



Three Views of Science in the Islamic World

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Intoduction

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

The second level of encounter between traditional beliefs and modern science was of an intellectual nature with lasting consequences the most important of which was the re-shaping of the self-perception of the Islamic world. Using Husserl's analysis of *Selbstverständnis*, a key term in Husserl's anthropology of 'Western man', von Grunebaum takes the reception of modern science to be a turning point in the self-view of the traditional Islamic civilization and its approach to history.^[3] One of the recurring themes of this epochal even, viz., the incompatibility of traditional beliefs with the dicta of modern science, is forcefully stated in a speech by Ataturk, the founder of modern Turkey, who was as much aware of the practical urgencies of the post-independence war Turkey as he was passionately engaged in creating a new identity for Turkish people: 'We shall take science and knowledge from wherever they may be, and put them in the mind of every member of the nation. For science and for knowledge, there are no restrictions and no conditions. For a nation that insists on preserving a host of traditions and beliefs that rest on no logical proof, progress is very difficult, perhaps even impossible'.^[4]

On a relatively smaller scale, the revealing clash between the secular premises of modern science and the traditional Islamic worldview was brought home to many Muslim intellectuals with the publication of Renan's famous lecture *L'Islamisme et la science* given in Sorbonne in 1883, in which he strongly argued for the irrationality and inability of Muslim peoples to produce science. For us today, Renan's quasi-racist attack on the Islamic faith

and crude promulgation of positivism as the new religion of the modern world makes little sense. Nevertheless, it was an eye opener for the Muslim intelligentsia of the time about the way the achievements of modern Western science were presented. Spearheaded by Jamal al-Din Afghani in Persia and Namik Kemal in the Ottoman empire, the Muslim men of letters took upon themselves the task of responding to what they considered to be the distortion of modern science at the hands of some anti-religious philosophers, and produced a sizable discourse on modern science with all the fervor and confusion of their tumultuous times.^[5] As we shall see below, Afghani, *inter alia*, came to epitomize the mindset of his time when he based his historical apology against Renan on the assumption that there could be no clash between religion and science, be it traditional or modern, and that modern Western science was nothing other than the original true Islamic science shipped back, via the Renaissance and Enlightenment, to the Islamic world. By the same token, there is nothing essentially wrong with modern science, and it is the materialistic representation of science that lies at the heart of the so-called religion-science controversy.^[6] Namik Kemal joined Afghani with a rebuttal of his own in his *Renan Mudafanamesi* (The Defense against Renan), focusing, unlike Afghani, on the scientific achievements of the Arabs, namely the Muslim countries of the past.^[7] In contrast to these Muslim intellectuals who sought to place modern science within the context of Islamic worldview, a number of prominent Christian writers in the Arab world including Jurji Zaydan (d. 1914), Shibli al-Shumayyil (d. 1916), Farah Antun (d. 1922) and Ya'qub Sarruf (d. 1927), began to advocate the secular outlook of modern science as a way of joining the European path of modernization, hence taking primarily a philosophical and secular stance on the ongoing debate between religion and science.^[8]

These two positions are still with us today as they continue to represent the ambitions as well as failures of the Islamic world in its elusive relation with modern science. Islamic countries spend billions of dollars every year for transfer of technology, science education and research programs. The goal set by the Ottomans in the 19th century has remained more or less the same: gaining power through technological advancement. Furthermore, the financial wedding between science and technology, begun with the industrial revolution, makes it ever harder to search for 'pure science', and the bottom line for the Muslim as well as the Western world becomes technology rather than science. The will of the Islamic countries to participate in the modernization process through transfer of technology obscures the philosophical dimension of the problem, leading to the kind of simplistic and reductionist thinking upon which we will touch shortly.

As for the intellectual challenge posed by modern science, it can hardly be said to have dwindled or disappeared in spite of the diminishing sway of positivism and its allies among the learned. There is a peculiar situation in the wake of the rise of new philosophies of science with new developments in scientific research, extending from the ousting of positivism and physical materialism to quantum mechanics and anti-realism. The postmodernist wave has shaken our confidence in science with consequences far beyond the scientific field, and many young Muslim students and intellectuals see no

problem with adopting the relativist and anti-realist stances of a Kuhn or Feyerabend. The dike of modern science broken, it is assumed that religion and science can now begin talking to each other whereas the truth is that neither has a firm standing because both of them have been deprived of their truth-value by the anti-realist and relativist philosophies of our time. The popularity of the current discussions of philosophy of science in Muslim countries is indicative of the volatile nature of the subject as well as its long history among the Muslim intelligentsia.^[9]

It would not be a stretch to say that the contemporary Islamic world is gripped by the challenges of these two divergent yet related points of view, which shape its perception of science in a number of fundamental ways. On the one hand, the governments and ruling elite of Islamic countries consider it to be of the highest priority to keep up with the global race of technological innovation from communications and medical engineering to weapon industry and satellite technology.^[10] Arguments to the contrary are seen as a call for resisting the irreversible process of modernization, or for backwardness, to say the least. On the other hand, it has become common wisdom that the consequences of the application of modern natural sciences to fields that have never been encroached upon before pose serious threats to the environment and human life. This is coupled with the threat of modern science becoming the pseudo-religion of the age, forcing religion to the margins of modern society, or at least making it a matter of personal choice and social ethics. This creates a bitter conflict of consciousness in the Muslim mind, a conflict between the sacred and the worldly power, between belief and scientific precision, and between seeing nature as the cosmic book of God and as a source of exploitation and domination.

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

that the concept of Islamic science goes back, a concept which has caused a great deal of discussion as well as confusion in Islamic intellectual circles.

