

THE COSMOS AS THE CREATED BOOK AND ITS IMPLICATIONS FOR THE ORIENTATION OF SCIENCE

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Based on the conception of the Cosmos as a grand, created Book consisting of Divine Signs, a conception made possible by the linguistic-conceptual system of the Islamized Arabic, this article deliberates on the orientation of science in Islām by elaborating on two theoretical implications of such a conception: one being the avoidance of secularization as a philosophical program, the most fundamental component of which is the disenchantment of nature; and the other being the appropriation of the tafsīr-taʿwīl method of reading the signs and symbols of the Qurʾān into science.

Keywords: Islamic worldview; natural sciences; philosophy of science; cosmos; nature; universe; secularization; cosmos as a sign of the Creator; al-Qurʾān; *āyāt*; *ilm*; *tafsīr*; *taʿwīl*; *muḥkamāt*; *mutashābihāt*.

Introduction

The manner in which knowledge is understood in any given society very much determines the way sciences develop in that society, whereas the way any given society regards knowledge depends on its predominant worldview, or its vision of truth-reality. As a revealed religion which projects a certain worldview, Islam promotes an understanding of knowledge and science which is substantially different from what is prevalent in the other societies and civilizations—including that of the modern West—and which

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Islam & Science, Vol. 6 (Summer 2008) No. 1

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ISSN 1703-7603 (Print); ISSN 1703-7602X (Online)

gives rise to a particular intellectual tradition and civilization.¹ Therefore, in deliberating the orientation of science within an Islamic state, due attention should be paid to the worldview of Islam and the attendant system of knowledge such a worldview projects. In fact, when one talks about sciences as being “Islamic,” one basically and ultimately refers to the worldview of Islam and its attendant system of knowledge. And one should bear in mind that the difference lies primarily at the level of understanding, at the level of concepts and conception. In short, one is here concerned with a distinct epistemology and intellectual framework.

Science, however, can be understood in a specific sense to refer to any division of the natural sciences as well as in a broad sense to cover any organized knowledge and discipline of study. Insofar as our present discussion is concerned, its focus will be primarily on science in the former sense. Nevertheless, since any meaningful discussion of the orientation of science needs to address *inter alia* its aims and directions, its foundations,

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1. There have been a number of important studies done by Muslim scholars to explain this unique relationship between the worldview of Islam and the attendant system of knowledge and science such a worldview projects, among which are the various works of Syed Muhammad Naquib al-Attas: *Islam and Secularism* (Kuala Lumpur: Muslim Youth Movement of Malaysia [ABIM], 1978); *The Concept of Education in Islam: A Framework for an Islamic Philosophy of Education* (Kuala Lumpur: Muslim Youth Movement of Malaysia [ABIM], 1980); *The Positive Aspects of Taṣawwuf: Preliminary Thoughts on an Islamic Philosophy of Science* (Kuala Lumpur: Islamic Academy of Science [ASASI], 1981); *Prolegomena to the Metaphysics of Islām* (Kuala Lumpur: International Institute of Islamic Thought and Civilization [ISTAC], 1995); and *A Treatise with Important Messages for the Muslims (Risalah untuk Kaum Muslimin)* (Kuala Lumpur: International Institute of Islamic Thought and Civilization [ISTAC], 2001). Similar discussions can also be found in Alparslan Açikgenç's two works, *Islamic Science: Towards a Definition* (Kuala Lumpur: International Institute of Islamic Thought and Civilization [ISTAC], 1996) and *Scientific Thought and its Burdens* (Istanbul: Fatih University, 2000). Two useful works—one a lengthy study and the other a brief survey—which may help introduce an enthusiastic reader to the system of thought of al-Attas are Wan Mohd Nor Wan Daud, *The Educational Philosophy and Practice of Syed Muhammad Naquib al-Attas: An Exposition of the Original Concept of Islamization* (Kuala Lumpur: International Institute of Islamic Thought and Civilization [ISTAC], 1998); and Adi Setia, “Al-Attas’ Philosophy of Science: An Extended Outline,” *Islam & Science*, Vol. 1, No. 2 (December 2003): 165-214.

concerns and approaches, as well as its position in a certain context—or structure—of relations, our discussion, rather than being conducted in the specific mould of science in the former sense, needs to be interdisciplinary² and, in many instances, falls more into the purview of metascience and philosophy, or what a physicist positively calls “the science before science.”³ That being the case, although our main concern here is with the orientation of *science* in the former sense, since we are equally concerned with its *orientation*, we cannot but deal with science in the latter sense as well. To minimize any confusion that may arise, we shall subsequently use the abbreviation “NS” (meaning, the natural sciences taken as a group) whenever we intend to refer specifically to science in that former sense.

NS, as a branch of knowledge in Islam, can be understood in at least two ways: one is to approach it as a particular human process of knowing and the other is to approach it from the angle of the peculiar object it studies and seeks to know further. The former, in other words, attempts to understand NS as a particular epistemic act of its agent (that is, man), involving necessarily specific methods of study and research deemed appropriate and sufficient to realize the intent of such an act, while the latter tries to grasp it in the context of its subject-matter, or what is being studied by it.

These two approaches, rather than being exclusive, are interdependent and mutually complementary, just like the two sides of the same coin. For, as Islam is characterized by *tawhīd*, this characteristic is also manifested in the approaches and methods of study it propounds. In fact, just as the nature of the object being studied very much determines the most appropriate manner for the subject—or the agent of the epistemic act—to approach it, so does the most suitable epistemological method adopted in

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2. An explanation of the reasons why, nowadays, this interdisciplinary approach is very much needed in one’s deliberation on science and technology can be found in Elisabeth Beck-Gernsheim, *Technik, Markt und Moral (The Social Implications of Bioengineering)*, trans. Laimdota Mazzarins (New Jersey: Humanities Press, 1995), 1-20. Examples of the application of this approach to science and technology studies can be found in Peter D. Hershock, Marietta Stepaniants, and Roger T. Ames (ed.), *Technology and Cultural Values On the Edge of the Third Millennium* (Honolulu: University of Hawaii Press and East-West Philosophers Conference, 2003).
 3. See Anthony Rizzi, *The Science Before Science: A Guide to Thinking in the 21st Century* (Baton Rouge: The Institute for Advanced Physics [IAP] Press, 2004).

studying a particular subject-matter determine what is known of the object. The unity of these two approaches, therefore, is neither artificial nor enforced from without but arises from within the intimate relation that exists between knowledge and reality-truth.⁴

Dealt with using the latter approach, NS is basically any discipline of study which has, as its object of study, the Cosmos and aims accordingly at knowing its nature or reality. In today's understanding and practice particularly, NS as systematic empirical and intellectual endeavours is primarily focused on man's discovery and understanding of the nature of the various physical dimensions, layers, and parts of the Cosmos. Such endeavours consist basically of observations and experiments, necessarily involving human sensory perceptions and attempts at conceptualization by the human mind, apart from reliance on authentic reports of the scientific community. These dimensions, layers, and parts of the Cosmos are basically what is generally referred to as matter (*māddah*) and its concomitants (*lawāzim al-māddah*). Such being the main focus and aim of NS, the method(s) adopted in it must necessarily be tailored to its major focus and aim.

