

TEACHING SCIENCE FROM AN ISLAMIC PERSPECTIVE

Muzaffar Iqbal

O humankind! Recall the blessings which Allah has bestowed upon you! Is there any creator, other than Allah, who can provide for your sustenance out of heaven and earth? There is no deity save Him; and yet, how turned away you are! (Q 35:3)

There is no place on earth where the enterprise of science is now rooted in the Islamic view of the physical world. The physical world—which science studies systematically and in an accumulative manner, through a continuous and sustained process building on the work of previous generations, resulting in testable explanations and reliable knowledge which can be duplicated anywhere—can be conceived in many different ways, but all such approaches fold into two primary categories: (i) a theistic conception, involving a single Creator who brought the world into existence from non-existence; and (ii) a conception in which there is no room for a Creator, or which conceives the created world to be caused by more than one creator. These two categories are independent of time and place as well as of the person who conceives them.

The way we understand the physical world has far-reaching implications for science, for not only the “how” but also the “why” of science is governed by this basic framework. Since this primary conception determines how and why we do science, it also, therefore, governs, in various ways, institutions of scientific research, relationships between members of the scientific community and organizations, science policies, funding for science, the manner and extent to which scientific knowledge is shared, and other aspects related to the enterprise of science. Since the enterprise of science, as it now exists, is also umbilically linked to technology, power, money, politics, defense, wars of aggression, and a

Muzaffar Iqbal is Founder-President of the Center for Islam and Science (www.cis-ca.org). Email: Muzaffar@cis-ca.org.

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multibillion dollar industrial complex, this initial understanding of the physical world also has a direct relationship with all of these aspects of the contemporary world.

If the physical world, that is, all that exists in and around us, is conceived theistically, then we immediately encounter two fundamental questions: the *raison d'être* of its creation and our relationship with it. There is no logical necessity for these questions to arise in the case of a non-theistic conception: in the absence of a singular, unique and one Creator, the natural world simply exists by itself, needing neither a *raison d'être* for its existence, nor an agency to manage and govern it: it simply is. Human beings and all other creatures can come and go, but it remains; and all who come and go can only have transitory relations with it.

There is now no place on earth where the enterprise of science is rooted in the conception that takes the natural world as a creation of Allah, whose Most Beautiful Names (*al-asmā' al-ḥusnā*) include *al-Khāliq* (the Creator), *al-Bārī* (the Originator), and *al-Muṣawwir* (the Shaper and Fashioner of forms). What is being done in the name of science in Makkah is no different than what is being done in Washington D.C. or Moscow or Berlin. There is now only one, monochromatic, global science, which has gained a status that is independent of the race, religion, and culture of the scientist. Scientists may have any belief, but science itself is beyond beliefs; or so it is claimed. It just investigates the physical world without taking into consideration issues of religion and it has nothing to do with its Creator, if there is one. Such is the claim of modern science, and its severance from the Sacred has become commonplace; no one is shocked by the absurdity of an object existing without a subject. The “neutrality” of science with regard to this basic question is considered a *sine qua non* for good science. Yet, despite this “official position”, both science and scientists dabble with the “God question” and a book written by a scientist on the “God hypothesis” remains on the bestseller list for months—not because of any intrinsic value of its text, but merely because it is marketed as the work of a scientist. In fact, someone publicly recognized as an accomplished scientist might well be considered a good candidate for public office! This prestige is not without reason: in public perception, there is no distinction between science and the technologies produced through the application of science; and since most human beings now living on earth have personal experience of the power of technology, they attribute the enthralling power of a machine to science. Scientists thus are even invited to solve problems in areas in which they have no expertise whatsoever; whereas no one goes to a blacksmith to fix a defect in a gold earring.

The power and prestige of science and scientists being what it is, one would expect that at least the teaching of science to Muslim students would be possible in such a manner that reflects the Qur'ānic view of the physical world,

even if the practice of science is no more possible in any way other than that of modern science, which does not consider the Creator to be its concern. Yet this is not the case. Science is taught to those who otherwise have faith in the Creator just as it is taught to those who do not. This is so all across the Muslim world, even in the most outwardly conservative societies where women are not allowed to drive. The same is true for believers of other faith communities, although Christian communities in North America have made a considerable effort to teach science from their own faith perspectives and have been quite successful in this regard.

