibn Rushd is again the iconic figure, whose analysis of how an artifact proves the existence of an artisan presaged that of William Paley centuries later. From Guessoum's sensitive account one sees more than a hint of parallels with the development of natural theology in Europe. Inferences to design were diverse in Islamic literature as they were to be in the West. For example, the "design" seen by al-Ghazzali consisted



largely in the provision made by God to meet all human needs. This was something that could be understood and celebrated at a phenomenological level without needing technical scientific reasoning for its substantiation. Hence the claim, similar to that of John Ray in his Preface to *The Wisdom of God Manifested in the Works of Creation* (1691), that the force of the argument could be appreciated even by the lowliest members of society. But Guessoum's point is that whether one looks to Ibn Rushd, to al-Ghazzali, to the many other Muslim philosophers who linked the concepts of providence and design, or to their equivalents in Christian tradition, one sees an interest in the marvels of the natural world that could be propitious for the growth and dissemination of a scientific culture. As recent historical research has shown, Paley's *Natural Theology* (1802) and the *Bridgewater Treatises* that followed in the 1830s, were commonly read as works of *scientific* popularization (Topham 2010).

It could be argued that in the West, "signs" or "indications" of a Creator had been recast as demonstrable "proofs" only when it had become necessary to contend with new sources of skepticism, such as the revival of Epicurean atomism that followed the recovery of Lucretius's poem *De Rerum Natura* in the late sixteenth century or (preceding Paley in the eighteenth century) the skeptical philosophy of David Hume and the evolutionary naturalism of Darwin's grandfather, Erasmus Darwin. But common to both Christian and Muslim protagonists was the recognition that rational arguments were more effective in confirming a preexisting faith than in converting infidels with a proof of God's existence. Guessoum is of course aware that Paley's formulation of the design argument had to be recast when Darwin articulated his principle of natural selection, but he places this episode and its aftermath in a broader schematic history, which allows him to explore modern literature (and Muslim responses to it where they exist) on theistic evolution, fine tuning, and the anti-Darwinian thrust of the recent "intelligent design" (ID) movement. He worries that ID has been gaining ground in Turkey and that, at the time of writing, it had elicited only one serious critique from a Muslim writer. Ironically, in their rejection, or more commonly disregard, of Darwin, Muslim fundamentalists have been able to appropriate the dismissive apparatus of American Protestant fundamentalism.

A happier parallel between Muslim and Christian cultures might be found in the permeation through both of a principle of nature's unity that, in different contexts, has mediated between religious and scientific thought. Guessoum observes that "in every standard treatise and textbook of Islamic knowledge, the first chapter is always devoted to *tawheed*" (Guessoum 2011, 22). This is a technical term denoting the unicity of the divine Creator, the proper perception and interpretation of divine attributes, and the worshipability of the one Being worthy of worship. The term has been held to imply the unity of truth and knowledge, the unity of creation, the

unity of life, and the unity of humanity. A belief in the unity of creation may find expression, as it does for Nasr and Muzaffar Iqbal, in a holistic sense of the interrelatedness of all that exists. But it is also possible to translate it into other metaphysical principles, such as the uniformity of nature and the immutability of God's laws. For Iqbal, "God's ways and laws are unchanging," a view he finds clearly stated in the Qur'an, with the consequence that "the entire world of nature operates through immutable laws that can be discovered through the investigation of nature" (cited by Guessoum, 60). We may recognize here one of the presuppositions that helped to shape the character of physical science in seventeenth-century Europe. With reference to the unity of creation there would seem to be at least the possibility of convergence between an Islamic and Christian theology of nature.

Two examples from British natural philosophy show how there could be symbiosis between a metaphysical principle of unity and the technical content of science. In his *Natural Theology* (1802), Paley argued to the unity of God from the universality of Newton's law of gravitation. One of his chapters was entitled "The Unity of the Deity," which Paley claimed was proved by the uniformity of plan observable in the universe. Of this he gave several examples, including the fact that the light from a fixed star affects our eyes in the same manner, and is refracted and reflected according to the same laws, as the light of a candle. I referred to symbiosis between the metaphysics and the science because, more than a century before Paley's apologia, Newton had premised the universality of his law of gravitation on the omnipresence of one God, an intelligent Creator, the constancy of whose will was reflected in the normal course of nature (Brooke 1991, 139). It would be an interesting exercise to show how the drive for unification in contemporary science is a secular residue of earlier theistic constructions. From Copernicus, who valued the unity he brought to a solar system; to Newton, who knocked the last nail in the coffin of Aristotle's divided cosmos; to Faraday, who endeavored to unify all physical forces; to Darwin, who in unifying the sciences of taxonomy, paleontology, biogeography, and embryology postulated the development of all life from a single primal form; to Einstein, Hawking, and Weinberg, the drive toward unification was relentless. In the case of Copernicus, Newton, and Faraday the impetus was at least partly theological. Even Darwin, as a godfather of agnosticism, would define "nature" as "the laws ordained by God to govern the universe" (Richards 2009, 61).