As far as Islam is concerned, such focus and aim as well as the method(s) so tailored, if *properly* viewed and applied within the larger context of reality-truth, are not inherently wrong. What is wrong is when NS—particularly physics—is taken to be the model, the prototype, or the benchmark, of true knowledge and science; when knowledge as well as the methods and approaches leading to knowledge and truth are reduced in one's understanding, attitude, and action to NS; when reality and existence is reduced merely to what NS basically seeks to study, that is, the physical dimensions, layers and parts of the Cosmos. In fact, this reductionistic ideology and tendency constitutes what in the modern West is called *scientism*, something that is fundamentally opposed to Islam and its worldview.⁵ In the teachings of Islam, on the contrary, there are generally

4. On the issue of methodology in this context, some of the relevant works for further reference are Wan Daud, *The Educational Philosophy*, especially chapter 2; Osman Bakar, *Tawhid and Science: Essays on the History and Philosophy of Islamic Science* (Penang and Kuala Lumpur: Secretariat for Islamic Philosophy and Science and Nurin Enterprise, 1991), especially chapters 1, 2, and 4; and Muzaffar Iqbal, "Islam and Modern Science: Questions at the Interface," pp. 3-41, in *God, Life, and the Cosmos: Christian and Islamic Perspectives*, ed. Ted Peters, Muzaffar Iqbal and Syed Nomanul Haq (Aldershot: Ashgate, 2002).

5. There are of course other cognate ideologies and tendencies, such as

two levels of cosmic existence: one is the visible world of dominion (*‘ālam mulk wa’l-shahādah*) and the other, the angelic and hidden world (*‘ālam al-malakūt wa’l-ghayb*). In between, according to many authoritative scholars and metaphysicians, is the imaginal world (*‘ālam al-mithāl*) known theologically as *barzakh*.⁶

Therefore, in order to ensure that the sciences—NS included—as developed by the Muslims are *Islamic*, it is important that they be conceived of and caused to unfold in line with the worldview of Islam and its attendant system of knowledge. As the various entities and events constituting the Cosmos are depicted in the Qur’ān and the Prophetic Traditions as *āyāt* (signs or symbols), and since we have decided to approach NS mainly from the angle of its subject-matter, the focus of our discussion shall be on the Cosmos—or the World of Nature—as an open, grand, created Book. Having understood the Cosmos as such, we shall proceed to see what implications such a peculiar understanding of the Cosmos may have so that an intellectual framework for the science agenda of the Muslim Ummah can then be formulated. Such a framework, if rightly imbued and disseminated through proper education, can determine a totally different orientation for the development of science in Muslim societies.

physicalism, materialism, etc., which are actually different yet inter-related manifestations of secularization as a major ideology in the modern West.

6. For further discussions on these other dimensions of the Universe, as understood from the Islamic cosmological perspective, see for instance al-Attas, *Prolegomena*, 167 ff., and chapter 7; our *The Sources of Knowledge in al-Ghazālī’s Thought: A Psychological Framework of Epistemology* (Kuala Lumpur: International Institute of Islamic Thought and Civilization [ISTAC], 2002), p. 52 note no. 16, p. 54 note no. 23, and p. 58 note no. 35; Osman Bakar, *Tawhid*, chapter 2; Seyyed Hossein Nasr, *An Introduction to Islamic Cosmological Doctrines: Conceptions of Nature and Methods Used for its Study by the Ikhwān al-ṣafā, al-Bīrūnī, and Ibn Sīnā*, rev. ed. (Thames and Hudson, 1978), 44-74, 132-165, 197-214, and 236-262; and Mostafa al-Badawi, *Man and the Universe: An Islamic Perspective* (Amman: Wakeel Books, 2002), 3-18. See also Seyyed Hossein Nasr, “The Question of Cosmogenesis—The Cosmos as a Subject of Scientific Study,” *Islam & Science*, Vol. 4, No. 1 (Summer 2006): 43-59; Muzaffar Iqbal, “In the Beginning: Islamic Perspectives on Cosmological Origins,” *Islam & Science*, Vol. 4, No. 1 (Summer 2006): 61-78; and *idem*, “In the Beginning: Islamic Perspectives on Cosmological Origins—II,” *Islam & Science*, Vol. 4, No. 2 (Winter 2006): 93-112.

Knowledge and the Cosmos as a System of Signs

That Allah taught Ādam the names of everything, as related in the Qurʾān, shows the importance of language in Islam as a system of symbolic forms which is indispensable for human cognitive activities.⁷ The term for “name” in Arabic is “*ism*,” a derivative of the root word “*wasm*” or “*simah*,” meaning “sign,” “mark,” or “brand.”⁸ It basically functions as an indicator to point to something so that it may be found and subsequently grasped by man’s searching mind, so much so that the human process of knowing the various objects of knowledge is almost inconceivable without involving any kind of language. Thus far, the human act of knowing almost always involves man’s recognition of the various objects by their names. In fact, scientific discoveries almost always result in naming things with terms that are cognitively befitting.⁹ This cognitive significance of language is further reinforced by the fact that man, insofar as the Islamic intellectual and scientific tradition is concerned, has been essentially considered to be *al-ḥayawān al-nāṭiq* (a rational animal). The term *al-nāṭiq*, signifying a differentia that distinguishes man from other animate beings and itself being a derivative of the root word *naṭq*, marks the symbiosis between language and mind. Hence, not only is man, to appropriate today’s jargons, *homo sapiens* but he is also *homo loquens*.¹⁰

7. See *Al-Baqarah*: 31.

8. See J. M. Cowan, *The Hans Wehr Dictionary of Modern Written Arabic*, 4th ed. (New York: Spoken Language Services, Inc., 1994), s.v. “w-s-m.”

9. It is important for us, in this regard, to realize that names and naming get to serve evil purposes as much as they do good. How often have we seen names and naming serving imperialistic ends, at least psychologically? Many a perceptive observer has in fact noticed the strong Eurocentric biases in the predominant tendency among Western sciences of naming anything “scientific” with Graeco-Latin terms. In this respect also, it is to be noted that among the distinctive features of the Islamic intellectual and scientific tradition is the utmost care it gives to the correct and precise use of any one term, especially that with technical and religious imports, in relation to both its connotation and denotation. It is therefore a common phenomenon in this tradition that the *conceptual content* of a science or an art will have its most appropriate *terminological form*, something that is rendered possible largely because of the root system of the main Islamic language, the Qurʾānized Arabic.

10. For further explanation, see al-Attas, *Prolegomena*, 121-122; *idem*, *Concept*, 13ff.; and *idem*, *Positive*, 3ff. See also R. L. Trask, *Language: The Basics* (London and New York: Routledge, 1995), 18.

