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CONTENTS

CONTENTS	iii - iv
EDITORIAL	v - vii
RECONFIGURING ISLAMIC DISCOURSE ON RELIGIOUS FREEDOM AND THE RIGHTS OF RELIGIOUS MINORITIES: Progressive Muslim Perspective	
Yusdani	1-26
UNDERSTANDING RELIGION-STATE RELATIONS IN MUSLIM SOCIETIES: Beyond Essentialist and Secular-Liberal Narratives	
Supriyanto Abdi	27-48
CONTRIBUTION OF ISLAMIC CIVILISATION TO SCIENCE EDUCATION AND TECHNOLOGY:SOME FRESH INSIGHTS	
Hamid Naseem Rafiabadi	49-75
THE ROLE OF RELIGIOUS EDUCATION IN FORMING TOLERANT INDIVIDUALS	
Hujair AH Sanaky	77-89
SOCIOLOGICAL DISCOURSE IN THE QUR'AN: Human Relation from Perspective of Sociological Establishment	
Sohirin Muhammad Solihin, Layth Suud Jasim	91-108

المسائل الفقهية النسائية المطبقة في المجتمع الجاوى
ووجهة نظر الشرع فيها

Mualimin Mohd Sahid, Mohd Faisal bin Mohamed,
Mesbahul Hoque 109-145

دلالة إشارة النص وآثارها في فهم النصوص الشرعية
والقوانين الوضعية

Hijrian A. Prihantoro 147-169

BOOK REVIEW

The Journey of *Ummah*

M. Irham Roihan, Nafi'atul Munawwaroh 171-176

Contributors Guidelines 177-182

CONTRIBUTION OF ISLAMIC CIVILISATION TO SCIENCE EDUCATION AND TECHNOLOGY: SOME FRESH INSIGHTS

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Abstract

This article underlines the epistemological miss-conception of knowledge in Islam which has been offered by many Muslim scholars. Muslim scholars tend to divide knowledge into fardl al-kifayah and fardl 'ain. This miss-conception could lead into secular paradigm where there are Islamic science and non-Islamic science. On the contrary, Islam actually has given comprehensive guide to all aspects of life. Islam did not classify knowledge to thus classification nor to sacred and mundane knowledge. However, some Islamologists, especially Western ones, like to state that Islam has nothing to do with science, especially natural ones. Hence, this article concentrates particularly on technology in Islam. These issues are discussed especially based on perspectives of Said Nursi, Ismail Raji al Faruqi, and Sir Syed and Maududi. As results, this article proves that Islam has done more than Christianity to science. Furthermore, the development of technologies in the West nowadays was originally founded by Islam. Unfortunately, because of the secular ideology, Moslems have forgotten those historical-scientific facts. This brings people to separate religious values such as ethics from natural

sciences. Therefore, this article finally invites Moslems to think of integrative approach since the aim of Islamic education is to produce an integrated and perfect individual, insān kāmil.

Keywords: *Islamization, Secularism, Orientalism, Islamic education, Islamic science, History of science.*

A. Introduction

Islam has given knowledge a new dimension and made it obligatory for all the males and females of Muslim community. It did not classify knowledge into sacred and mundane unlike many civilisations and religions of the world which believed in giving to God ‘what is God’s and to the Caesar what is Caesar’s. Islam encouraged adopting technologies of other nations when there was an exigency or need for acquiring them. The corpse of *ahadith* do not contain only the strict religious commandments but details about dietary items, important discussions on the genealogical, historical and other worldly matters which are considered mundane by many, thus Islam gave a new orientation to epistemology and highlighted all the dimensions of ‘*ilm al-nafi’ah* in contrast to *ilm ghair al-nafi’ah*.

But despite this great emphasis on all such aspects of knowledge and its ingredients, why Muslims in particular stage of their history lost sight of this dimension of Islamic civilisation and classified knowledge into *Fard al Kifayah* and *Fard al Ayn* needs a serious attention.

In this paper we intend to highlight all these issues and bring back the focus on Islamic concept of knowledge, science and technology which needs to be imparted in our universities, colleges and schools as a part of civilisational contribution of Islam to the world. Moreover, different paradigms of knowledge presented by Said Nursi, Ismail Raji al Faruqi, Sir Syed and Maududi will be scrutinised in this perspective in detail.

To start with, the Quran says that for leadership of the world, two ingredients are urgent: excellence in knowledge and bodily prowess. For example, Samuel has been reported to have said: «Allah hath chosen him above you, and hath gifted him abundantly with knowledge and bodily prowess”. Before talking about technology we need to talk about knowledge in the Qur’anic perspective.

B. Knowledge in the Qur’anic Perspective

Lisan al-Arab mentions that the term *'ilm* is one of the attributes of Allah, as He has been described as *'Aleem*, *'Alim* and *'Allam* in the Quran. He is the Most Exalted and His knowledge encompasses everything of the world, His knowledge is inclusive of all things and covers their external and internal reality, niceties and shortcomings to the most perfect level (*'ala atama imkan*), while as *'alim* is on the measure of *fa'il* and is an extensive noun, its usage can be extended to man as well as the prophet Joseph said :“(Joseph) said: “Set me over the storehouses of the land: I will indeed guard them as one that knows (their importance).”(12:55) Or “And so amongst men and crawling creatures and cattle are they of various colours. Those truly fear Allah among His Servants who have knowledge: for Allah is Exalted in Might Oft-Forgiving” (35:28). In this verse Allah the Most exalted informs us that among the servants only the scholars fear Allah the most. Here by scholars the scientists are meant as the phenomenon of nature mentioned here pertains to science and not to purely theological subjects.