In the case of Muslims, there is not even a theoretical framework for the teaching of science from an Islamic perspective. During the last fifty years, some Muslim scholars have produced a powerful critique of modern science, but little attention has been paid to alternative ways of doing science on the ground, and even less has been said about teaching science from an Islamic perspective. While there is an urgent need to initiate a fully-funded and ultimately self-sustaining enterprise of science which is different from secular science, this remains beyond the capacity of any scholar, or even groups of scholars, for it involves policy makers, industrialists, and numerous institutions which can only be made partners by governments. There are, however, relatively few barriers hindering a genuine program of teaching science from an Islamic perspective. There is hardly a school, madrasa, university or research institution in the world where the teaching of science from an Islamic perspective has gained any attention.

Even in the short-lived ‘Islamization of knowledge’ movement, which promised a global resurrection of the Islamic view of knowledge (at least in its early phases), there was no room for the natural sciences—as if chemistry, biology, physics, astronomy, and other branches of science did not need an urgent reconfiguration. Compare a chemistry textbook based on the belief that there is no teleology in nature, that all that exists in and around has originated on its own through some random and chance permutation of cells, to one based on the Qur’anic descriptions of nature in which a Merciful Creator, possessor of absolute Knowledge, Power, and Might, fashions the cosmos and all that exists in it for a purpose and for a fixed duration. These two books would have to be fundamentally different in the way they are conceived, written, and organized. There may be a certain overlap of data in the two books, but both would interpret observable scientific data through their own lenses. In one book, the falling of rain will be presented as merely a physical process; in the other, it will have a metaphysical as well as a physical aspect and both will be fused together in a seamless manner. The book based on a foundational understanding of the One Creator Who sustains all creation will have a central unity, reflecting the vertical axis of *tawhīd*; all material in such a book would continuously reflect the inherent Qur’anic understanding of the creation of the physical world, its design,

and purpose; it would infuse the same worldview into the very act of studying it; it would aim to also transform the learner in the very process of learning the chemistry of a given natural element. Such a chemistry would also be an alchemy of the soul, and its aim would not be merely to teach students to mechanically balance chemical equations, but would aim for spiritual realignment of the learner toward the One whose creation he or she is studying.

Thus modified, the teaching of science would be no different from teaching any other “Islamic” discipline. Science teaching would find its rightful place within an hierarchy of knowledge that is unified through its anchoring in the Qur’ān. Chemistry, physics, biology and other branches of the natural sciences would then not float in a vacuous and disconnected isolation, but would be integral parts of a greater whole embracing all branches of knowledge.

Science does not deal with what is beyond the physical realm. This legitimate boundary need not be altered in an Islamic reconfiguration; all that is required in this regard is an acknowledgment of the realms beyond physical reality and an understanding that there are branches of knowledge other than science which deal with those realms. Reality is not confined to what can be observed and measured. The drop of rain falling down from the sky is much more than a cluster of water molecules randomly coming down by the force of gravity. In fact, even the popular conception of theistic science being the study of the second ‘book’ in a rather unsound binary model called the two-book-theory (i.e., the books of nature and scripture) will have to be abandoned to arrive at a unified view of the created order, whose physical form reflects the same script as that of the Book.

It is not our intention here to articulate a program of science teaching from an Islamic perspective; the scope is merely to point out its urgent need and provide a few suggestions which can be used to develop such a program. Let us consider the formative period of a student’s life, from kindergarten through high school:

- (i) Early Childhood and Elementary School
- (ii) Middle School
- (iii) High School

II

Early Childhood and Elementary School: Recognizing that early childhood is the most important period one’s of life, special attention needs to be paid to the teaching of science at this level. The most important goal desired for this age group is to instill an awe and wonder of the natural world in the young minds

and souls. This awe and wonder needs to be rooted in certain details about the physical world; it is not produced by sprinkling Qurʾān verses onto drops of rain falling down, but rather is to be attained by providing fascinating details about the natural world—for instance about the mosquito, of which some 3,500 species are found in the world and about which the Creator has said: *Allah does not shy away from giving the example of a mosquito and even smaller than the mosquito, for believers know that this is the truth from their Lord, but disbelievers say ‘what kind of example is this?’ Indeed Allah uses these parables to guide many and misguides many, and only the rebellious are misguided by this example* (Q 2:26).