There are indeed strong grounds, as demonstrated in a number of serious studies, for us to consider the Islamized Arabic—that is, the Arabic language after the revelation of the Qurʾān and as used in the Islamic religious, intellectual and scientific tradition—to be a linguistic-conceptual system that eloquently projects a particular worldview, a particular way of understanding Truth-Reality.¹¹ In this regard, one main characteristic of the Islamic intellectual and scientific tradition is its emphasis on the symbolic content and function in knowledge and knowing, a feature made possible by the scientific nature of the Islamized Arabic, being the linguistic medium of the Qurʾān with its unique characteristics and well-preserved root system.¹²

To briefly illustrate this point, let us consider the word *ʿilm*, the most commonly used term in Arabic referring to knowledge, which is in fact part of the basic Islamic vocabulary of the Muslims worldwide. This term

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11. Insofar as the Islamized Malay language, as the effective medium of Islamizing the worldview of the Malays and thus defining as well as preserving their identity is concerned, one cannot but read the various writings of Syed Muhammad Naquib al-Attas on this subject for convincing historical and intellectual proofs. His thesis may partly be summarized in the following way: the process involved in Islamizing the Malay language and mind is reminiscent of the process of Islamizing the Arabic language and mind that started with the first revelation to the Prophet Muḥammad. See particularly his *Preliminary Statement on a General Theory of the Islamization of the Malay-Indonesian Archipelago* (Kuala Lumpur: Dewan Bahasa dan Pustaka, 1969); *Islam dalam Sejarah dan Kebudayaan Melayu* (Kuala Lumpur: Universiti Kebangsaan Malaysia, 1972); and “A General Theory of the Islamization of the Malay-Indonesian Archipelago,” in *Profiles of Malay Culture: Historiography, Religion and Politics*, ed. Sartono Kartodirdjo (n.p., Indonesia: Ministry of Education and Culture, 1976). See also Wan Mohd Nor Wan Daud, *Masyarakat Islam Hadhari: Suatu Tinjauan Epistemologi dan Kependidikan ke Arah Penyatuan Pemikiran Bangsa* (Kuala Lumpur: Dewan Bahasa dan Pustaka, 2006), especially “Bab 4: Kerangka Keilmuan Tamadun Melayu,” pp. 110-146.
 12. This has been sufficiently explained by Syed Muhammad Naquib al-Attas in some of his writings (see especially those in note no. 1 above). Relevant also in this respect are some of Toshihiko Izutsu’s works on the semantics of several Islamic key terms, particularly his *God and Man in the Qurʾān: Semantics of the Qurʾānic Weltanschauung* (Tokyo: Keio University, 1964; reprint., Petaling Jaya: Islamic Book Trust, 2002) and *Ethico-Religious Concepts in the Qurʾān* (Montreal: McGill University Press, 1966), 3-41.

stems from a root comprising three letters, ^ʿ*l-m*, or ^ʿ*alam*. The basic meaning inherent in that root word is that of ^ʿ*alāmah*, meaning “way sign.” Al-Rāghib al-Iṣfahānī in his *Muʿjam mufradāt al-fāz al-Qurʾān* explains that *al-ʿalam* is “the trace (or mark) by which something is known” (*al-athar alladhī yuʿlam bihi al-shayʾ*).¹³ As to the relation that may obtain between ^ʿ*ilm* and ^ʿ*alam*, especially in the Arabian context, Rosenthal has made an interesting suggestion,

...the meaning of “to know” is an extension, peculiar to Arabic, of an original concrete term, namely, “way sign.”...the connection between “way sign” and “knowledge” is particularly close and takes on especial significance in the Arabian environment. For the Bedouin, the knowledge of way signs, the characteristic marks in the desert which guided him on his travels and in the execution of his daily tasks, was the most important and immediate knowledge to be acquired. In fact, it was the kind of knowledge on which his life and well-being principally depended. Thus, it is easy to see how in a largely nomadic environment, the general concept of knowledge was able to develop from the concrete process of being acquainted with “way signs.”¹⁴

In addition, ^ʿ*l-m* is also the root for another widely used term, ^ʿ*alam*, which generally means the World of Nature—the Universe, or the Cosmos—and which covers not only all that is around us, but also whatever is in us, which can be studied and known. It has in fact been an established position in the Islamic intellectual and scientific tradition that there are two interrelated kinds—or better still, modes—of the world: the macrocosm (*al-ʿalam al-kabīr*) and the microcosm (*al-ʿalam al-saghīr*), the former referring to the universe, while the latter pointing specifically to man as a being modelled on the former.¹⁵ In that tradition as well, based upon

13. Al-Rāghib al-Iṣfahānī, *Muʿjam mufradāt al-fāz al-Qurʾān* (Beirut: Dār al-Kutub al-ʿIlmiyyah, 1997), s.v. “^ʿ*l-m*.”

14. Franz Rosenthal’s *Knowledge Triumphant: The Concept of Knowledge in Medieval Islam* (Leiden: E. J. Brill, 1970), 10. Although we can agree with Rosenthal’s suggestion about the particularly close connection between the way sign and knowledge, which takes on especial significance in the Arabian environment, we should not limit that environment simply to that of the Bedouin Arabs, especially when it concerns Islam and the Prophet Muḥammad, as the Qurʾān was revealed to the people whom we may generally deem historically as the urban Arabs.

15. Al-Iṣfahānī relates this view from Jaʿfar ibn Muḥammad who, we may surmise, is the well-known Imām Jaʿfar al-Ṣādiq. See al-Iṣfahānī,

the intellectual framework projected by the Qurʾān and the Prophetic Traditions, all the individual things and events in the universe are considered to be God's *āyāt* (singular, *āyah*), viz. God's signs and symbols.¹⁶ An *āyah* basically means a manifest sign (*al-ʿalāmah al-ẓāhirah*) which serves to indicate what is hidden, or not directly manifest, in such wise that when the sign is perceived, the other, which cannot be perceived and which is of one predicament as the former, comes to be known.¹⁷ Since *al-ʿālam*, as explained by al-Rāghib al-Iṣfahānī, was a term originally used for anything instrumental and indicative in the obtainment of the knowledge of something,¹⁸ these signs taken as a totality are referred to in the Islamic intellectual and scientific tradition as *al-ʿālam* (the Cosmos; the Universe; the World-of-Nature), theologically defined as “everything other than God which points to Him.”¹⁹

Muʿjam, s.v. “-l-m”; and Suʿād al-ḥakīm, *Al-Muʿjam al-ṣūfī: Al-ḥikmah fī ḥudūd al-Kalimah* (Beirut: Dandarāh, 1981), s.v. “insān”; cf. al-Attas, *The Concept of Education*, p. 39, note no. 45.