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

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

This attitude can best be seen among the forerunners of Islamic modernism, especially among those who addressed the question of science as the most urgent problem of the Islamic world. Jamal al-Din Afghani in his celebrated attack on the 'materialists', i.e., Haqiqat-i mazhab-i naichiri wa bayan-i hal-i nachiriyān, translated into Arabic by Muhammad Abduh as al-Radd 'ala'l-dahriyyin, was engaged in a self-proclaimed battle of saving science from the positivists, a battle for which he derived support from both the history of Islamic and modern sciences. He had the following to say in his celebrated response to Renan:

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

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

'The strangest thing of all is that our ulama these days have divided science into two parts. One they call Muslim science, and one European science. Because of this they forbid others to teach some of the useful sciences. They have not understood that science is that noble thing that has no connection with any nation, and is not distinguished by anything but itself. Rather, everything that is known is known by science, and every nation that becomes renowned becomes renowned through science. Men must be related to science, not science to men. (...)

The father and mother of science is proof, and proof is neither Aristotle nor Galileo. The truth is where there is proof, and those who forbid science and knowledge in the belief that they are safeguarding the Islamic religion are really the enemies of that religion. The Islamic religion is the closest of religions to science and knowledge, and there is no incompatibility between science and knowledge and the foundation of Islamic faith.^[13]

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

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

It is not difficult to see the imagery of the torch of science inherent in this view. Being the most prevalent attitude towards the history of science both in the Islamic and Western world, this view considers history of science progressing along a linear trajectory of discoveries and heuristic advancements. The torch of science transmitted from one nation to another, from one historical period to another, signifies the constant progress of

scientific research, relegating such facts as religious convictions, philosophical assumptions and/or social infrastructure to a set of preparatory conditions necessary for the advancement of science. Thus the only difference between the science of the 13th century Islamic world and that of the 19th century Europe turns out to be quantitative, that is, in terms of the accumulation and further specialization of scientific knowledge about the physical world. By the same token, the scientific revolution of the 17th and 18th centuries was a revolution not in the outlook of the modern man concerning nature and the meaning of scientific investigation but in the methodological tools and formulations of the natural sciences. This is how the majority of the 19th century intellectuals would have interpreted the history of science and the rise of modern natural sciences, and this is how the subject is still taught today in the schools in the Islamic world.^[14]

A logical result of this view of science is the incorporation of scientific findings as confirmations of the Islamic faith. In the pre-modern era when the religious worldview was strong, no scientist deemed it necessary to subject the Quranic verses to a 'scientific' reading, hoping, perhaps, to improve one's faith in religion or showing the religious basis of scientific investigation. As a trait of the modern period, however, many believers of different religions and denominations look for possible confirmations from the sciences for their religious belief, confirmations that would, it is hoped, both increase the truth-value of the sacred book and ward off the hegemonic onslaught of the positivists. A good example of this approach in the Islamic world is without doubt Said Nursi (1877-1960), the famous scholar, activist and founder of the Nurcu movement in Turkey.

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

As a religious scholar well grounded in traditional Islamic sciences, Nursi was aware of the apparent discrepancy between traditional cosmology articulated by Muslim philosophers and Sufis and the Newtonian world-picture which contained no religious terms. Instead of rejecting the mechanistic view of the universe presented by modern science, Nursi saw an interesting parallel between it and the kalam arguments from design (nizam).

In his view, the classical arguments from design, used profusely by Muslim and Christian thinkers alike, were meant to prove the eternal order and harmony built into the texture of the cosmos by the Divine creator, and as such they do not contradict Newtonian determinism. If the mechanistic view of the universe presents a world-picture in which nothing can remain scientifically unaccounted for, then this proves not the fortuitous generation of the cosmos but its creation by an intelligent agent, which is nothing other than the Divine artisan.^[16] Therefore the depiction of the universe as a machine or clock, the two favorite symbols of the deists of the 19th century, does not nullify the theistic claims of creation. On the contrary, rationality as regularity, harmony and predictability, Nursi would wholeheartedly argue, lies at the heart of the religious view of the cosmos. Thus the mechanistic view of the universe, which was hailed by the secularists and positivists of the 19th century as the indisputable triumph of reason over against religion, poses no threat to the theistic conception of the universe. As Mardin points out, this attitude was so influential among Nursi's followers that vocabularies taken from 19th century thermodynamics and electricity became household terms of the Nurcu movement. Thus the physical world is described as 'a fabrika-i kainat (factory of the universe) (Lem'alar, 287); life is a machine of the future from the exalted benchwork of the universe (hayat kainatin tezgah-i azaminda ... bir istikbal makinesidir) (Lem'alar, 371). Sabri, one of the first disciples of Bediuzzaman, speaks of 'machines which produce the electricity of the Nur factory' when speaking of the work of disciples.^[17]

Nursi's approach to modern science has been interpreted in a number of variant and, sometimes, conflicting ways. There are those who take his coping with science as a powerful way of deconstructing its metaphysical claims by using the language of Newtonian physics, chemistry and astronomy.^[18] The opposite side of the controversy is represented by those who tend to emphasize the influence of modern science and positivism on Nursi -- an influence visible in the entire generation of 19th century Muslim scholars, intellectuals, and activists. Even though one can easily detect an apparent incongruity between what Nursi had intended by his so-called 'scientific commentary' (al-tafsir al-ilmi) and what his followers made out of it^[19], the roots of his theistic scientism, one may claim, are ultimately traceable to his *Risale-i Nur*.^[20] A few examples will suffice to illustrate this point. When discussing the miracles of the prophets mentioned in the Qur'an, Nursi identifies two main reasons for their dispensation by the Divine authority. The first reason pertains to the veracity of the prophets of God, viz., they have been sent with an undeniable truth (burhan) to summon people to God's eternal word. The second reason, and this is what concerns us here, is that the prophetic miracles contain in them the seed of the future developments of human civilization. The story of the Prophet Sulayman (Solomon) mentioned in the Qur'an (Saba', 34/12), for instance, predicts the invention of modern aviation systems. As Nursi interprets it, the fact that God has given the wind under Sulayman's command to travel long distances in a short period of time points to the future possibility of traveling in the air in general, and to the invention of aircraft (teyyare) in particular.^[21] Another example is the Prophet Moses' miracle to bring out water from the earth, as mentioned in the Qur'an