The interpretation of dreams, given to Joseph, was also called *'ilm*, which in a sense was a realm falling outside the domain of seen world, apart from knowledge about economic matters based on inspirations. Sometimes the term *'ilm* has been used in the sense of action. According to Ibn Mas'ud, knowledge is not merely the excessive information about the traditions but rather it is consisting on fear of Allah. Some

people say that in real sense of the term, the meaning of the 'alim is a person who also puts his knowledge to actions.¹

There is very interesting discussion on the subject of 'ilm in the *Mufaradat al-Quran* of Imam Raghīb Isfahani. He says that 'ilm means to understand or comprehend anything and it consists of two kinds, first to understand essence of something and second to pass a judgement about something with assigning a quality to it, which could also be proved for it in reality. Or to deny one thing by another which in reality may be different from it also. In the first case it will be a transitive verb with one passive participle as in the Quran it is mentioned: - "Muster against them all the military strength and cavalry that you can afford so that you may strike terror into the hearts of the enemy of Allah and of your, and others besides them who are *unknown to you but known to Allah...*". (8:60)

Yet from a different angle there are two kinds of knowledge, i.e. theoretical and practical (*nazari*, 'amali), the former is completed and perfected with its acquisition, for example, the knowledge pertaining to the existence of the creations of the world and the latter is such a knowledge which is not perfected unless it is put into action, for example, the knowledge about the prayers. From yet different perspective there are still two categories of knowledge i.e., *aqli* and *sam'i* (rational and testimonial and transmitted through listening and recording).

¹ Allamah Jamaluddin Muhammad ibn Mukarram Ibn Manzoor, *Lisan al-'Arab*, vol. 14, (Beirut: Daru Sadir, 1997), p. 416-417. The knowledge is the antonym of ignorance (*jahalat*). Knowledge is thus a process when we say *alima wa ilman wa aluma* it will mean that a person has taught his own self this knowledge and first he became the seeker of that knowledge (*muta'aliman*) and later a scholar ('*aaliman*), when the propensity and faculty of knowledge in man was activated. The plural of 'Aalim will be 'ulama which is the antonym of *juhla* and the plural of it is on the analogy of *hulama* because the knowledge is a cause of politeness for a person (*muhhalaman*), who is knowledgeable. On the same analogy it is maintained that *fahashun wa fuhsha*, is from the genre of ignorance and thus opposite to politeness (*hilm*). When we say '*alimtu al-shayin* it means that I understood it ('*ariftuhu*), Ibn Bari says that when you say '*Alima wa faqiha* it means to learn (*ta'allama*) and to comprehend (*tafaquhu*) indicating that the people with these traits have become learned and the scholars and jurists ('*ulama wa fuqaha*). The Qur'anic verse '*Alamal-al-Quran* means that Allah the most exalted has made the Quran easy for understanding and remembrance (*lian yuzakuru*) and the meaning of '*allamahul al-Bayan* is that He has taught the Quran in which there is mention (*Bayan*) of everything.

In reality the meaning of the terms *'alamtuhu* and *'allamatuhu* is the same, however, others say that the actual meaning of *ta'līm* is to make mind prepared for conception, *i'alam* indicates telling something hurriedly and *ta'alam* on the other to inform and educate again and again so that it may have its impact on the mind of the learner.

There is another opinion about the terms *ta'līm* and *ta'allūm*; the former means to attract the self for receiving the conception while the later means to get attentive towards such a conception. However sometimes we use the term *i'alam* at the place of *ta'līm* when the stress is required as has been said in the Quran: --“Say (unto them, O Muhammad): Would ye teach Allah your religion, when Allah knoweth all that is in the heavens and all that is in the earth, and Allah is Aware of all things?”(49:16) .But in the following verse the word *ta'līm* has been used instead, “The Beneficent, hath made known the Quran.”(55:12-) Or “He Who taught (the use of) the Pen.”(96:4) Or “Those people have not valued the attributes of Allah, the way His attributes should be valued, who say: “Allah has never revealed anything to a human being.” Ask them: “Who then sent down the Book (Torah) which Musa brought, a light and guidance for mankind? You have transcribed it on separate sheets, publishing some and suppressing much of that given knowledge, which neither you nor your forefathers previously possessed.” If they do not answer, then just say: “Allah” and leave them alone with the discourse of their useless arguments.”(6: 91) or “Sulaiman succeeded Dawud. He said: “O people! We have been taught the tongue of birds and given all sort of things. This is indeed a great blessing from Allah.(27:16)” or “Allah has done a great favour to the believers that He raised among them a *Rasūl* from among themselves, reciting to them the Revelations of Allah, sanctifying them and teaching them the Book and Wisdom, although before this they were in manifest error”(3:164).

According to Raghīb Isfahani the mention of teaching Adam the names of things indicates that the talent of speech had been kept latent in Adam by Allah as a propensity by using that talent Adam

was able to name everything, this naming of all the things was made possible by revealing the same on the heart of Adam. This process can be understood by making an analogy to the revealing the names of animals of the jobs they are performing and He has given them the voice they are making use of.

“One person who had knowledge of the Book said: «I can bring it to you in the twinkling of an eye.” As soon as Sulaiman saw the throne placed before him, he exclaimed: “This is by the grace of my Rabb to test me whether I am grateful or ungrateful. Any who is grateful? Surely his gratitude is a gain for his own soul, and any who is ungrateful should know that surely my Rabb is Self-Sufficient, Self-Exalted.” (27:40) is also about a person who had the knowledge of the book and that *‘ilm* indicates the special knowledge as we have already discussed.

The *‘ālamun* is such a thing by which we know anything as it is used as an instrumental noun like *tabih* meaning *mā yutbah bihi* or *katamun* meaning thereby *mā yukhtama bihi* and in the same way since we get knowledge about Allah through the universe therefore the whole universe is called as an *Al-‘ālam*. It is perhaps for the same reason that we have been exhorted again and again by the Quran to have a ponderous consideration on the universe in order to get the gnosis of the unity of Allah.²

Thus the concept of knowledge above seems most comprehensive and includes science technology and other all branches of sciences which are found in the world by the name of knowledge even interpretation of dreams and information about economic matters.

Moreover, apart from such a holistic view about knowledge the Quran has given us such notions like caliphate, which indicates that we are responsible creatures to make the earth a better place. But to

² “Have they not pondered the kingdom of the heavens and the earth and whatever Allah has created, and that maybe their hour of death has come closer? In what message after this would they then believe?”(7:185) The plural of it is *‘ālamun* and since everything of the universe and every element of it is at its own place and right a complete world, therefore they are called so in their individual capacity as well. For example we say *‘ālam al-insan*, *‘ālam al-mā*, *‘ālam al-nār* etc. etc”. See Imam Raghīb Isfahani, *Mufaradat al-Quran*, tr.by Maulana Muhammad Abduhu Firozepori, (Lahore: Kashmir Block Iqbal Town), vol.2. p. 717-721,

guard against arrogance man has been admonished to walk around to see the fate of earlier nations. Some of the important tenets Islam has integrated with 'ilm are: 1-*khilāfah*, 2-*ibādah*, 3-*tawhid* 4 *ākhirah*, 5-'ilm, 6 *Halāl*. Islam has prohibited haram things for man as a caliph and commanded him to enjoin 'adl and remain away from all kinds of *zulm*.