16. Examples of such Qurʾānic verses are *Āl-ʿImrān*: 190; *Yūnus*: 5-6; *al-Ḥijr*: 16; 19-23; 85; *al-Naḥl*: 3; 5-8; 10-18; 48; 65-69; 72-74; 78-81; *al-Anbiyāʾ*: 16; *al-Naml*: 59-64; *al-Muʾmin*: 61; *al-Mulk*: 2-5; 15; and *Fuṣṣilat*: 53. Al-Imām Muḥammad b. Abū Bakr al-Rāzī notes that when applied to the Qurʾān, *al-āyah* generally means *jamāʿatu ḥurūf* (a cluster of letters). See his *Mukhtār al-ṣiḥāḥ* (Beirut: Librairie du Liban, 1989), s.v. “ā-y-ā”; see also Al-Iṣfahānī, *Muʿjam*, s.v. “ā-y-ā”; and al-Sayyid Murtaḍā al-Ḥusainī al-Zabīdī, *Tāj al-ʿArūs min Jawāhir al-Qāmūs*, 10 vols. (n.p.: Dār al-Fikr, n.d.), vol. 10, s.v. “ā-y-ā.”

17. See al-Iṣfahānī, *Muʿjam*, s.v. “ā-y-ā”; cf. al-Rāzī, *Mukhtār*, s.v. “ā-y-ā.”

18. See al-Iṣfahānī, *Muʿjam*, s.v. “-l-m.”

19. See, for example, al-Sayyid al-Sharīf ʿAlī ibn Muḥammad al-Jurjānī, *Kitāb al-Taʿrīfāt*, ed. Ibrāhīm al-Abyārī (Beirut: Dār al-Kitāb al-ʿArabī, 1998, 4th imprint), s.v. “al-ʿalam”; and Saʿd al-Dīn al-Taftāzānī's *Sharḥ al-ʿAqāʾid al-Nasafiyyah* in *Majmūʿat al-ḥawāshī al-Bahiyyah ʿalā Sharḥ al-ʿAqāʾid al-Nasafiyyah*, 2 vols. in 1 book ([Egypt]: Maṭbaʿat Kurdistān al-ʿIlmiyyah, 1329H), 1: 68-69. Even Rosenthal, though himself reluctant to admit that there is a semantic connection between the terms *ʿilm* and *ʿalam*, recognizes that such a connection is something readily acknowledged by the Muslim scholars. He notes,

“As may be expected, Muslim scholars sometimes connected *ʿalam* with *ʿilm* or *ʿālam*. Cf. ʿAbd al-Qāhir al-Baghdādī, *Uṣūl ad-dīn*, 34 (Istanbul 1346/1928, reprinted, n.y., n.p.): “*ʿālam* is everything that has knowledge and sense perception,” but a combination with *ʿalam*/*alāmah* is preferable. *ʿālam* is “a designation for the angels, the jinn, and the human beings who

It is also important for us to note that physics, which is widely considered as the prototype of NS in its peculiarly modern sense, is called in the Islamic intellectual and scientific tradition “the science of nature” (*‘ilm al-ṭabī‘ah*). The word *al-ṭabī‘ah*, unlike the English word “nature” which seems to imply the eternity of the world, stems from the root word ṭ-b-‘ or ṭab‘, meaning basically “impression left on something” (*ta’thīr fī...*), “seal,” or “stamp” (*khatm*), and connoting therefore “a natural disposition or propensity with which a creature was created” (*al-sajīyyah allatī jubila ‘alayhā...*). All such meanings assume that there exists a Creator who, in

possess knowledge.” It is “the totality of bodies (substances) and accidents of which the Creator has knowledge.” (cf. az-Zamakhsharī, *Kashshāf*, I, 43). In this case, *‘ilm*, and not *‘alam*, is clearly meant. However, it is *‘alam/‘alāmah* which is adduced by the Imām al-Ḥaramayn al-Juwaynī in explaining that *‘alam* is called *‘alam* because it is an indication set up to indicate the existence of the owner of the *‘alam*. Likewise, the world with its substances, accidents, parts, and particles is a sign indicating the existence of the Lord, the owner of the world, cf. his *Luma‘ al-adillah*, ed. Fawqiyah Husayn Maḥmud, 76 (Cairo 1385/1965). The view expounded by ar-Rāghib al-Iṣfahānī is not quite clear. With great if misplaced ingenuity, probably borrowed from some older source, he combines *‘Ālam* with words of a similar noun formation such as *khātam* and *ṭāba‘*, both meaning “seal,” and interprets it as the “instrument” by which the world with all the substances and accidents it contains “is known” (or does he mean, “is marked,” from *‘alam*?). Thus, the world is instrumental in proving the existence of its Creator, cf. his *Mufradāt* III, 141, s.rad. ‘-l-m (Cairo 1322, in the margin of Ibn al-Athīr, *Nihāyah*). At-Tahanawī is even more ambiguous. He also brings *‘alam* together with *khātam* and *ṭāba‘* and derives it from *‘alam/‘alāmah* as the designation for something through which something is known. He presumably did not think at all “is marked,” since he goes on to say that the word came to be used primarily for that “through which the Creator is known” (this would seem to be the only possible translation in this case). “It designates all the *existentia* with the exception of God, that is, the created things whether they are substances or accidents,” which indicate the existence of a Necessary Originator, cf. his *Kashshāf iṣṭilāḥāt al-funūn*, 1053 (Calcutta 1854-62). Notwithstanding all these speculations, however, by and large little was made of the suggestive, if completely wrong, etymology which brings *‘alam* together with the Arabic root ‘-l-m.” (Rosenthal, *Knowledge Triumphant*, pp. 19-20, note no. 1.)

His own way of creating (*sunnatu'llāh*), makes “order” and “regularity” inherent in the universe as cosmos—as opposed to chaos—and renders knowledge and prediction possible.²⁰ Predictability being a characteristic of NS is made possible because of the intelligent design and regularity in Nature, the one encapsulated by the Islamic notion, *Sunnatu'llāh*. This, as Fazlur Rahman rightly points out, is itself miraculous and provides enough ground for man to be filled with the sense of awe.²¹

All that has thus far been discussed, cursory though our discussion may be, relates coherently with another key word in Islam, *khalq* (creation), and such of its cognates as *khāliq* (creator), *makhḷūq* (creature), and *khuluq* [pl. *akhlāq*] (inner dimension of a creature; character). *Khalq* as a root-word, ibn Manẓūr explains, signifies “the creation of something in a form which has no precedence” (*ibtidā' al-shay' 'alā mithāl lam yusbaq ilayh*) as well as “the act of giving a definite measure [to something]” (*al-taqdīr*).²² Such being the case, one finds Muḥammad b. Abū Bakr al-Rāzī not only remarking that *'alam* is basically synonymous with *'alāmah* but also stating that *al-'alam* means *al-khalq* (creation).²³

20. Al-Rāzī, *Mukhtār*, s.v. “ṭ-b-’”; al-Attas, *Risalah*, 105-107; and John Ayto, *Dictionary of Word Origins*, paperback ed. (New York: Arcade Publishing, 1993), s.v. “nature.” A detailed analysis of the word “nature” can be found in C.S. Lewis, *Studies in Words*, 2d. Canto ed. (Cambridge: Cambridge University Press, 1990; reprint., 1996), “Chapter 2: Nature,” 24-74. Cf. Gilbert Rist, *The History of Development: From Western Origins to Global Faith* (London & New York: ZED Books, 1997), 28ff.