(Baqarah, 2/60), when he and his followers were searching for water in the middle of the desert. According to Nursi, this event predicts the development of modern drilling techniques to dig out such indispensable substances of modern industry as oil, mineral water and natural gas. Following the same line of thinking, so typical of his generation of Qur'anic commentators, Nursi explains the mention of iron and 'its being softened to David' (Saba', 34/10) as a sign of the future significance of iron and, perhaps, steel for modern industry.^[22] Another striking example of how Nursi was deeply engaged in scientific exegesis is his interpretation of the verse of the light (Nur, 24/35), upon which such colossal figures of Islamic history as Ibn Sina and Ghazzali have written commentaries. Among many of the other profound and esoteric meanings of the light verse, which depicts God as the 'light of the heavens and the earth', is the allusion to the future invention of electricity whose continuous diffusion of light is compared to the Qur'anic expression 'light upon light' (nurun 'ala nur) mentioned in the verse.^[23]

These examples, the number of which can easily be multiplied, and the way they are justified, were in tandem with a presiding idea, which Nursi adopted and elaborated with full force. This he called the 'miracle of the teaching of Divine names to Adam' (talim-i esma mucizesi). The Qur'an tells us in Baqarah 2/31 that God, after creating Adam as his vicegerent on earth, to which the angels had objected for fear of corruption on earth, taught him 'all the names' (or according to another reading 'the names of all things', asma'a kullaha). Throughout the Islamic intellectual history, this verse has been interpreted in a myriad of different ways, ranging from the most literalist to the most esoteric readings. In a daring statement, Nursi takes this miracle of Adam, the father of humanity, as greater and more perfect than those of all the other prophets after him for it embodies and comprises the entire spectrum of 'all the progress and perfection human beings will ever achieve in the course of their history'.^[24] Essentially, it is on the basis of this principle that Nursi justifies his scientific and 'progressive' exegesis of various verses of the Qur'an. True, interpretations of this kind can be found in traditional commentaries on the Qur'an or among the Sufis. What is peculiar about Nursi's new hermeneutics, if we may use such an appellation here, is the scientific and modern context in which it is articulated and carried out.

In its vulgarized version, Said Nursi's encounter with modern science has led to a torrent of one-to-one correspondences between new scientific findings and Qur'anic verses, generating an unprecedented interest in natural sciences among his followers. Moreover, his position on science as the decoder of the sacred language of nature influenced a whole generation of Turkish students, professionals and lay people with repercussions outside the Turkish-speaking world. Today, his followers are extremely successful in matters related to sciences and engineering, and continue Nursi's method of integrating the findings of modern physical sciences into the theistic perspective of Abrahamic religions. They are, however, also extremely poor and unprepared when it comes to the philosophical aspects of the subject.

The pages of the journal *Sizinti*, published by Nursi's followers in Turkish, and its English version *Fountain*, are filled with essays trying to show the miracle of creation through comparisons between the cosmological verses of

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

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

The great majority of people in the Islamic as well as Western world share the sentiments of the above view of science that we have just summarized. Many people from all walks of life believe in the necessity of upholding an ethical framework within which scientific investigation should be carried out and controlled. This has certainly important policy implications for scientific research funded by federal governments and business corporations in many parts of the world. The point that is inevitably obscured, however, is much more crucial than having an influence on policy decisions. To limit ethics to policy implementations is to make it a matter of personal preference for the scientific community whose political and financial freedom against governments and giant corporations is highly questionable. The fact that the scientists who approve human cloning and genetic alteration believe in theistic evolution does not change

the course of modern science. The conflict of consciousness to which we referred above resurfaces here in the form of people whose hearts and

emotions are attached to the mandates of their respective religion but whose minds are empty of the religious view of the universe.

The Epistemic View of Science: For and Against the Method

An important channel through which the contemporary Islamic world, especially in the last three decades of the 20th century, has come to terms with modern science is philosophy science as developed in the West. The impact of the deconstruction of the epistemological hegemony of 19th century positivism together with the critique of Newtonian physics and scientific objectivism and realism on the Islamic world has been stupendous and caused a torrential release of intellectual energy among students and intellectuals. Needless to say, the influx of ideas associated with such names as Kuhn, Feyerabend and Popper and their current students continues almost unabated in spite of the fact that the post-antirealist thinking on science seems to have come to a serious stalemate. Being on the receiving end of this debate, many Muslim students and intellectuals are still experimenting with these ideas with little effort, as we shall see shortly, to extrapolate their full implications. Before doing that, however, a few words of clarification on the scope of contemporary philosophy of science are in order.