Moreover, man has been made master of the universe and he has been given enormous potential to explore this universe. But to stop man from aggrandizement, *khilāfah* is to be reconciled with *ibadah*. Surah Rahman talks about *sulṭān* which is taken by modern scholars in the sense of the capacity of man to acquire knowledge to travel to space.

These objectives inculcated by Islamic vision and *weltanschauung* in all activities of man including knowledge and science were espoused by people for some time, in the context of modern science also. For example the great chemist Sir Robert Boyle maintained that the science was for the "greater glory of God and for the good of mankind"³

Furthermore, earlier the natural sciences were seen as a progressive force closely linked to the enhancement of human welfare. To Francis Bacon, science was subordinated to charity and of charity there could be no excess. However, the perception of the natural science, which was close to the Islamic epistemology, could not stand the onslaught of new materialism of the West. The natural sciences in their new incarnation came to the help of chauvinistic self-interest. Hitler was helped by these sciences in claiming the overall superiority of the Aryan race.

The framework of Darwin's Evolutionary Biology was set by metaphors (i.e. competition of the species, struggle for existence and survival of the fittest etc.) which reflected the norms for the new society and contributed to the subsequent development of a dehumanised social ideology based on these biological notions,"⁴

³ MG Hussain, *Muslim Youth and Madrasa Education*, (New Delhi: IOS, 2004), p. 60.

⁴ *Ibid*, p. 60.

With the gross materialization of modern science and technology the perception of the people has undergone a drastic change. Noble Laureate E.B Chain claimed: “science has no moral and ethical quality, and this applies to the physical as well as biological sciences.”⁵

In this situation if we ignore this aspect any more it will be suicidal for our Islamic individuality and personality and we will face challenges which will be unprecedented. In the backdrop of the fact that the secular education is dominant in Muslim countries, Muslim thinkers are becoming worried that gradually the Muslim world will lose its identity by losing its Islamic character and will thus suffer from the same moral disintegration and confusion as the West. They think that Muslim world can preserve that identity and preserve the Ummah from the confusion and erosion of values and from the conflict between religious and secular groups only if Muslims receive a truly Islamic education. They further have started realizing the fact that education can be truly Islamic if Muslim scholars can produce Islamic concepts for all branches of knowledge and Muslim countries can disseminate them among Muslim intellectuals and students. This requires research projects, production of text books, and properly devised teacher – training programmes.⁶

In presence of these all challenges before us, how can we teach our Muslim generations science and technology is worth considering. To start with, Qur’anic observations with respect to scientific and physical phenomenon have astonished scientists and scholars throughout history. The Quran is a book that has produced a fresh and energetic

⁵ *Ibid.* What is technology and science and what is the role of Islam in its promotion is a question which needs our special attention at a time when even Muslim thinkers have felt the ill effects of ignoring this important reality of present life where west has dominated the scene at the exclusion of all others. It is not now only the matter of technological deprivation Muslims are suffering from, but the after math of this scientific and technological advance of the west and rest is bringing in its wake dangerous ideological moral and spiritual drawbacks to fore, hence endangering the very identity of Muslims.

⁶ First World conference of Muslim education held in Mecca in 1977, see in William Montgomery Watt, *Islamic Fundamentalism and Modernity*, (London: Routledge, 1988), p. 87. Shaykh Muhammad al-Ghazzali, *A thematic commentary on the Quran*, translated by Ashur A. Shamis, (Herndon: International Institute of Islamic Thought, 2000), p. 319-320.

civilisation which has restored to humankind its dignity, purpose, and honour.⁷

Islamic education begins with the development and training of human mind and character, which has been explained by the term *tazkiyah*. The skills in learning processes ensue simultaneously and lead finally to the phases of enlightenment, civilization and spiritualization of an instructed, which has been explained by the Qur'anic terms of *hikmah* and *ta'lim al-kitab*. However, since Islam does not make any bifurcation between mundane and spiritual spheres of life, questions which advocates "utility and ornamental" theories of education that have raised seem irrelevant. Here, the scope for "making machines and men" is intact. The bodily desires are to be fulfilled alongside the mental, psychological and spiritual urges of the educated in particular and the commonality of the people in general. However, the teleological paradigm remains glaringly present in all such educational and techno-scientific activities, which saves the instructed from lapsing in the pit falls of one-sidedness.

In each of the early Surahs, God spoke intimately to the individual, often preferring to pose many of his teachings in the form of a question... "have you not heard"? Do you consider? 'Have you not seen?' Each listener was thus invited to interrogate him or herself. Any response to these queries was usually grammatically ambiguous or indefinite, leaving the audience with an image on which to meditate but with no decisive answer. This new religion was not about achieving metaphysical certainty: the Quran wanted people to develop a different kind of awareness."⁸

⁷ Karen Armstrong, *Muhammad Prophet for Our Time*, (London: Harper Perennial, 2007), p. 53—61.