21. See the chapter on Nature in his *Major Themes of the Qur’ān* (Minneapolis and Chicago: Bibliotheca Islamica, 1980); and also Adi Setia, “Taskhīr, Fine-Tuning, Intelligent Design and the Scientific Appreciation of Nature,” *Islam & Science*, Vol. 2, No. 1 (Summer 2004): 7-32.

22. See his *Lisān al-‘Arab*, s.v. “kh-l-q.”

23. Al-Rāzī, *Mukhtār al-Ṣiḥāḥ*, s.v. “‘l-m.” It can thus be inferred, on justified grounds and with reference to other relevant Qur’ānic verses (such as 25:2; 65:3; 33:38; 13:8; 15:21; 54:49; 36:12; 72:28; and 78:29), that God not only brought all the creatures and events into existence according to a comprehensive design predetermined in His Perfect Knowledge, but also generously sustains and governs all of them (*tadbīr al-amr*). The erudite Fakhr al-Dīn al-Rāzī (d. 604 A.H.), for instance, in commenting upon one of those verses, says: “*Yudabbir al-amr* means that God decrees and foreordains according to the requirement of wisdom and [He also] does that which is done by one whose act is always apposite and who attends to the ends and outcomes of affairs such that nothing unbecoming would ever come

What is even more significant than all that had been discussed thus far is the fact that not only are all the individual entities and events comprising the World of Nature considered by the Qurʾān to be the *ayats* of Allah (that is, God's signs and symbols), but the verses in the Qurʾān are themselves so called. This has indeed led many a scholar in the Islamic intellectual and scientific tradition to draw an analogy between the two, regarding the cosmos as a book in more or less the same manner as the Qurʾān, the main difference between them being that the former is created whereas the latter is Revealed.²⁴ Such an analogousness is greatly reinforced by the semantic field formed by the interrelation of the meanings of the aforementioned key words, projecting thus the notion of the Cosmos being a unified system of Divine signs. For those who subscribe to such an understanding, doing science essentially becomes attempts to read and interpret the Open Book of Nature correctly. And since the Author of the two books is the same, being both One (*wāḥid*) and Unique (*aḥad*) in the Absolute sense, one can rightly infer that the book as a totality also reflects such a unity—being a unified system of signs and meanings—just like the Qurʾān with its unity of message and teachings. Therefore, a scientist cannot but also be attentive to the Revealed Book in his very act of reading the Created Book. All these are among those features that are constitutive of what the Muslims generally call the *tawḥīd* (integrated) approach to all the different and valid branches of knowledge. Sciences developed by Muslims must therefore reflect such features for them to be properly regarded as Islamic.

Some Theoretical Implications of the Cosmos as the Created Book

Syed Muhammad Naquib al-Attas has been one of the very few Muslim

into existence (*maʿnāhu annahu yaqḍī wa yuqaddir ʿalā ḥasab muqtaḍā al-ḥikmah wa yafʿal mā yafʿaluhu al-muṣīb fī afʿālihi al-nāẓir fī adbār al-umūr wa ʿawāqibuhā kay lā yadkhul fī al-wujūd mā lā yanbaghī.*)” See his *al-Taḥsīn al-Kabīr*, 32 vols. in 16 books. (Beirut: Dār al-Kutub al-ʿIlmiyyah, 1990), 17: 13. His commentary on the other verses can be found in *ibid.*, 17: 70-71, 18: 187, and 25: 150-151.

24. For instance, in his *Mawāqif al-Nujūm*, Ibn ʿArabī, the great ṣūfī of Islam, as Suʿād al-Ḥakīm noted, had used the term “Great Book” (*al-kitāb al-kabīr*) to refer to the cosmos and, accordingly, “Small Book” (*al-kitāb al-ṣaghīr*) to the Qurʾān. See al-Ḥakīm, *Al-Muʿjam*, s.v. “kitāb.” I wish to thank my colleague Mohd Sani bin Badron for drawing my attention to this.

scholars of the present time who, with intellectual rigour, has consistently and systematically expounded on the idea of the Cosmos being the Created Book.²⁵ In an important work of his, he explains,

The world of nature as depicted in the Glorious Qurʾān is composed of symbolic forms (*āyāt*), like words in a book. Indeed, the world of nature is another form of the Divine Revelation analogous to the Glorious Qurʾān itself, only that the great, open book of nature is something created; it presents itself in multiple and diverse forms that partake of symbolic existence by virtue of being continually articulated by the creative word of God. Now a word as it really is is a symbol, and to know it as it really is, is to know what it stands for, what it symbolizes, what it means. If we were to regard a word as if it has an independent reality of its own, then it would no longer be a sign or a symbol as it is being made to point to itself, which is not what it really is. So in like manner the study of nature, of any thing, any object of knowledge in the world of created things, if the expression 'as it really is' is taken to mean its alleged independent reality, essentially and existentially, as if it were something ultimate and self-subsistent, then such study is devoid of real purpose and the pursuit of knowledge becomes a deviation from the truth, which necessarily puts into question the validity of such knowledge. For as it really is a thing is other than what it is, and that 'other' is what it *means*.

25. A summary of al-Attas's cosmology has been attempted by Adi Setia in his "Philosophy," 179-187. Besides al-Attas, Seyyed Hossein Nasr is another scholar who has deliberated on this idea, directly or indirectly, in several of his writings, some of which are: *Man and Nature: The Spiritual Crisis of Modern Man* (London: George Allen and Unwin, 1976); *An Introduction to Islamic Cosmological Doctrines: Conceptions of Nature and Methods Used for its Study by the Ikhwān al-Ṣafā, al-Bīrūnī, and Ibn Sīnā*, rev. ed. (Thames and Hudson, 1978); *Knowledge and the Sacred: The Gifford Lectures, 1981* (Edinburgh: Edinburgh University Press, 1981); and *The Need for a Sacred Science* (Richmond: Curzon Press, 1993). Much earlier than both al-Attas and Nasr, Badi'uzzamān Saʿīd al-Nūrī (1877-1960) had also dealt with this issue extensively. Several studies on this aspect of his thought have been made, some of which are: Sükran Valide, "The Book of the Universe: Its Place and Development in Bediuzzaman's Thought" in *A Contemporary Approach to Understanding the Qurʾān: The Example of the Risale-i Nur* (Istanbul: Sözlür Nesriyet, 2000), 466-483; Adi Setia, "Taskhīr," 7-32; and Yamine Mermer and Redha Ameur, "Beyond the 'Modern': Saʿīd al-Nūrī's View of Science," *Islam & Science*, Vol. 2, No. 2 (Winter 2004): 119-160.