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

Thinking out the question of being in terms of how it is known, to use a Heideggerian language, is the leitmotif of modern philosophy, including its prima facie foes, rationalism and empiricism.^[25] Whether we consider the knowing subject as a rationalist, empiricist, structuralist or deconstructionist, the anthropocentric ethos runs through the veins of how we perceive the world around us, how we interact with it, and how we position ourselves vis-à-vis the other human beings with whom we share the intentional as well as the physical space of our life-world. Here the eternal paradox of all subjectivist epistemologies is brought into clarity: to put the subject before the world, of which he is a part, is to claim the square inside the circle to be larger than the

circle. Said differently, to ground the intelligibility of the world in the discursive constructions of the knowing subject is to see the world, or rather anything outside the subject, as essentially devoid of intrinsic meaning and intelligibility.^[26] The Muslim critique of modern science based on the premises of modern epistemology has usually lost sight of this crucial fact as we see in the otherwise commendable literature produced by Ismail Faruqi and his protégé International Institute of Islamic Thought (mentioned hereafter as IIIT).

There is no denying the fact that Kuhn's radical anti-realism or Popper's concept of verisimilitude cannot be interpreted as lending support to the epistemic hegemony of modern science. On the contrary, they are meant to destroy it once and for all. The anti-realist component of their positions, however, reinforces the anthropocentric imagery: it is the knowing subject who is willing to deny science its self-proclaimed objectivity and appeal to credibility.^[27] It is this aspect of contemporary philosophy of science, I believe, that has been totally mistaken and ignored by its adherents in the Islamic world. Today we can hardly come across a book or article written in English, Arabic, Turkish or Bahasa Malaysia that does not have recourse to Foucault, Kuhn, Feyerabend or Lyotard to denounce the philosophical underpinnings of modern science.^[28] From the academic papers of Muslim graduate students to the writings of the so-called 'ijmalis' led by Ziauddin Sardar, the names of numerous philosophers of science sweep through the literature with indigenous additions from the Islamic point of view. To put it mildly, this has led to the overemphasis of epistemology and methodology among many Muslim thinkers and young scholars while questions of ontology and metaphysics have been either left out or taken for granted. The concept of Islamic science, in this point of view, is centered around a loosely defined epistemology, or rather set of discrete ideas grouped under Islamic epistemology whose content is yet to be determined. In many ways, the idea of Islamizing natural and social sciences has been equated, by and large, with producing a different structure of knowledge and methodology within what we might call the epistemologist fallacy of modern philosophy. The crucial issue has thus remained untouched: to reduce the notion of Islamic science to considerations of epistemology and methodology, which are without doubt indispensable in their own right, is to seek out a space for the Islamic point of view within, and not outside, the framework of modern philosophy.

Ismail Faruqi's work known under the rubric of Islamization of knowledge is a good example of how the idea of method or methodology ('manhaj' and 'manhajiyah', the Arabic equivalents of method and methodology being the most popular words of the proponents of this view) can obscure deeper philosophical issues involved in the current discussions of science. Even though Faruqi's project was proposed to Islamize the existing forms of knowledge imported from the West, his focus was exclusively on the humanities, leaving scientific knowledge virtually untouched. This was in tandem with his conviction that the body of knowledge generated by modern natural sciences is neutral and as such requires no special attention. Thus, Faruqi's work, and that of IIIT after his death, concentrated on the social sciences and education.^[29] This had two important consequences. First,

Faruqi's important work on Islamization provided his followers with a framework in which knowledge (al-'ilm) came to be equated with social disciplines, thus ending up in a kind of sociologism. The prototype of Faruqi's project is, we may say, the modern social scientist entrusted with the task of the traditional 'alim. Second, the exclusion of modern scientific knowledge from the scope of Islamization has led to the negligence, to say the least, of the secularizing effect of modern scientific worldview.^[30] This leaves the Muslim social scientists, the ideal-type of the Islamization program, with no clue as to how to deal with the question of modern scientific knowledge. Furthermore, to take the philosophical foundations of modern natural sciences for granted is tantamount to reinforcing the dichotomy between the natural and human sciences, a dichotomy whose consequences continue to pose serious challenges to the validity of the forms of knowledge outside the domain of modern physical sciences.^[31]

A similar position, with some important variations, is to be found in the works of Ziauddin Sardar and a number of closely associated scholars known as the "ijmalis" and the "Aligarh School".^[32] Although the ijmalis do not accept the appellation of being a 'merely Kuhnian', one can hardly fail to see the subtext of their discourse based on Kuhn, Feyerabend and others in their critique of modern Western science.^[33] Sardar's definition of science shares much of the instrumentalist and anti-realist spirit of the Kuhnian science. For him, science is 'a basic problem-solving tool of any civilization. Without it, a civilization cannot maintain its political and social structure or meet the basic needs of its people and culture.'^[34] The ijmalis' socio-cultural point of view certainly points to an important component of scientific activity, viz., the social setting in which the sciences are cultivated and flourish. It is, however, to be noted that the relegation of physical sciences, or any scholarly activity for that matter, to social utility is bound to have serious consequences insofar as the philosophical legitimacy of sciences is concerned. As we see in the case of Van Fraassen and Kuhn, the instrumentalist definition of science entails a strong leaning towards anti-realism, a position whose compatibility with the concept of Islamic science is yet to be accounted for.

Yet, there is another paradox involved here. The most common critique of modern science has been to present it as a culturally conditioned and historical endeavor with claims to universality and objectivity. Kuhn's philosophy of paradigm, which has become the most fashionable buzz word in the Islamic world, Feyerabend's defense of society against science, or Van Fraassen's scientific instrumentalism are all profusely used to show the utter historicity and relativity of modern science. Since every scientific, and, by extension, human activity is embedded in a historical and cultural setting, we can no longer speak of sciences in isolation from their socio-historical conditions. This implies that no account of science, be it Western or Islamic, is possible without the history and, more importantly, sociology of science, whose task is to deconstruct the historical formation and genealogy of sciences. Furthermore, this approach has been applied to humanities as well,

with almost total disregard to its implications for what is proposed in its place, i.e., Islamic science and methodology.