⁸ *Ibid.* The Quran has explained this fact in the following verses: - "Behold! In the creation of the heavens and the earth; in the alternation of the Night and the Day; in the sailing of the ships through the ocean for the profit of mankind; in the rain which Allah sends down from the skies and the life which He gives there with to an earth that is dead; in the beasts of all kinds that He scatters through the earth; in the change of the winds, and the clouds which they trail like their slaves between the sky and the earth; (Here)indeed are signs for a people that are wise." (2: 164) and "Behold! In the creation of the heavens and the earth, and the alternation of Night and Day, there are indeed signs for men of understanding, men who celebrate the praises

In his famous “*History of Human Society*”, Professor Frank Blackmore of the University of Kansas writes: “in every country that was conquered, the first duty of Islam is to build a mosque in which Allah would be worshipped and his prophet honoured”. Attached to this mosque was a school where people were taught to read and study the Quran. From this initial point they enlarged the study, the science, literature and art, and, through the appreciation of these sublime things, they collected the treasures of art and learning wherever these could be found. From imitation they passed on to the great field of creation, and great advances were made to the sum of human knowledge. Schools were founded, great universities established, and libraries were built which laid the permanent foundations of knowledge.”⁹

Hart wig Hirschfield says:

“we must not be surprised to find in the Quran the fountain head of sciences. Every subject connected with heaven or earth, human life, commerce and various trades are occasionally touched upon, and this gave rise to the production of numerous monographs forming commentaries of the holy book.....how successfully Moslem people of all races pursued the study of astronomy is shown by the fact that for centuries they were its principal supporters. Even now many Arabic names of stars and technical terms are in use. Medieval astronomers in Europe were pupils of the ArabsIn the same manner the Quran gave an impetus to medical studies and recommended contemplation and study of nature in general”¹⁰

of Allah, standing, sitting, and lying down on their sides, and contemplate the (wonders of) creation in the heavens and the earth, (with the thought): "Our Lord! Not for naught has Thou created (all) this! Glory to Thee! Any whom Thou don't admit to the fire, truly Thou coverest with shame, and never will wrong doers find any helpers! Our Lord we have heard the call of one calling (us) to faith; Believe ye in the Lord, and we have believed. Our Lord! Forgive us our sins, blot and from us our iniquities, and take to thyself our souls in the company of the righteous." (3: 190 - 193). Here, these verses of the Quran clearly depict the attitude of a "believing" scientist and researcher, how he approaches the universe in the course of his study and exploration and is saved from waywardness of his counter-part, who does not study the universe teleologically.

⁹ Maulvi Abdul Karim, *A Simple Guide to Islam's Contribution to Science and Civilisation*, (Calcutta: Good Word Books, 1935, reprint 2006), p. 52-53.

¹⁰ New Researches into the Composition And Exegesis of the Quran, (London, 1902), p. 9. The same fervour and curiosity which was the hallmark of Muslim scientists of the glorious period marks the modern scientific zeal of people like A P J Abdul Kalam which can be seen from the following passages. The religion seems no where hurdle in his way rather a catalyst... Talking about his friend Ahmed Jalaluddin Abul Kalam says: “Jalaluddin and I talked mainly on spiritual matters.”P-6

To take an example from my own life, I had been fascinated by the mysteries of the sky and the flight of the birds from early childhood. I used to watch cranes and seagulls soar into flight and longed to fly. Simple, provincial boy though I was, I was convinced that one day, I too, would soar up into the skies. Indeed, I was the first child from Rameswaram to fly.”p-13

Wings of Fire An autobiography, Universities press Hyderabad 2005, A P J Abdul Kalam Zohara, my sister, mortgaging her gold bangles to get me into engineering college.p-176

Even the mystical or spiritual tendencies can not hamper the way, if there is resolve to progress scientifically and technologically. He says for example, in this context “Always encouraged to follow Buddha’s or Gandhi’s teachings, how and why did India become a missile power is a question that needs to be answered for future generations.”p-147

Like any other human being a scientist resorts to religious practices and these practices never stop him from advancing his scientific credentials. Prayer supports scientific activity if carried on with right intentions. Abdul Kalam says: “Before Abdul Kalam was asked to proceed to America, for a six –month training programme on sounding rocket launching technique, at the National Aeronautics and Space Administration (NASA) Work centres .He took off some time before going abroad and went to Rameswaram. His father was very pleased to learn about the opportunity that had come his way. He took him to the mosque and organised a special namaz in thanksgiving.”I could feel the power of God flowing in a circuit through my father to me and back to God; we were all under the spell of the power.”p-32 One of the important functions of prayer, I believe, is to act as a stimulus to creative ideas. Within the mind are the resources required for successful living .Ideas are present in the consciousness ,which when released and given scope to grow and take shape ,can lead to successful events. God our Creator has stored within our minds and personalities, great potential strength and ability .Prayer helps us to tap and develop these powers.”(33) He remembers his father starting his day at 4 am by reading *namaz* p-5.

Even case of modern western scholars and scientists, the lack of faith in God and religion leads them to faltering and sometimes lopsided conclusions.

Friend Michael Church believed that Hawking “loved the fact that he had created the world and then created the laws that governed it.” Kristine Larsen, Stephen Hawking–A biography, Jaico Publishing house Delhi, 2010, p-4.

See how Hawking reacts to a remark of Einstein: God does only play dice but also sometimes throws them where they cannot be seen “—namely into a black hole.”P-42 to Einstein’s god does not play dice with the universe “p-42.

When he received Wolf Prize in physics in Israel by the wolf foundation of Israel he said: “The progress of science has shown us that we are a very small part of the vast universe, which is governed by rational laws .It is to be hoped that we can also govern our affairs by rational laws, but the same scientific progress threatens to destroy us as all,... let us do all we can to promote peace and so insure that we will survive till the next century and beyond.”(Mathematical sweep 1988 wolf prizes p-82.

While in Israel he said in reply of a question about God: he “did not believe in God and there was no room for God in his universe.”P-82.In brief history of time there is a controversial passage: we shall all, philosophers, scientists, and just ordinary people, be able to take part in the discussion of the question of why it is that we and the universe exist. If we find the answer to that, it would be the ultimate triumph of human reason –for then we would know the mind of God (Brief History p-175(p-84).

Stephen’s wife Jane “even commented to reporters that her role in Stephen’s life had become “telling him that he was not God”. See A Brief history of a First Wife “Tim Adams, p-87the Observer, April 4, 2004.

Some people “compared Hawking’s faith in mathematics to religion,”p-102.

Hawking seems silent about the Designer but tacitly approves Him when he says: “Hawking justified his use of the anthropic principle, pointing out that “clearly, the universe we live in, did not collapse early on, or become almost empty. So we have to take account of the anthropic principle, that if the universe hadn’t been suitable for our existence, we wouldn’t be asking why it is the way it is”, p-102.