If Guessoum's book provides a stimulus to consider parallels between Muslim and Christian traditions in their engagement with the sciences, it also invites reflection on possible contrasts. Is it possible to identify differences that might shed light on reasons why a more durable scientific culture proved possible to establish in Europe from the sixteenth and seventeenth centuries onwards? The issues here are immensely complex

as will be clear to those familiar with such recent studies as Stephen Gaukroger's *The Emergence of a Scientific Culture: Science and the Shaping of Modernity* (Oxford University Press 2006) and Floris Cohen's *How Modern Science Came into the World: Four Civilizations, One Seventeenth-Century Breakthrough* (Amsterdam University Press 2010). Cohen's study, in particular, reveals just how fragile traditions of natural knowledge were before the modern period. There was nothing natural about natural science that automatically gave it durability, especially when transplanted from one culture to another. There was no simple "scientific method" that made modern science possible. Indeed, Cohen suggests that one of the preconditions of modern science finding itself was the breaking down of barriers between the mathematical methods of Galileo, the mechanical modeling of nature by Descartes and Francis Bacon's interventionist empiricism. For the Baconian dream of power over nature to become socially respectable, a rapprochement with Christian theology was also necessary. How this was achieved in Europe does raise questions whether comparable resources had been available in Islam. I shall formulate these as purely speculative, broad-brush queries. They are emphatically not intended to suggest that an explanation for the social legitimation and long-term viability of European science can be adequately given in terms of reconciliation between science and religious tradition. Identifying the full range of social, economic, political, and religious preconditions of the modern sciences of nature remains as challenging as ever.

My first question relates to Bacon's plea for a science that, through its practical applications, would benefit humankind and improve the world. We are forced to confront a contrast between active and contemplative attitudes toward nature (Gruner 1975). The question is whether such a vision of changing the world was more easily reconciled with Protestant Christian spiritualities than might have been possible in cultures where submission to the divine will was and has been paramount—where, for example, the construction of theodicies had a lower profile than in Christian literature on evil and suffering because in *Ashari'*-influenced theologies "both good and evil were co-constitutive and God's purpose in each ultimately inscrutable" (Elshakry 2011, 335).<sup>1</sup> Bacon could give at least three religious reasons why intervention in nature in the form of controlled experimental enquiries should be welcomed. First, a long tradition of scholastic commentary on Aristotle had simply failed to produce knowledge that promoted human welfare. Bacon could claim that this failure violated the biblical precept that faith should find expression in charitable works. In addition were two theological doctrines that could be invoked to justify an active over a submissive stance before nature. Each in its way underscored a distinction between how the world is now and what it might become. For Bacon, the doctrine of the Fall had, as one of its meanings, that the

dominion over nature, which God had intended for Adam, had been lost through primal disobedience. If it was to be even partially restored, the tools of applied science were necessary. The doctrine of Christ's second coming allowed a similar contrast between how the world is now and how it should be restored to prepare for the millennium—Christ's thousand-year rule on Earth. Some at least of the utopias envisaged by seventeenth-century writers had this millenarian connotation. And so a question might be whether there were doctrinal resources in Islam that could have created a comparable sense of responsibility for translating a less than perfect present into a scientifically enhanced future?

A second question, with particular reference to Scriptural exegesis, is whether there is truth in the claim that concepts of "accommodation" were less well developed among Muslim scholars than in the thought of Christian theologians such as Aquinas and Calvin? The idea that the language of the Bible had been accommodated by the Holy Spirit to the needs of the vulgar was declared by Galileo to be so well known to Christian theologians that it was scarcely necessary to remind them of it. There is no doubt that the idea played a crucial role in creating space for a new astronomy, especially in Protestant circles (Snobelen 2008).