Thus, in the same manner that the study of words as *words* leads to deviation from the truth underlying them, the preoccupation in philosophy and physics with things as *things* leads to the erroneous, common sense belief in their existence outside the mind as aggregations of particles persisting through a certain period of time and moving in space, as if these particles were the ultimate material of the world. Whereas in reality the stuff of 'matter' consists of a series of events (*a'rād*, sing. *'arad*), and physical phenomena are processes whose every detail is discontinuous. A thing like a word is then in reality ultimately a sign or a symbol, and a sign or a symbol is something that is apparent and is inseparable from something else not equally apparent, in such wise that when the former is perceived, the other, which cannot be perceived and which is of one predicament as the former, is known. That is why we have defined knowledge epistemologically as the arrival in the soul of the *meaning* of a thing, or the arrival of the soul at the *meaning* of a thing. The 'meaning of a thing' means the right meaning of it, and what we consider to be the 'right' meaning is in our view determined by the Islamic vision of reality and truth as projected by the Quranic conceptual system.

Thus the phrases...such as the 'true order of reality', the 'just order pervading all creation', the 'levels and degrees', and the 'general order of created things' in our reference to the 'system' of conceptual relations in which the 'proper places' of things are recognized, point to no other than the Quranic conceptual system. Correspondence and coherence as we understand them in connection with reality and truth refer to proper place in the former case and to the Quranic system in the latter case.²⁶

From what al-Attas has succinctly explained pertaining to the similarities, or correspondence, between the revealed Book and the created Book, as partly reproduced above, at least two theoretical implications can be drawn:²⁷

1. Avoidance of Secularization as an Ideology

Secularization as an *ideology* or a *philosophical program*, as explained by al-Attas based on what the leading modern Western intellectuals have them-

26. Al-Attas, *Prolegomena*, 133-134.

27. The major part of such implications, as we shall draw here and unless otherwise stated, consists of our reproduction, reorganization and summary of what al-Attas has himself elucidated in his *Islām and Secularism*, pp. 29-40, and *Prolegomena*, pp. 133-140.

selves admitted, consists of three interrelated and integral components: the disenchantment of nature, the desacralization of politics, and the deconsecration of values.²⁸ In his analysis, the ‘disenchantment’ of nature is the most fundamental component in the dimensions of secularization as a philosophical program and is most certainly opposed to the Islamic view of Nature. The disenchantment of nature, understood and propagated as such, aims at, as well as, ends up divesting nature of any cosmic significance and severing its symbolical connection with God; depriving man’s respect for nature to the extent that he treats nature which he once held in awe with a ruthless sort of vindictiveness; destroying the harmony between man and his environment.

On the contrary, granted the coherent conceptual system centering on the key word “Allāh,” formed by the semantic interconnections of a set of Islamic-Arabic key words, some of which have been briefly discussed above, it is inconceivable that someone who adheres to such a system propagates instead a system of knowledge and science which is secular in its orientation. A person with the above mental grasp will surely deal with the objects of knowledge and science differently. At the very least, he is not

28. Al-Attas has pointed out, however, that,

...secularization *as a whole* is not only the expression of an utterly unislamic world view, but that it is also set against Islam; and yet...the *integral components* in the dimensions of secularization—that is, the disenchantment of nature, the desacralization of politics, and the deconsecration of values—when seen in their *proper* perspectives, indeed become part of the integral components in the dimensions of Islām, for they reflect one of the fundamental elements in the Islamic vision of reality and existence, and characterize Islām in the true and real manifestation in history bringing about the effect that revolutionizes the world view of man.

(*Islām*, 39-40.) Elsewhere he clarifies the process which he calls *Islamization* in the following terms:

The phenomenon of Islām and its impact in the history of world cultures and civilizations did...bring about the *proper* disenchantment of nature, and the *proper* desacralization of politics, and the *proper* deconsecration of values, and hence without bringing about with it secularization. (*Islām*, 38.)

For further elaboration on this, see his *Prolegomena*, 20ff.; and *Islām*, chapters 1 and 2.

going to treat such objects as *mere things* to which he may do as he wishes. For as signs, the various objects are never existentially and epistemologically independent of God, and hence they have to be treated with a sense of responsibility to God. To treat them simply as mere things, as objects-in-themselves with no other point of reference, is to deny the fact that they are signs pointing to God and for the treatment of which we shall be answerable to God. And any scientist who does so while proclaiming to be a Muslim, does not in fact know what he or she is saying. Al-Attas himself makes it clear that

The Noble Qur'ān declares in no uncertain terms that the whole of nature is as it were a great, open Book to be understood and interpreted. The Glorious Qur'ān also says that those among mankind who possess intelligence, insight, understanding, discernment, knowledge, know the meaning of that Book, for nature is like a book that tells us about the Creator; it 'speaks' to man as a revelation of God. The Glorious Qur'ān's description of nature and man—both in their outward manifestation and their inward hiddenness—as *āyāt* (words, sentences, signs, symbols) is self-explanatory in that respect. Nature has cosmic meaning and must because of its symbolical connection with God be respected. Man according to the Glorious Qur'ān is God's vicegerent (*khalīfah*) and inheritor of the Kingdom of Nature. This does not mean that he should be presumptuous enough to regard himself as "copartner with God in creation".... He must treat nature justly; there must be harmony between him and nature. Since he has been entrusted with the stewardship of the Kingdom of Nature which belongs to God, he must look after it and make legitimate use of it, and not ruin and spread chaos over it. If nature is like a great, open Book then we must learn the meaning of the Words in order to discern their tentative and final purposes and enact their biddings and invitations and instructions to beneficial use in such wise that we may come to know and acknowledge in grateful appreciation the overwhelming generosity and wisdom of the incomparable Author. It is true that the Glorious Qur'ān also 'disenchanted' nature from the very moment of its revelation; ... yet...Islam 'disenchanted' nature...only in the sense of, and so far as, banishing the animistic and magical superstitions and beliefs and false gods from nature where indeed they do not belong. Islām did not completely deprive nature of spiritual significance, for it sees in Creation, in the heavens and the earth and what lies between...in every thing in the farthest horizons and in our very selves...the Signs of God.²⁹

29. Al-Attas, *Islam and Secularism*, 35-38.

As far as our present life in the world is concerned, the world in its especially material and physical dimension is known as *al-dunyā*. The word *dunyā* itself is a derivative of the root word *danā* and conveys the meaning of something being brought near. Its being applied to the world signifies thus that the world is that which *is brought near to the sensible and intelligible experience and consciousness of man*. Since the world as “that which is brought near” both surrounds us and overwhelms us, it distracts us from being ever-conscious of our final destination—*al-ākhirah*, or the Hereafter—which is beyond the world and comes after it. Yet, the world, as we have discussed earlier, is also the Signs of God in their totality; as such, it is the Signs of God *that are brought near*. That they have been brought near to us will surely put us in a better position to understand their meanings and is itself proof of Divine Mercy and Loving Kindness. Should the world be so understood and should those signs be known in their true purpose, then not only would it be blasphemous for one to derogate the world but there can also be no excuse for one to involve oneself in any of the following three attitudes toward the world: one who, being awed by those signs, worships them, instead of God to whom they point; or one who, seeing nothing in those signs except distractions in one’s way of seeking God, rejects them; and one who, having denied God, appropriates the Divine Signs for one’s own ends and changes them in pursuit of *illusory* development.³⁰ It is therefore important that Muslims, including the scientists from among them, be cognizant of the reason why the Cosmos is being called *al-‘alam* as well as *al-dunya*. For as far as their attitude to it is concerned, such an understanding will surely prevent them from being extremists in their reception or rejection of the world in all its various forms.