Experiential learning is essential for this age group. Every child has experienced a mosquito bite, and thus a science teacher can easily build interest in this wonderful creature, which is seldom longer than 16 mm, weighs a mere 2.5 mg on average, and lives for less than two weeks in its slender body designed for specific purposes. Its head is equipped with a complete system for acquiring sensory information and for feeding, and contains eyes and a pair of long, many-segmented antennae, which detect host odors (including the odors of breeding sites where females lay eggs and which in males are noticeably bushier and contain auditory receptors to detect the characteristic whine of the female). The teacher can easily show young students a real mosquito, magnifying its compound eyes under a glass, so that children gathered around can distinctly see the mesh-like appearance of its two eyes. They consist of hundreds of thousands of tiny lens-capped optical units called ommatidia. Each ommatidium has its own cornea, lens, and photoreceptor cells for distinguishing brightness and color. The teacher can point out how each individual ommatidium guides light through a lens and cone into a channel (the rhabdom), which contains light-sensitive cells. These are connected to optical nerve cells to produce the image. Imagine a classroom of young children enthralled by the understanding that the mosquito in front of them in that glass container is actually looking at them!

The children can be inspired through an actual examination of the thorax of the mosquito, which is its means for locomotion, consisting of three pairs of legs and a pair of wings, which allow it to fly for up to four hours continuously at a speed of 1 to 2 kilometers per hour, an ability that increases at night so that it can travel up to 12 kilometers in a night. The teacher can build on the mosquito bite, which every child has experienced, and provide the young learners an understanding, in simple terms, of the two-way transaction that occurs when they become a host to a hungry female mosquito: they provide a small amount of their blood, which is digested in the abdomen of the mosquito within the next couple of days and used for egg production; and they receive an equally small amount of mosquito saliva, which contains a mixture of secreted proteins, which create itching and inflammation (because they affect vascular constrict-

tion, blood clotting, platelet aggregation, angiogenesis and immunity). In addition, the teacher can tell the young students that since nothing is superfluous in nature, for Allah Most High did not create anything for sport, notwithstanding the itching and the possibility of receiving disease-causing viruses and parasites that a mosquito bite entails, the mosquito does have a role in nature; in fact, the entire eco-system can be dangerously affected if it is eliminated. Add to these details an ongoing dimension of scientific research to complete the picture: scientists are working on the development of anti-clotting drugs based on mosquito saliva molecules, which might be useful for approaching heart-related disease because they are more user-friendly blood clotting inhibitors and capillary dilators.

Such information is readily available; all that a systematic effort aimed at developing content, methods, and pedagogies for teaching science from an Islamic perspective needs to do is develop the framework into which this content can be absorbed and link it to the Qur'ānic worldview at several levels of production, distribution, and delivery. For instance, having instilled a vibrant interest in the hearts and minds of the students in the life of the little creature, a teacher can easily lead them to reflect on the Qur'ānic parable through anchoring the lesson in tafsir tradition: commenting on this verse, Abū al-Layth al-Samarqandī (d. 373/983) said that if the entirety of humankind and the jinn were to gather together to create a mosquito, they would not be able to, and that Allah Most High gave the example of the mosquito because it is a marvelous creation. He added, moreover, that it is said that as long as it is hungry it stays alive, but when its stomach is overfull, it dies; so too with man, who transgresses when he pretends to be self-sufficient.

This is just one example which can be used in teaching science from an Islamic perspective. The word of nature, full of wonders as it is, is an ever-present backdrop in the Qur'ān; a child filled with awe and wonder for this world would naturally respond with respect, care, and love for it. As he or she moves to middle school years, a foundation would have been established for building more data-based instructional material.