Thus, in light of the above confessions of the leading scholars, *Ulūm* can be classified as *nāfi'ah* and *ghair nāfi'ah* but not as Islamic and non-Islamic from the religious point of Islam. Because Muslims in the times of the Prophet (SAW) and even afterwards were ahead of all other nations in the acquisition of all sciences and technologies though these were in crude form given the pace of technological advancement in the medieval period.

For example, the prophets'(SAW) adopted the *Khandaq* technology during the battle of *Ahzab* on the advice of Salman of Persia (RA) and sent letters to the rulers with the prophetic seal. The arranging of education of *Ansar* boys by the prisoners of war belonging to Makkan infidels and taking *Areqat* as the guide at the time of Hijrah by none else than the Prophet (SAW) and exhorting Umar Ibn Abdullah Ibn Abas (RA) to learn Hebrew language and the mastery of Zayd Ibn Thabit of Hebrew and Syraic languages are only few examples of that glorious past where knowledge of various crafts, sciences, languages and skills was not considered profane or sacred but either useful or useless.

This holistic educational scenario has always engaged attention of Muslims down the age and with this rich background, even *Madrasah* kept on changing according to the needs of the times.

During the period of the Prophet (SAW), the Quran, and the fundamental religious teachings constituted the syllabus of the children education. Moreover, the training of calligraphy was also given to the children with this primary education. As mentioned above the prisoners of Badr were employed to teach the children of Medina art of writing. Ubadah Ibn Samit also gave training in the art of calligraphy to the people of the Bench. Hazrat Umar likewise issued a commandment to his rulers and governors, which included mention of training of the children in swimming, horse -riding, and making them to memorize and read wise old sayings (*Am̄sal*) and poems (*Ashar*). Likewise, he wrote to the rulers of Syria that the children may be instructed to

learn arrow throwing, running between two posts bear-footed, and calligraphy and swimming.¹¹

After the details about this obvious fact of Islamic epistemological legacy which ushered in the new phase of renaissance not only in the Muslim world but finally led to the enlightenment of Europe, this reality is now being realised and it is believed that modern science owes its origin to Islam and modern progress is the outcome of the freedom of thought and spirit of enquiry proscribed for the Muslims by the Holy Quran, and not a product of Christianity which for a long time relentlessly proscribed all free thinking and liberal reasoning and even scientific researches on original lines, and horribly persecuted all those who indulged in these. The impression that it was Christianity that advanced science and civilisation is, therefore, as erroneous as the idea that Islam hampered their progress.¹²

For example in a highly critical book, *Hagarism the Making of the Islamic World*, Patricia Crone and Michael Cook say that it was due to renaissance and not because of Muslim contribution that science could flourish: “Both the Europeans and the Islamic worlds inherited the concept of immutable celestial laws from the Greeks, together with the main doctrines of the Hellenic philosophical schools, but such concept was acceptable to only heretical circles, therefore it fell short of the level achieved in the renaissance, therefore speculative reasoning was not taken to logical conclusion so to say. Plato and Aristotle was to be presented in a “united form” as it was made necessary by “orthodox hostility “while the mathematisation of the universe in the thought of Galileo marked the triumph of speculative treason in Europe. Islamic speculation in mystical proportion of numbers marked the flight of reason to the esoteric wisdom of the *imam*”¹³

¹¹ Maulana Qazi Athar Mubarakpuri, *Khayr-il-al-Quran ki darsgahain aur unka Nizam-I-Tailim wa tarateeb*, (Deoband: Shayk al-Hind Darul al-Ulum, 1995), p. 344-45.

¹² Hamid Naseem Rafiabadi, *A Brief Introduction to Islamic Epistemology Ilm al Kalam and Muslim Philosophy*, (Srinagar: City Book Centre, 2010), p. 139.

¹³ *A Simple Guide to Islam's Contribution to Science and Civilisation*, (Calcutta: Good word books, 1935) *op.cit.* p. 34-35. Here we need to bring this fact to the notice of our readers that Christianity only hampered the way for the development of science and technology and

They say further: “Islam, thank God, has no need of logic whatever, Europe, thanks to science, had no need of God whatever”.¹⁴

Watt thinks that under the notion of self-sufficiency Muslims have not taken knowledge from the Roman or Christians and Jews though during early few centuries they would get some information from some Jewish converts but latter they have even kept themselves aloof from that source. However, Muslims have borrowed from Greek intellectual culture and Iranian culture. They were particularly interested in Greek science and philosophy. In medicine and astronomy, “the latter being useful in their far flung empire in determining the direction to be faced in prayers (towards Mecca).

Greek philosophy could not usher into any scientific enterprise basing its theories on the experimental foundations. Therefore we need to know the catastrophic disservice done to scientific enquiry by Christianity and the lethargic Greek method of deduction at the expense of induction.

To start with the most obvious example of conflict of Science and religion in Christian world is that of the church's persecution of Galileo (1564-1642). The famous trial of Galileo before panel of cardinals was held in 1632, and he was condemned by a vote of seven to three for violating an injunction sent to him in 1616 requiring him not to hold, teach, or defend in any way what so ever that the earth moves. He recanted and spent the rest of his life under house arrest. This is also a fact to reckon with that sometimes Galileo had claimed that science and scripture had different goals and were irrelevant to each other. He had cited Augustine's assertion that scripture did not teach us about matters that were not relevant to our salvation. He also had quoted Cardinal Bronius: “The intention of the Holy Ghost is to teach how one goes to heaven, not how heaven goes”.

Moreover at some places Galileo had asserted that a metaphorical interpretation of scripture was acceptable only when a literal interpretation would have conflicted with a scientific theory that could be proved with certainty. Scientific theories that could not be irrefutably demonstrated should be rejected in favour of a literal interpretation of a scripture.

Similarly, many other scientists like Bruno, Copernicus, Kent were given the punishment of imprisonment and death. Courts were framed to resist the new trends of learning and philosophy in France and Italy, persecuting more than 10,000, others were put to jail. Many research books were thrown into fire under pretence of protecting the religion represented by the priests.