2. Appropriation of the *Tafsīr-Ta’wīl* Method

In the Islamic intellectual and scientific tradition the cosmos is often regarded as the Created Book, somewhat analogous to the Qur’ān as the Revealed Book, hence all the individual entities and events comprising the World of Nature, like the verses in the Qur’ān, are considered by the Qur’ān to be God’s signs and symbols (*āyāt*). Since the Author of the two books is one and the same, being Himself One (*wāḥid*) and Unique (*Āḥad*) in the Absolute sense, the Created Book as a totality is also reflective and indicative of such a unity—in being a unified system of signs

30. For further elaboration on the issue of progress, change, and development, see al-Attas, *Islam and Secularism*, 82ff.

and meanings—just like the Revealed Book in its unity of message and teachings. For those who subscribe to such an understanding, doing science essentially becomes attempts to read and interpret the Open Book of Nature correctly. And as such, a scientist cannot but also be attentive to the Revealed Book in his very act of reading the Created Book.

In reading, one has to deal with the various signs and symbols which are arranged in such a way that they convey a certain meaning or message. Take a verse, for instance. A verse, as in the case of the Qur'ān, is composed of a number of meaningfully related words, each word in turn comprising a number of meaningfully related letters. "A word as it really is," as al-Attas has explained above, "is a symbol, and to know it as it really is, is to know what it stands for, what it symbolizes, what it means." If one were to regard it as if it has an independent reality of its own, then it is being made to point to itself, which is not what it really is, and would cease to act as a sign or a symbol.³¹

Supposing a person while touring an area, comes across a warning sign written in red, "BEWARE OF ROTTWEILER." If he is reasonable enough, he would pay heed to the message by leaving the place, lest he encounters the Rottweiler. But suppose that instead of leaving the place, he spends his time pondering the very composition of the sentence, measuring the shape and size (length, width, diameter, etc.) of each letter and determining its colour and shade, then given the somewhat obvious context, his reason will surely be questioned, at the very least. It is clear therefore that a word, as a sign or a symbol, remains useful as long as it points to the meaning or message it is supposed to convey. Otherwise, being awed by the physical appearance of a certain word, one may spend one's lifetime scrutinizing everything about or surrounding it, yet missing its very meaning which is its *raison d'être*.

Similarly, as the individual entities and events comprising the World of Nature are referred to in the Qur'ān as God's signs and symbols, just as its verses are so called, the study of any of those entities and events as it really is should not be understood solely in the sense of studying it as something ultimate and self-subsistent, as an alleged independent reality, essentially and existentially.³² Moreover, the Qur'ān speaks of its verses, or its signs and symbols, as partly comprising those that are clear and established (*al-muḥkamāt*), and partly comprising those that are obscure and

31. Al-Attas, *Prolegomena*, 133-134.

32. Ibid.

ambiguous (*al-mutashābihāt*). The Created Book then, being analogous to the Revealed Qur'ān, also comprises signs and symbols—which we call ‘things’—that are clear and established in their meanings, and those that are obscure and ambiguous. Since to read either book basically involves deciphering its various signs and symbols to grasp their actual meanings or message and since not all of those signs and symbols are clear and established, there must be a correct method to read each book in order to interpret such signs and symbols correctly and thus be able to know their true meaning(s).

In any true epistemic act, however, one cannot start from either what is unclear or what one is ignorant of, using it to grasp what is clear and understandable. As such, knowing as an act has often been formulated as *the progress of one's mind from 'what-has-already-been-known' (al-ma'lūm) to 'what-is-still-unknown' (al-majhūl)*. Therefore, to qualify as a valid form of epistemic act, any correct method of reading to be applied to the Books must reflect such a guiding formula. As *tafsīr* and *ta'wīl* are generally the twin methods of dealing with the signs and symbols of the Qur'ān, and as the *tafsīr-ta'wīl* method reflects the aforementioned formula, al-Attas has proposed that Muslim scientists appropriate this method in their act of doing science.

Ta'wīl basically means getting to the ultimate, primordial meaning of something through a process of intellection. Such being the case, the detecting, discovery, and revealing of the concealed meanings of the ambiguous signs and symbols in the Qur'ān is referred to, in the science of the Qur'ān, as *ta'wīl* (allegorical interpretation). Yet, in order to be valid, such an interpretation ought to be based upon *tafsīr*, meaning the interpretation of those signs and symbols which are clear and apparent. By way of analogy, the interpretation—or the study and explanation—of the obscure and ambiguous aspects of the things of the empirical world must be grounded upon those aspects which are already clear and established. Their being clear and established is understood by virtue of their being considered in their apparent and obvious meanings, pertaining to their respective places within the system of relations, as arrived at by way of common sense; and their places become apparent to our understanding when the limits of their significance are recognized. Yet, one ought to realize that there are bound to be things whose ultimate meanings cannot be grasped by the intellect; and those deeply rooted in knowledge accept them as they are through true belief which we call *imān*. This is the position of truth; in that there are limits to the meaning of things, and their

places are profoundly bound up with the limits of their significance.³³

Furthermore, there seems to be at least two levels of the application of this *tafsīr-taʿwīl* method in the context of the phenomenal world. At one level, the method is applied to an empirical thing, or a group of such things, in the context of its relation to other such things, or other group(s) of such things. Yet, at this level, the *very natures* of those things as a whole are not considered in their totality. At another level, they are dealt with in totality, whether or not they as a whole are *by their nature* clear and established. With regard to this latter level, as the things of the empirical world are physical in nature, they are all generally ambiguous because they appear to our consciousness to point to themselves, as if they each have an independent, individual, and self-subsistent reality, and not to that of which they are simply signs and symbols.

In other words, considered as a unified whole in the manner a book is supposed to be, the Universe as a grand system of signs and meanings, is more ambiguous and less established than the Qurʾān and its conceptual system. As a result, one's dealing with the former book—which will surely involve study and interpretation—especially with regard to matters of ultimate and absolute significance, ought to be guided by the teachings expounded in the latter book, teachings which, in their conceptual and metaphysical forms, are referred to as the worldview of Islam.