III

Middle School: Primed to receive data from natural sciences within the framework of the Qur'ānic worldview of nature, the child is now ready to do some hands-on experiments and achieve an elementary understanding of various branches of science and what is studied through them. The overall goal of an Islamic approach to teaching science for this age group is to prepare the learners for a full encounter with modern science when they reach high school. This is a prime time to introduce history of science and launch students into the

wonderful exploration of various facets of Islamic scientific tradition. This is precisely the time when students are looking for their roots, and are ready to establish intellectual and affective connections with thinkers and scholars who can provide them ideas and concepts. Thus, science units which introduce them to al-Bīrūnī, Ibn Sīnā, Ibn al-Haytham and other Muslim scientists who appear in the history of the eight-hundred-year long Islamic scientific tradition—in a manner that is not filled with emotional nostalgia, but is built on solid content—can open many vistas for the young minds. Given substantial grounding at this stage, they will not be blown away when they reach high school and launch into modern science proper, where they will find no Muslim name in the grand parade of names which appear in science textbooks. Corrections to the history of science narrative is, however, only one aspect of the new effort needed to teach science from an Islamic perspective; the second facet is the development of material to provide a basic understanding of philosophy of science and the critical perspective it offers to teachers who can then gain the ability to situate modern science within a meta-scientific framework. Obviously, it is not being proposed that a grade six student be given heavy doses of philosophy of science; rather, teachers need to have a basic understanding of Islamic philosophy of science so that they can open windows onto a new world for their students to give them an inclination of how raw scientific data transforms after passing through an interpretive lens. Students should be given tools to ask critical questions which are dealt with in the history, philosophy, and sociology of science. They should be able to ask these questions and receive answers from teachers and thereby enrich their understanding of Islamic scientific tradition. They can be challenged to research, in their own way and at their own level, biographies of Muslim scientists and what they contributed to the development of science; some bright students can even deal with questions such as the factors which contributed to the rise and fall of Islamic scientific tradition and how modern science emerged in Europe. All of this needs to be integrated with what they are studying in their standard science textbooks in their own grade levels through a creative process which should anchor the entire teaching process in the Qurʾānic worldview.

IV

High School: Most Muslim students encounter the greatest concentration of troubling questions about science during their high school years, including questions arising from that reigning paradigm of modernity, evolution. In addition, they wonder why Muslim lands are so far ‘behind’ in science compared to Europe and North America. They use textbooks that provide no insights into meta-scientific assumptions on which modern science is built, but are given strong doses of theories which make little sense when viewed from the Qurʾānic

worldview. They often receive little or no intellectual support for dealing with this vast amount of data that flows into their lives at this crucial stage.

A well-designed program of teaching science from an Islamic perspective needs to take all these “extra-scientific” aspects into consideration. It needs to deal with fundamental issues young Muslims face while studying science entrenched in the secular view of nature. Furthermore, it needs to provide well-grounded alternatives to specific theories such as evolution. One question that will be of utmost importance in any effort aimed at developing a program of teaching science from an Islamic perspective is that of origins: How did the world come into existence? How has life started? Other questions that will need to be addressed include: What are the mechanisms in nature that sustain life? How can we explain the disappearance of certain life forms? What are different possible ways in which the same observable data can be explained? This is precisely the time to introduce students to a fully developed Islamic philosophy of science taught through a carefully developed textbook which provides source-based Qur’anic explanations to fundamental questions about the human relationship with nature. They need to be introduced to the primary Qur’anic concepts of our custodianship of the created order of nature and our moral responsibility toward it through our honoring, as reflected in the title given to us in the Qur’an: *khulafā’*, the successors, deputies, and custodians.

Establishment of a program of teaching of science from an Islamic perspective is an enormous task which cannot be achieved by an individual. A network of scholars needs to actively engage in building a core program which can be adopted by various schools around the world with necessary changes and modifications. This network does not exist at present, but can easily be established by an umbrella organization which can affiliate educators and education-related institutions from around the world, develop a core team, and start the thousand mile journey with a small but firm step. *Wa’Ilāhul-musta’an, wa mā tawfīqī illā bi’Ilāh.*

Wuddistān



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