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

What I have called here the epistemic view of science, which has taken the form of an extremely common tendency rather than a single school of thought, has certainly raised the consciousness of the Islamic world about modern science, and contributed to the ongoing discussion of the possibility of having a scientific study of nature based on an Islamic ethos. We can, however, hardly fail to see the contradictions in this point of view especially when it is most vulnerable to the temptations of modern epistemology. The emphasis put on epistemology to the point of excluding ontology and metaphysics has grave consequences for any notion of science, and it is for this reason that we do not see any serious study of philosophy, metaphysics or cosmology among the followers of this point of view. Furthermore there is a deliberate resistance to these disciplines in spite of the fact traditional Islamic philosophy and metaphysics had functioned as a gateway between scientific knowledge and religious faith. At any rate, it remains to be seen if the adherents of the epistemic view of science will be able to overcome the subjectivist fallacy of modern philosophy, i.e., building an epistemology without articulating an adequate metaphysics and ontology.

The Sacred versus the Secular: The Metaphysics of Science

The last major position on science of which we can give here only a brief summary is marked off from the other two positions by its emphasis on metaphysics and the philosophical critique of modern science. Represented chiefly, inter alia, by such thinkers as Rene Guenon, Seyyed Hossein Nasr, Naquib al-Attas, Osman Bakar, Mahdi Golshani and Alparslan Acikgenc, the metaphysical view of science considers every scientific activity operating within a framework of metaphysics whose principles are derived from the immutable teachings of the Divine revelation. In contrast to philosophy and sociology of science, metaphysics of science provides sciences with a sacred concept of nature and cosmology within which to function.^[35] At this point, the sacred view of nature taught by religions and ancient traditions takes on a prime importance in the formation and operation of physical sciences, and all of the traditional sciences, regardless of the historical and geographic setting they were cultivated in, were based on such principles which had enabled them to produce highly advanced sciences and techniques while maintaining the sacredness of nature and the cosmos. The traditional natural sciences, Nasr and others argue, derived not only their work-ethics and methodology but also metaphysical and ontological *raison d'etre* from the principles of Divine revelation because they were rooted in a conception of knowledge according to which the knowledge of the world acquired by man and the sacred knowledge revealed by God were seen as a single unity. As a result, the epistemological crisis of the natural and human sciences that we try to overcome today did not arise for the traditional scientist who did not have to sacrifice his religious beliefs in order to carry out a scientific experiment, and vice versa.

The traditional metaphysics envisages reality as a multi-layered structure with different levels and degrees of meaning. The polarity between the Principle and Its manifestation, which is translated into the language of theology as God and His creation, gives rise to a hierarchic view of the universe because manifestation already implies a domain of reality lower than its sustaining origin. Moreover, since reality is what it is due to the Divine nature, it cannot be seen as a play-thing or the product of a series of fortuitous events. On the contrary, the cosmos, as the traditional scientists firmly believed, is teleological throughout, displaying a remarkable order and purposiveness. Nature, depicted by modern science as a ceaseless flow of change and contingency, never fails to restore itself into an abode of permanence and continuity with the preservation of species and self-generation.^[36] Seen under this light, nature, which is the subject matter of physical sciences, cannot be reduced to any one of these levels. With reductionism out, the traditional metaphysics of science uses a language built upon such key terms as hierarchy, *telos*, interconnectedness, isomorphism, unity and complexity. These qualities are built into the very structure and methodology of traditional sciences of nature, which can be taken to be one of the demarcation lines between the sacred and modern secular views of science.^[37] It is therefore impossible, the proponents of this view would insist, to create or resuscitate the traditional Islamic sciences of nature without first

articulating its metaphysical framework. Any attempt to graft Islamic ethics and epistemology to the metaphysically blind outlook of modern science is bound to be a failure.

The philosophical underpinnings of Islamic science, as defined by Nasr, Attas, and others are derived from the metaphysical principles of Islam. Just as the Islamic revelation determines the social and artistic life of the Muslim civilization, it also gives direction to its understanding of the natural environment and its scientific study.^[38] The doctrine of tawhid, the most essential tenet of Islamic religion, affirms the unity of the Divine Principle, and it is projected into the domain of natural sciences as the essential unity and interrelatedness of the natural order. A science can thus be defined as Islamic, Acikgenc states, to the extent to which it conforms to and reflects the cardinal principles of the Islamic worldview.^[39] In a similar way, Nasr insists that 'the aim of all the Islamic sciences -- and more generally speaking, of all the medieval and ancient cosmological sciences -- is to show the unity and interrelatedness of all that exists, so that, in contemplating the unity of the cosmos, man may be led to the unity of the Divine Principle, of which the unity of Nature is the image.'^[40] Thus the Islamic sciences of nature function in a two-fold way. First, they look at nature as a single unity with all of its parts interconnected to each other. Second, they are meant to lead both the scientist and the layman to the contemplation of Nature as the sacred artifact of the Divine. For Nasr, the sacred cosmology of the Sufis, which is grounded in metaphysics and inspiration rather than physical sciences per se, is related to the second function of the sciences of nature, and maintains its validity even today for it is based on the symbolic significance of the cosmos. This brings us to the other important feature of the Islamic sciences of nature, i.e., their intellectual function.