Beyond issues of biblical exegesis, Christian natural philosophers of the seventeenth century seem to have found subtle ways of making room for "natural" explanations of events in the world, without granting full autonomy to nature. Even Descartes, the most mechanistic of the mechanical philosophers, argued that God concurs with bodies to cause natural motion in such a way that both God and bodies are genuine, efficient causes of motion (Platt 2011). At times Descartes even seems close to al-Ghazzali in his assertion that God recreates the world from moment to moment—a fact that incidentally detracts from the claim that al-Ghazzali's occasionalism was intrinsically inimical to scientific inquiry (Ragep 2010). Other European giants in the study of nature, such as Robert Boyle and Isaac Newton, strenuously argued against the autonomy of the natural order. Boyle explicitly objected to vulgar conceptions of nature that implied it was "Nature" that was responsible for doing this or that. Newton, although not an orthodox Christian, exclaimed early in his career that one of his objects was to show that it is easier for God to move matter in the world than for us to move our bodies. Theories of God's concurrence with natural causes, of God's conservation of natural causes, and of God's interpenetration of nature were elaborately worked out in ways that were at least partially successful in achieving conciliation with theologies of divine sovereignty. Such models of divine activity were clearly not absent from the work of the great Muslim philosophers, but to what extent were they used to legitimate actual scientific investigation?

Guessoum has shown the existence of important parallels between Muslim and Christian natural theology. There is, however, a question about

the shift from a natural theology of Providence, focused anthropocentrically on how human needs have been catered for, to one which, through its encouragement of scientific research, generates more sophisticated grounds for the claim, certainly made by Newton, that the universe is the result of choice not chance. One could only appreciate the fine-tuning that Newton detected in the solar system if one first understood that planets with too great a tangential component of their velocities at the time of their creation would not be held in orbit by the sun's gravitational pull. Had Earth escaped in this way, it would have been uninhabitable. An important plank in Boyle's apologia for the natural sciences was that the scientist was in a privileged position to appreciate the wisdom enshrined in creation. Did this argument have a prominent place in the Muslim canon?

Boyle declined ordination, preferring the role of priest in the temple of nature. Hence, one last question. It takes its cue from Guessoum's concern about the authority of the *ulema*, still wielded today, that discourages what we might call the laicizing of religious discourse—the very kind of activity that he has accomplished so impressively in his book. What is striking about the Christian natural philosophers of the late seventeenth century is that the majority, when necessary, did find the freedom to theologize about the implications of their science, often stressing its religious utility. For those under the centralized authority of the Roman Church, this could be difficult if their attempts at mediation were judged heretical. But this did not prevent the elaboration of arguments for conciliation by Catholic scientists, which were diverse and not so very different from those employed by Protestant thinkers (Ashworth 1986; Principe 2009). If Amos Funkenstein was right in suggesting that increasing opportunities for scientists to function as lay theologians became a distinctive feature of European intellectual life in the seventeenth century (Funkenstein 1986), were there comparable opportunities for Muslim scholars? Or is the more common pattern an exclusive ownership of religious discourse by those specially trained as religious teachers?

It is perhaps worth mentioning a possible irony here. In the scientized theologies of Funkenstein's exemplars, a catalyst for scientific activity was not (as is often assumed) the complete separation of science from theology but what Funkenstein sees as an unprecedented fusion. It could be exemplified by Descartes's deduction of the conservation of motion from God's immutability, or by Newton's contention that absolute space is constituted by God's omnipresence. Given Dallal's recent insistence that it was one of the achievements of earlier Muslim philosophers, such as Fakhr al-Din al-Razi, to compartmentalize religious and scientific knowledge (Dallal 2011, 142), it is an intriguing question whether too severe a partitioning in seventeenth-century Europe would have been counterproductive as a means of attracting religious sympathy for scientific activity. One could push the question too hard because it is clear that by the 1660s,

when both the Royal Society and the French Académie des Sciences were established, the exclusion of religious discourse from their agendas had become an explicit policy, precipitated in large measure by the baleful consequences of inter- and intrareligious hostilities.

Would that such hostilities and their consequences were of lesser moment today! One of the many reasons why I have found Professor Guessoum's study such a pleasure to read is that through its breadth of scholarship it strikes a conciliatory note for contemporary Muslim-Christian dialogue. There is heartache and passion in his clarion call for Muslims to embrace the scientific enterprise, instead of deserting their classical heritage by reacting with suspicion or with schemes of reconciliation that deliver only pseudoscience.

#### NOTE

1. The complexity of the issues here is nicely illustrated by the fact that Elshakry notes the marginalizing of theodicy in Muslim natural theologies in the context of explaining how this could induce a greater receptivity toward Darwin's science than in Christian constituencies where Darwin's exacerbation of the problem of suffering compounded the problems that had to be faced.

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