Under such torture, science had suffered a lot, and conflict had started between science and religion due to irrational and wrong attitude of the church. Perhaps it was a reaction of this hostility and persecution that science in the West during the last four centuries has become Godless and anti-religion, because the scientists were persecuted under the authority of Church.)Furthermore, contrary to the hostile attitude of the Christianity to science and rationalism Islam patronized both in a big way .According to Professor Abdul Salam we do not find any inquisition in Islamic history which has punished any scientist for scientific invention or views as we find in case of Church in the western part of the world.Now there are several other questions also which need to be discussed before our audiences. There are people who complain that Muslims could not make any additional and original contribution to the Greek legacy which they had inherited and remained content merely by being the imitators or the commentators of the Greek scientific edifice of knowledge.p...141

¹⁴ Patricia Crone, Michael Cook, *Hagarism the Making of the Islamic World*, (London: Cambridge University Press Cambridge, 1997), p. 145.

It seems Montgomery Watt is repeating the same allegation against Muslims which was long back levelled by Renan who was befittingly rebuked by Jamaluddin Afghani by saying that when Aristotle was neighbour of the West he was neglected but Muslims inherited his views and presented these finally before the West, though being away from him.

Watt says something conspicuous: "...Muslims were not willing to seek knowledge even from the alien cultures within their empire. This is probably to be explained by the fact that when Muslims think of knowledge, they think primarily of what may be called knowledge for living, whereas when westerners think of knowledge it is mainly of knowledge for power, that is such knowledge enables one to control natural and material objects and human individuals and societies. It is introspect of knowledge for living, consisting of religious and moral values, that Islam claims finality and self-sufficiency.¹⁵

It should perhaps be noted here that Sr. Hamilton Gibb has characterized the medieval Islamic conception of knowledge in a somewhat different way. He writes: "the old Islamic view of knowledge was not a reaching out to the unknown but a mechanical process of amassing the 'known. 'The known was not conceived of as changing and expanding but as 'given' and eternal. Not everybody, of course, could possess all knowledge, but there was at least a fixed sum of knowledge, most of which was in the possession of some persons or other."¹⁶

But if we see minutely this allegation (and seen in the context of Watt's remarks that Muslims abhorred the Greek and Christian legacy they had inherited and rather accepted Iranian influences) when scrutinized on the whetstone of hard realities seems hallow.

Apart from this inherent bias of some of the European scholars about the actual contributions of Muslims to pure sciences and technological

¹⁵ *Ibid.*

¹⁶ *Op.cit*, p-13-14.

enterprise there are people who deliberately give the impression that the gap between Islamic ascendancy during the medieval period and Renaissance could not be bridged by Islam. Thus, conspicuously, the histories of science and culture show a break between the period of the Greeks and the renaissance, as no breakthrough was found during this long span of time.

In other words they give the impression that the history of science was blank for nearly one thousand years, and scientific knowledge made a sudden leap, taking a millennium in its stride after the renaissance only. These histories ignore the fact that the intervening ages from the first/seventh to the eight/fourteenth century constituted the era of the Arabs and other Muslim peoples.¹⁷

But when we analyse these perceptions or I may call the misperceptions, we see that instead of the speculative approach of Greek philosophers like Plato to knowledge and the action oriented and faith based knowledge of Islam, surfaced again and made its headway as a consequence. Because Islam purifies knowledge through *tazkiyah* and gives it orientation through faith leading its beholder finally to *dhikr* culminating in pious actions. In contrast, Greek philosophy in most cases has led to worst kind of speculative corpse of knowledge, which was deductive in nature and not inductive. It gives a metaphysics that assumes a phenomenon, of ‘news from nowhere.’ It needs to be understood here that it was under the influence of Islamic epistemology that the West could get rid of the age old question begging and hair-splitting, which was the hallmark of the peripatetic legacy of Greek philosophy.

Robert Briffault says in his famous book *the Making of Humanity*: “The light from which civilization was once more rekindled did not arise from any embers of Greco-Roman culture smouldering amid the ruins of Europe, nor from the living death on the Bosphorus. It did not come from the North, but from the Saracens. It was under

¹⁷ *Ibid.*

the influences of the Arabia and Moorish revival of culture and not in the fifteenth century, that the real Renaissance took place. Spain, not Italy, was the Cradle of the rebirth of Europe”.

He writes further: “Science arose in Europe as a result of new spirit of inquiry, of new methods of investigation, of the method of experiment, observation, and measurement of the development of mathematics in a form unknown to the Greeks. That spirit and those methods were introduced into the European world by the Arabs.”¹⁸

And as a matter of fact “...The edifice of modern science,” says Hifizur Rahman Siddiqui “however impressive it might appear today, is based largely on the achievements made by Muslim masters in the past. Had science been confined to Greece, it could revolve merely around philosophy,”¹⁹

According to him the modern philosophy has been fully on the lines of Greek philosophy. But “modern science is related closely to Muslim science. ”It has no links whatsoever with Greek science, for it appears today something ridiculous. Explaining the point further he says: “To know facts with the help of reason is common to both the Greek and the modern philosophy. Moreover, Greek philosophers made claims to have known physical realities in the light of only reason. However, Muslim masters relied on sense power in ascertaining physical realities. To put in scientific terms, Muslims abandoned deductive and analogical methods and opted for the experimental method.”²⁰

On the contrary, Muslim masters not only employed but also insisted on using the experimental methods in studies related to material realities. For them it was the only criterion. As a result, one finds their work duly supported by experiments. In pursuance of the

¹⁸ M. R. Siddiqui, M .M .Sharif, *A History of Muslim Philosophy*, volume two, (New Delh: low price publications, 1989), p. 1277.

¹⁹ Quoted in *Rational Sciences in Medieval India*, Hamid N.Rafiabadi, *History of Science, Philosophy and Culture in Indian Civilisation*, General Editor D .P.Chattopadhyaya, vol.11, part 5, *Development of Islamic Religion and Philosophy in India*, edited by Mohammad Rafique, Project of History of Indian Science, Philosophy and Culture, Centre for studies in Civilisations . New Delhi, 2009, p. 39.