Nasr uses the word 'intellect' in its traditional sense, viz., as related to contemplation. The modern connotation of the words intellect and intellectual as logical analysis or discursive thinking is the result of the emptying of their metaphysical and mystical content. Having rejected the usage of the word 'intellect' as abstract analysis or sentimentality, Nasr seeks to regain its medieval and traditional usage.

"Intellect" and "intellectual" are so closely identified today with the analytical function of the mind that they hardly bear any longer any relation to the contemplative. The attitude these words imply toward Nature is the one that Goethe was to deplore as late as the early nineteenth century -- that attitude that resolves, conquers, and dominates by force of concepts. It is, in short, essentially abstract, while contemplative knowledge is at bottom concrete. We shall thus have to say, by way of establishing the old distinction, that the gnostic's relation to Nature is 'intellective', which is neither abstract, nor analytical, nor merely sentimental.^[41]

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

By the same token, the function of philosophy cannot be confined to being a mere interpreter of the data produced by natural sciences. In sharp contrast to the Kantian notion of philosophy, which has turned philosophy into a handmaid of Newtonian physics, Nasr assigns to philosophy an important role in establishing a harmonious relation between the givens of religion and the demands of scientific investigation. In the post-Kantian period, philosophy was gradually reduced to a second-order analysis of the first-order facts of physical sciences, and this has assigned to philosophical pursuit a completely different task. In contrast to this new mission, Nasr insists on the traditional meaning and function of philosophy. On the one hand, philosophy is related to the life-world in which we live, including the physical environment, and as such it cannot remain indifferent to a veritable understanding of the universe and the cosmos. On the other hand, it is closely related to metaphysics and wisdom, and as such it cannot be reduced to a branch of physical sciences. In fact, this is how the relationship between philosophy and science was established in classical classifications of knowledge, both in the West and the Islamic world. The scientist and the philosopher were united in one and the same person as we see in the case of an Aristotle or Ibn Sina, and this suggests that the scope of philosophical thinking could not be relegated to quantitative analysis of natural sciences. Thus, in Nasr's concept of science, philosophy, in addition to metaphysics and aesthetics, plays a crucial role that cannot be substituted for by any other science.^[42] Moreover, the sciences of nature always function within a definite framework of ontology and cosmology, which is articulated primarily and essentially by philosophy in the traditional sense of the term. This is why philosophy is an integral part of Nasr's metaphysical concept of science.

The metaphysical view of traditional civilizations concerning nature and its scientific study has been lost in modern science whose philosophical foundations go back to the historical rupture of the Western thought with its traditional teachings. The rise of modern science, Nasr and others would insist, was not simply due to some ground-breaking advancements in scientific methods of measurement and calculation.^[43] On the contrary, it was the result of a fundamental change in man's outlook concerning the universe.^[44] This outlook is predicated upon a number of premises, among which the following five are of particular significance. The first is the secular view of the universe, which allows no space for the Divine in the order of nature. The second is the mechanistic world-picture presented by modern science, which construes the cosmos as a self-subsistent machine and/or pre-ordained clock. The third is the epistemological hegemony of rationalism and empiricism over the current conceptions of nature. The fourth is the Cartesian bifurcation, based on Descartes' categorical distinction between *res cogitans* and *res extensa*, which can also be read as the ontological alienation of the knowing subject from his/her object of knowledge. The fifth and the final premise of modern scientific worldview, which can be seen as the end-result of the preceding points, is the exploitation of the natural environment as a source of global power and domination.^[45] This is coupled with the hubris of modern science which does not accept any notion of truth and knowledge

other than what is verifiable within the context of its highly specialized, technical, and hence restricted means of verification.

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

* * * * *

Conclusion

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

Notes

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

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

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

[4] Ataturk'un Soylev ve Demecleri (Ankara, 1952), II, 44, from a speech given in October 27, 1922; quoted in Von Grunebaum, *ibid.*, p. 104.

[5] Although the most celebrated responses to Renan belong to J. Afghani and N. Kemal, a number of other refutations have been written. The Turkish scholar Ducane Cundioglu lists twelve major refutations, ten of which are by Muslims, and the list comprises such names as Sayyid Amir Ali, Rashid Rida, Celal Nuri, Louis Massignon, and Muhammad Hamidullah. For an excellent survey of the subject, see his 'Ernest Renan ve 'Reddiyeler' Baglaminda Islam-Bilim Tartismalarina Bibliyografik Bir Katki', *Divan*, Vol. 2 (Istanbul, 1996), pp. 1-94.

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

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

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

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

[10] See the remarks of Abdus Salam, the Nobel laureate and one of the famous scientists of the 20th century, *Ideals and Realities: Selected Essays of Abdus Salam*, ed. by C. H. Lai (Singapore: World Scientific, 1987).

[11] Osman Amin, one of the prominent figures of Egyptian intellectual scene of the last century and perhaps the most outspoken vanguard of the 19th century Islamic modernism

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

[12] Afghani's letter to Renan, published in *Journal de Debats*, May 18, 1883, translated in Kiddie, *ibid.*, p. 183.

[13] Afghani, 'Lecture on Teaching and Learning', in Kiddie, *ibid.*, p. 107.

[14] Perhaps the most notable exception, albeit in a rather negative sense, was Sayyid Ahmad Khan who had called for the complete rejection of the traditional notions of nature under the name of 'new theology' (*ilm-i kalam-i jadid*). Afghani was well aware of the perils of this point of view, and thus did not hesitate to include Ahmad Khan among the 'materialists', whom he called 'neicheri', namely the naturalists. For Afghani's response, see his 'The Materialists in India', *al-'Urwat al-Wuthqa*, August 28, 1884, translated in N. R. Kiddie, *ibid.*, pp. 175-180.