Reading involves thinking in most, if not all, cases. Thinking being an integral cognitive component in science must also be guided and regulated by the same epistemic principle of progressing from 'what-has-already-been-known' to 'what-is-still-unknown'. In fact, it is in the light of this principle that thinking is described in *ʿilm al-manṭiq*, the discipline of logic, as “the mental act of (1) putting into a meaningful order (2) what one has already known in order to (3) attain what one is still ignorant of” (*tartīb umūr maʿlūmah li-taʿaddī ilā al-majhūl*).³⁴ As thinking in most

33. For further elucidation on such limits in relation to truth and reality, see al-Attas, *Prolegomena*, 125ff.

34. Al-Jurjānī, *Kitāb al-Taʿrīfāt*, s.v. “al-fikr”; see also Imām ʿAḍud al-Dīn ʿAbd al-Raḥmān b. Aḥmad al-Ījī, *al-Mawāqif fī ʿIlm al-Kalām* (Cairo: Maktabat al-Mutanabbī, n.d.), 22; and its commentary by al-Jurjānī, *Sharḥ al-Mawāqif*, 8 vols. in 4 books (n.p.: al-Haj Muhammad Afandi, 1907), 1: 196. It is clear that there are three central and constitutive elements embedded in such a description. One constituent, marked by (2) above, is the units of knowledge already in one's possession—what one has already known—which is regarded as the “material,” or “matter” (*māddah*) of thinking. Another constituent, marked by (1), is

cases involves the mind's attending to signs³⁵ and as signs may take several forms, there is bound to be an intimate relation between the forms of thinking and those of signs. For example, signs may be of the nature of evidence or may assume the quality of effect-indicator, these two by no means being mutually exclusive. Depending on which of those two forms the signs involved are taking, thinking itself may take at least one of its two modes: one being *al-tafakkur* and the other, *al-tadabbur* (or *al-tadbīr*), the former being the mind's attending to the signs-as-proofs, whereas the latter, to the signs-as-ends. In this respect, *al-tafakkur* is more or less a synonym of *al-istidlāl* (inference), which is another term for thinking that concentrates on proofs (*dalīl*).³⁶

Moreover, among those elements which are really necessary and vital

the way one mentally organizes those units of knowledge—the way one mentally relates one unit with another unit, or a group of other units of knowledge, meaningfully—resulting in certain mental patterns, certain arrangements. This second constituent of thinking is thus considered to be the “form” (*ṣūrah*) of thinking. The third constituent represents the noetic progress, the successful movement of one's mind to new units of knowledge (such as deriving right conclusions or making correct inferences) after the first and second constituents above have been obtained. This progress seems necessary once one's mind knows certain facts and manages to relate those facts correctly. In short, thinking is like one putting the right form to the right material so that at last one will arrive at true meaning. As such, defects in thinking may well be due to the defects in its material, or to those in its form, or to flaws in both. For further explanation on this, see our *Sources*, especially Chapters 2 and 3; as well as our other writing, “Logic in al-Ghazālī's Theory of Certitude,” *Al-Shajarah: Journal of the International Institute of Islamic Thought and Civilization* (ISTAC), Vol. 1, Nos. 1&2 (1996): 108-119, and 124.

35. One of the Qur'ānic terms for thinking is *tawassum* (*al-Hijr*: 75), being a derivative of the word *wasm* which is also the root word for *ism* (name), as discussed earlier, signifying thus the mental act of scrutinizing the various signs or marks in the process of knowing.
36. Al-Jurjānī notes that both *al-tafakkur* and *al-tadabbur* (or *al-tadbīr*) are mental acts or dispositions, but while the former is the mental act of looking at the proofs, the latter is that of scrutinizing the ends (*anna al-tafakkur taṣarruf al-qalb bi al-naẓar fī al-dalīl wa al-tadabbur taṣarrufuh bi al-naẓar fī al-ʿawāqib*). See his *al-Taʾrīfāt*, s.v. “*al-tadbīr*”; see also our “*Tadbīr and Adab as Constitutive Elements of Management: A Framework for an Islamic Theory of Management*,” *Al-Shajarah: Journal of the International Institute of Islamic Thought and Civilization* (ISTAC), Vol. 5, No. 2 (2000): 305-335.

for a scientific culture to not only grow but also to endure is the presence of a high level of curiosity among a sufficient number of a country's population. It is this strong desire in a person to know and learn that drives him or her to explore and discover, despite circumstances which may not always be in favour of one's scientific interest. However, a strong desire to know and learn alone will not guarantee the development of a scientific culture. It has to be coupled with a disciplined mind so that what we have at the end is disciplined rather than aimless curiosity, a factor that is crucial for the development of such a culture.

Why is this so? The reason, in our view, lies in the answer to another question: what actually arouses such a desire to know in oneself? The key word is QUESTION(S). It is questions as well as its immediate and powerful relative, PROBLEMS, which gives rise to and constitutes one's curiosity. As one is always searching for the true answer or correct solution to a problem, the very presence of a problem as well as the manner it is addressed provides one's quest or pursuit with both the focus and the direction. But we also know from our experience that in general a question does not arise out of the blue. More often than not, a question arises in our minds together with a set, or a series, of other related questions. There is in fact a logical system inherent in any set or series of questions, involving a certain pattern of logical priority and posteriority. A really scientific manner of dealing with questions and problems, including those pertaining to the various signs in the World of Nature and their structure of relations, demands that one pay due attention to such a system and order. Logic, as a science meant to discipline one's mind and thinking so that one does not commit erroneous reasoning, necessarily and naturally includes the disciplining of one's mind in dealing with questions and problems. Some questions should not be raised unless and until other more fundamental questions have been satisfactorily dealt with first. Or such questions may not even arise in the first place if these other more basic questions were already answered properly. Some questions, or problems, although justifiable, should not have been tackled in a certain science, or field of study, but rather should have been made the proper subject-matter of another discipline, whether more fundamental to that former science or secondary to it. This is what, among others, we should be taught if we are ever serious in nurturing a scientific culture. In other words, we ought to be fully aware of the logic of questions if we are to deal with problems scientifically.

Conclusion

In the worldview of Islam as well as in the attendant system of knowledge such a worldview projects, the Cosmos—or the World of Nature—is conceived of primarily as an open, grand, created Book, consisting of Divine Signs. Such an understanding of the Cosmos has at least two theoretical implications: one being the avoidance of secularization as an *ideology* or a *philosophical program*, the most fundamental component of which is the disenchantment of nature; and the other being the appropriation of the *tafsīr-ta'wīl* method of reading the signs and symbols of the Qur'ān into science, understood essentially to be serious attempts to read and interpret the created Book. These are important elements to be creatively considered in the formulation of the intellectual framework for the science agenda of the Muslim Ummah. It is believed that such a framework, if rightly imbued and disseminated through proper education, can determine a totally different orientation for the development of the natural sciences in contemporary Muslim societies.