²⁰ Briffault, *The Making of Humanity* (quoted in *Iqbal, Reconstruction of Religious thought in Islam* (Lahore: Iqbal Academy), p. 104.

aim of arriving at tenable conclusions Muslims funded laboratories and observatories and invented number of instruments. Western historians of science have also borne testimony to the above mentioned facts. So do the instruments invented by Muslims preserved in museums stand witness to it. For example Jaber been Hayyan's laboratory, the mortar used by him and a piece of gold have been excavated near Baghdad".²¹

The West, though acquainted with the intellectual activities of the Greek, was amazed to note the scientific development of the Islamic world, which was a fruit of their having practiced experimental method. Ray, Merv, Baghdad, Damascus, Cairo, Cordova and Granada, the centres of the Islamic world, were reflective of the scientific progress achieved by Muslims."²²

From Granada to Delhi they had blazed heavenward establishing colleges libraries and observatories wherever they went. Even Basrah and Kufah originally founded as military cantonments, had become humming centres of literary activity to quote Carlyle.

This scientific and technological knowhow provided Muslims the military superiority on their rivals. According to Graham Fuller, Arab armies, energized by the new social, political and religious ideas of Islam in the mid-seventeenth century, quickly advanced north out of Arabia. We witness here a classic encounter of the old and the new.²³

He says further: "If there had been no Islam and the Eastern Orthodox Church had held onto its power in the Middle East, it would still have been only the Latin Church, Rome, that was challenged by the budding Protestant German princes and others in contestation for political power, wealth, and control of doctrine. Constantinople would likely have remained a bulwark of stern Orthodoxy, more convinced than ever of the misguided, dangerous, even disastrous course of Christianity in the West."²⁴

²¹ *Ibid*, p. 127.

²² *Ibid*.

²³ *Ibid*.

²⁴ Graham E .Fuller, *a World without Islam*, (New York: Little Brown and Company,

Thus it can be safely said that when the Christianity had broken the back of scientists and rationalists on the name of inquisition, it was Islam which gave a new lease of life to science and technology and added new dimensions to it which could not be found in its Greek dispensation due to obvious reasons.

Canon Isaac Taylor says while endorsing these facts that: "Islam has done more for civilisation than Christianity".²⁵ Bosworth Smith challenged these erroneous notions that Islam was not responsible for facilitating the Renaissance in the Europe and says: "During the darkest period of European history, the Arabs for five hundred years held up the torch of learning to humanity".²⁶

Draper has a point: "...The systematic manner in which the literature of Europe has continued to put out of sight our scientific obligations to Mohamedans. Surely they cannot be much longer hidden, injustice founded on religious rancour and national conceit cannot perpetrated forever."²⁷

After the conquest of Spain the Muslims established there several universities which opened their doors to all students without distinction of creed, caste, colour or country; and also boarded and lodged them at public expense. Spain thus also became the centre of European culture, and scholars from all parts of Christian Europe looked to her seats of learning. Roger Bacon and other pioneers of the Rationalist movements in Europe, all received their education in the Muslim university of Cordova. Even the great Emperor Charlemagne had to send his son to Spain to be educated by the Muslim teachers, for nowhere else in Europe was there any seat of learning worthy of the name.²⁸

When we compare this glorious phase with the ignorant Arabia before Islam, we can easily discern the contribution of Islam in bringing

2010), p. 77.

²⁵ *Ibid*, pp. 119.

²⁶ *A Simple guide to Islam's Contribution to Science and Civilisation Op. Cit.* pp. 15.

²⁷ *Ibid*, pp. 16.

²⁸ *Ibid*, pp. 17.

about this clandestine civilizational revolution. According to Bulazhri in *Futūh al Buldān* only 17 persons among the Quraysh are reported to be literate, able to read and write, at that time when Islam appeared in Makkah.²⁹

And according to Karen Armstrong: during pre-Islamic Arabia “the poet was the spokesman, social historian, and cultural authority of his tribe”³⁰

Whatever progress Muslims and Arabs made it was only after their acceptance of Islam. Before the advent of Islam in Arabia there were only few persons who knew how to read and write. Arab education was restricted to poetry, oratory, and a primitive form of astrology, *kahana*, or augury. The prophet did not encourage poets, condemned story tellers and abolished the gathering of *Ukaz*, but recommended and even persuaded his followers to acquire knowledge which has been repeatedly mentioned and praised in the Quran.

The detailed argumentations of the Quran and reflective verses had ignited the zeal and zest of the Arabs that they started to find knowledge from anywhere or any one they could find.³¹

After the Prophet (SAW) the process of assimilation of new sciences and intellectual activities remained a continued process and never were disrupted. The grandson of Mawiyah Khalid was interested in logic and alchemy while as Mawiyah was interested in hearing legendary stories. Before the end of Umayyad rule Muslims had begun to study history, geography and astronomy, besides tradition, philosophy and theology. The Abbasid rules not only encouraged learning but also enjoined public discussions and founded schools where besides Arabic literature, theology, philology, grammar, rhetoric, arithmetic, physics, astrology, astronomy and other branches of science were studied.³²

²⁹ *Ibid*, p. 38.

³⁰ *Ibid*, p. 41. See also Karen Armstrong, *Muhammad: Prophet for Our Time*, (London: Harper Perennial, 2007), p. 58.

³¹ *Ibid*.

³² Mawlana Hanif Nadvi, *Aqiliyat Ibn Taimiyah*, (New Delhi: Areeb Publications, 2005), p. 31.

Here it needs to be emphasized that the translations the Muslims got from the Greek books were not merely philosophical ones but also scientific.

Arabs did not remain confined to Greek sciences only but even benefited from the Indian sciences as well. Russell endorses this universalistic aptitude of early Muslims to knowledge when he says:

“Meanwhile, in Persia, Muslims came in contact with India. It was from Sanskrit writings that they acquired, during the eighth century, their first knowledge of astronomy. About 830, Muhammad Ibn Musa al-Khwarizmi, a translator of mathematical and astronomical books from the Sanskrit, published a book which was translated into Latin in the twelfth century, under the title *Algoritmi de numero Indorum*. It was from this book that the West first learnt of what we call “Arabic” numerals, which ought to be called “Indian.” The same author wrote a book on algebra which was used in the West as a text book until the sixteenth century.”

The authors of the encyclopaedia, entitled Brethren of Purity, in 52 parts included seventeen parts on natural sciences, Al Biruni (973-1048 AD) after acquiring a good knowledge of Sanskrit, Indian history and philosophy, wrote his monumental works on these subjects and on science. His works on mathematics, physics, geography and astronomy are all invaluable; His chronology of ancient nations is often quoted by European authors.