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

[16] Nursi's works, especially the *Sozler* (Istanbul: Sinan Matbaasi, 1958), are replete with references to God as the Great or Absolute Artisan (*sani-i mutlak*) of the universe. It goes without saying that Nursi was not alone in approaching the deterministic and orderly universe of modern science from this peculiar point of view. In fact, this was a common attitude among the forerunners of what is called the 'scientific method of commenting upon the Qur'an' (*al-tafsir al-'ilmi* and/or *al-tafsir al-fanni*) such as Muhammad Abdu, Muhammad ibn Ahmad al-Iskandarani, Sayyid Abd al-Rahman al-Kawakibi, and Muhammad Abdullah Draz. Like Nursi, these figures were passionately engaged in reconciling the scientific findings of 19th century physical sciences with the cosmological verses of the Qur'an and, in some cases, the sayings (*hadith*) of the Prophet of Islam. For these figures and the concept of scientific commentary, see Ahmad Umar Abu Hijr, *al-Tafsir al-'Ilmi li'l-Qur'an fi'l-Mizan* (Beirut, 1991) and Muhammad Husayn al-Dhahabi, *al-Tafsir wa'l-Mufasssirin*, 2 vols (Beirut, 1976).

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

[18] Without exception, all of Nursi's followers appeal to the first view, rejecting any association with positivism. For a defense of this position, see, among others, Yamine B. Mermer, 'The Hermeneutical Dimension of Science: A Critical Analysis Based on Said Nursi's *Risale-i Nur*', *The Muslim World*, Special Issue: Said Nursi and the Turkish Experience, ed. by M. Hakan Yavuz, Vol. LXXXIX, Nos. 3-4 (July-October, 1999), pp. 270-296. Mermer's essay is also interesting for making a case for occasionalism on the basis of Nursi's views.

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

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

[21] Sozler (Istanbul: Sinan Matbaası, 1958), p. 265, and *Isharat al-i'jaz fi mazanni'l-ijaz* (Istanbul, 1994), p. 311.

[22] Sozler, p. 266.

[23] *Ibid.*, pp. 263; see also his *Sikke-i Tasdik-i Gaybi* (Istanbul: Sinan Matbaası, 1958), p. 76.

[24] Sozler, pp. 272-273; *Isharat*, p. 310.

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

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

[27] Heidegger calls this 'projection', through which the world of nature is made the subject-matter of mathematico-physical sciences: 'What is decisive for its development [viz., the development of mathematical physics] does not lie in its rather high esteem for the observation of 'facts', nor in its 'application' of mathematics in determining the character of normal processes; it lies rather in the way in which Nature herself is mathematically projected. In this projection, something constantly present-at-hand (matter) is uncovered beforehand, and the horizon is opened so that one may be guided by looking at those constitutive items in it, which are quantitatively determinable (motion, force, location, and time). Only 'in the light' of a Nature which has been projected in this fashion can anything like a 'fact' be found and set up for an experiment regulated and delimited in terms of this projection. The 'grounding' of 'factual science' was possible only because the researchers understood that in principle there are no 'bare facts'. *Being and Time*, tr. by J. Macquarrie and E. Robinson, (Oxford: Basil Blackwell, 1978), pp. 413-4.

[28] To illustrate the lure of postmodernism in the current debate, one may refer to Alan Sokal's now famous hoax and its wholehearted incorporation by M. Zaki Kirmani, a member of the Aligarh school. Alan Sokal, a physicist and philosopher of science, published an article in *Social Text* 46/47 (Spring-Summer, 1996), pp. 217-52 titled "Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity". In the article, Sokal, using the recent findings and discussions in quantum physics, made a case for what is labeled as 'postmodern science', giving perhaps one of the most incredulous versions of postmodernist discourse on science. The article was published by *Social Text* in all seriousness. After the publication of the article, however, Sokal shocked the academic world by declaring that his article was a hoax and that its sole purpose was to expose what goes under the name of postmodernism. As expected, the Sokal hoax quickly became a hallmark of intellectual masquerading so rampant in academic circles today. In the wake of the publication of his article and the debate that ensued afterwards, Sokal made his overall case in *Intellectual Impostures* (London: Profile Books, 1998) authored with Jean Bricmont. Sokal's famous article appears at the end of this book. Apparently not aware of the Sokal event, A. Z. Kirmani quotes the aforementioned article in earnest to make a case for postmodern science, which he then relates to Islamic science. For Kirmani's views, see his

“Islamic Science Debate: Entering the New Millennium”, *Hamdard Islamicus* Vol. XXIII, No. 4 (October-December, 2000), pp. 33-34.

[29] See, Ismail R. al-Faruqi *Islamization of Knowledge: General Principles and Work Plan* (Washington DC: International Institute of Islamic Thought, 1982). This book has been largely revised and expanded in its 1989 edition by a group of scholars associated with the International Institute of Islamic Thought.

[30] Jamal Berzinji, one of the family members of IIIT, mentions the natural sciences only once (p. 28) in his informative article on Islamization of knowledge and IIIT's role in its development. See his 'History of Islamization of Knowledge and Contributions of the International Institute of Islamic Thought' in *Muslims and Islamization in North America: Problems & Prospects*, ed. by Amber Haque (Maryland: Amana Publications, 1999), pp. 13-31.

[31] For an informative analysis of Faruqi's work on Islamization, see Leif Stenberg, *The Islamization of Science: Four Muslim Positions Developing an Islamic Modernity* (Lund: Lund Studies in History of Religions, 1996), pp. 153-219.

[32] For an exposition and defense of the views of these two groups, see A. Z. Kirmani, *ibid.*, pp. 7-36.

[33] Ziauddin Sardar, *Explorations in Islamic Science*, (London: Mansell Publishing Ltd., 1989), p. 155. This emphatic denial itself is quite telling for our discussion here.

[34] Z. Sardar, *Islamic Futures* (London: Mansell Publishing Ltd., 1985), p. 157.

[35] Nasr uses the word metaphysics as the all-inclusive science of the Divine Principle, which comprises both ontology and theology: 'If Being is envisaged as the principle of existence or of all that exists, then It cannot be identified with the Principle as such because the Principle is not exhausted by its creating aspect. Being is the first determination of the Supreme Principle in the direction of manifestation, and ontology remains only a part of metaphysics and is incomplete as long as it envisages the Principle only as Being in the sense defined.' *Knowledge and the Sacred* (New York: SUNY Press, 1989), p. 136.

[36] Perhaps the most systematic and comprehensive exposition of this idea is to be found in Mulla Sadra's concept of nature (*tabi'ah*) and substantial movement (*al-harakat al-jawhariyyah*). See the section on natural philosophy ('ilm al-*tabi'ah*) in his *al-Hikmat al-muta'aliyah fi'l-asfar al-arba'at al-'aqliyyah*, ed. by M. Rida al-Muzaffar, (Beirut: Dar Ihya al-Turath al-'Arabi, 1981), vol. 3, part. 1. Sadra's work is also important for its highly articulated cosmology which is comparable only to that of Ibn al-'Arabi.

[37] For an analysis of such concepts as quality, quantity, unity, simplicity regularity, etc., from the traditional point of view, see Rene Guenon, *The Reign of Quantity and the Signs of the Times* (London, 1953), especially, pp. 19-100.

[38] S. H. Nasr, *Islamic Science: An Illustrated Study* (Kent: World of Islam Festival Publishing Company Ltd, 1976), pp. 3-9; and S. M. Naquib al-Attas, 'Islam and the Philosophy of Science' in his *Prolegomena to the Metaphysics of Islam: An Exposition of the Fundamental Elements of the Worldview of Islam* (Kuala Lumpur: ISTAC, 1995), and *Islam and Secularism* (Kuala Lumpur: Muslim Youth Movement of Malaysia, 1978).

[39] 'Islamic science is that scientific activity which takes place ultimately within the Islamic worldview (which can now be identified also as the Islamic conceptual environment); but as an extension of it directly within the Islamic scientific conceptual scheme (which can be identified also as the Islamic context of sciences).' Alparslan Acikgenc, *Islamic Science: Towards a Definition* (Kuala Lumpur: ISTAC, 1996), p. 38.

[40] S. H. Nasr, *Science and Civilization in Islam* (New York: Barnes & Noble Books, 1992), p. 22.

[41] *Ibid.*, p. 24.

[42] For Nasr's concept of philosophy, see his 'The Meaning and Concept of Philosophy in Islam' and 'the Qur'an and the Hadith as Source and Inspiration of Islamic Philosophy' in *History of Islamic Philosophy*, 2 vols, ed. by S. H. Nasr and O. Leaman (London: Routledge, 1996), pp. 21-39.

[43] This has been noted by many Western historians of science. See, for instance, Edwin Arthur Burt, *The Metaphysical Foundations of Modern Physical Science* (New York: Doubleday Anchor Books, 1932) and Wolfgang Smith, *Cosmos and Transcendence: Breaking Through the Barrier of Scientistic Belief* (Illinois: Sherwood Sugden & Company, 1984). For the transformation of the concept of nature in the Western tradition, see R. G.

Collingwood, *The Idea of Nature* (Oxford: Oxford University Press, 1972), especially pp. 133-177. For a thorough study of the ongoing debate on the meaning of the Scientific Revolution, see H. Floris Cohen, *The Scientific Revolution: A Historiographical Inquiry* (Chicago: The University of Chicago Press, 1994). Cohen's book has also a useful section (pp. 384-417) on Islamic science in relation to the Scientific Revolution.

[44] Russell has provided one of the most elegant expressions of the secular outlook of modern physical sciences in his celebrated essay 'A Free Man's Worship'. See his *Mysticism and Logic* (New York: Doubleday Anchor Books, 1957), pp. 44-54. It would not be out of place to quote him here to underline the sharp contrast between the secular and traditional conceptions of science: 'Such in outline, but even more purposeless, more void of meaning, is the world which Science presents for our belief. Amid such a world, if anywhere, our ideals henceforward must find a home. That Man is the product of causes which had no prevision of the end they were achieving; that his origin, his growth, his hopes and fears, his loves and his beliefs, are but the outcome of accidental collocations of atoms; that no fire, no heroism, no intensity of thought and feeling, can preserve an individual life beyond the grave; that all the labors of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system, and that the whole temple Man's achievement must inevitably be buried beneath the debris of a universe in ruins -- all these things, if not quite beyond dispute, are yet so nearly certain, that no philosophy which rejects them can hope to stand.' *Ibid.*, p. 45.

[45] Nasr has given a full account of this process in his *Religion and the Order of Nature* (Oxford: Oxford University Press, 1997), which is a comprehensive and detailed sequel to his earlier work *Man and Nature: The Spiritual Crisis in Modern Man* (Chicago: ABC International, 1999). I have dealt with Nasr's conception of science in greater detail in my 'The Sacred versus the Secular: Nasr on Science', *The Philosophy of Seyyed Hossein Nasr*, ed. by L. E. Hahn, R. E. Auxier, and L. W. Stone, (Chicago: Open Court, 2001), pp. 445-462.