In his physics, he has given the exact specific weight of eighteen precious stones. Abdullah Khwarizmi (820, AD) from whose surname the word Algorithm is derived was among the earlier Muslim Mathematicians. He translated the India Siddhanta and revised Ptolemy’s tables. According to Roger Penrose: the word algorithm comes from the name of the ninth century Persian mathematician Abu Jafar Mohammad Ibn Musa al Khwarizm, who wrote an influential mathematical textbook, in about 825 AD, entitled *Kitab al –Jabr wal-Muqabala* .³³

³³ Roger Penrose, *The Emperors New Mind*, (Oxford: Oxford University, 1999), p. 41

Jabir, son of Hayyan, supposed by some to have been an Iranian of Khurasan and by other a Syrian of Harran (776A.D), was the author of twenty–seven works. He discovered sulphuric and nitric acids and aqua regia. He wrote several woks on chemistry. He is known as Geber in European languages. Jabir gained also the distinction of preparing lead carbonate and separating arsenic and antimony from their sulphides. He explained the preparation of steel, the polishing of metals, the dyeing of cloth and leather and distillation of vinegar into concentrated acetic acid. Modern chemistry says Humboldt “was” admittedly the invention of the Muslims “they found out the chemical affinities of mercury, lead, copper, silver and gold and knew the chemical processes of oxidation, and calcination. A number words such as alembic, alkali, etc. were derived from Arabic. Jabir bin Hayyan, known as Geber in the western world, wrote some five hundred treatises on chemistry. He discovered for the first time, nitric acid, sulphur acid, aqua regia, silver nitrate and several compounds.³⁴

Umar Khayyam was a great astronomer and mathematician. He has written on Algebra, Geometry, Chemical Analysis and Mineralogy and helped to reform the calendar known as *Jalali*, still in use in Iran.

Jghamini wrote an abridged treatise on astronomy. The Arabs obtained their knowledge of alchemy from the Iranian school of Alexandria and made it an important subject of science. Other Muslim chemists discovered that mercury and sulphur combine into a brilliant red supphide. Ibn Musa and Jabir wrote original works on spherical trigonometry. In Zoology Muhammad Damiri (1283a.d) has also given a fair description of animals, plants and stones. Khazini of Merv (1200A.D) has, in his valuable work entitled *The Balance of Wisdom*, written on the specific weight of alloys and the density of water. Jazari (1206-AD) wrote an important work on Mechanics and the manufacture of clocks. Rizvan (1203) has furnished a description of a

³⁴ *Quest for New Science, Op. Cit.* p. 125-126.

water-clock made by his father. Muslims are also credited with having invented wind-mills.³⁵

Less than two hundred and thirty years after the Hijrah Muslims were borrowing and successfully adapting techniques and knowledge which they wanted from their neighbours belonging to different Civilisations.³⁶

According to H .J.J Winter “recent research has shown that in regard of both time and space the influence of Islamic science was of greater significance than has hitherto been supposed, and the nature of this culture based science will repay examination.”

The industries developed by the Muslims during their rule in Spain were many and of far reaching consequences. Shipbuilding, horticulture, tanyards, glassware, silver mines, cotton manufactures, silks, woolen carpets, iron and copper utensils and inland metal work were some of these.

Draper: “in whatever direction we look, we meet in various pursuits of peace and war, of letters and science, Saracenic vestiges”^{38/}

Dr Campbell, a reputed British scientist, in his book “Arabian Medicine”, writes: when Europe was lying torpid in the depth of intellectual obscurity and gloom in the dark ages, culture and civilisation were spreading in the Islamic States under the high patronage of the caliphs of Baghdad and Cordova, and at a time, when Barons and ladies of medieval Europe could not even sign their names, almost every adolescent boy and girl in Islam could read and write freely and with ease.”³⁷

According to Murad “joyful curiosity combined with a readiness always” p-30 to exert one’s mind, was the right platform for the extraordinary development of the Islamic sciences from the late eight

³⁵ *Ibid*, p. 55. *Outlines of Islamic Culture*, pp. 174-176.

³⁶ *Ibid*. p. 58-59.

³⁷ Chagatai. An Indian links with central Asia in Architecture “in Indian Art and Letters”, Vol. xi (2), 85. London: India society, 1937. See, *Endeavour*, London, vol. xxx111, p. 105, September.

century onwards. He provides fourteen examples like: Ibn Firmas (died) to whom first flying machine is attributed. A. Hassan b.Al Haytham / al-Hazem (965- 1039) inventor of the camera obscura.

Umar AL Khayyam (dead between 1123 and 1131) was a poet and mathematician. He also reformed the Indian calendar with greater accuracy than the 1582 Gregorian calendar.³⁸

The Egyptian physician ibn Nafis (died 1288) discovered blood circulation. Ibn Batutah (1304 - 1368 Or 1377), Moroccan globetrotter on a par with Marco Polo who reached Timbuktu, Peking, and the Volga. The navigator was Ahmad Ibn Majid, fifteenth century authority on ocean voyages. The Turkish ocean geographer and admiral Piri Reis (1480 - 1553) who *Kitab -i-Bahriye*, with its precise maps of the seas, still amazes us (Istanbul 1988) and his scientific colleague Seyyidi Ali Reis (died 1562) who measured the Asiatic coasts and developed nautical astronomy.

Islamic sciences flourished during the zenith of Muslim civilisation, a period of some seven hundred years from 700 to 1500 CE. The science that evolves during this period has a distinct Islamic identity. This identity manifests itself in terms of epistemology—which shaped the outlook and goals of science; and in terms of methods which affected the ways of doings well as the content of science.

For, Ibn Haytham the pursuit of science without an ethical framework is inconceivable. And ethics for al Haytham is a pragmatic concern not some abstract philosophical notion. He says: there are three disciplines which go to make philosophy: mathematics, physical sciences, and theology.”

He introduced the inductive method and is an arch believer in rationality. But his rationality is subservient to his ethical system.³⁹ With this rich background in science and technology and all branches of sciences when we try to reorient our studies about Islamic

³⁸ Endeavour. *op.cit.* p. 44.

³⁹ A Simple guide to Islam’s Contribution to Science and Civilisation, *op.cit.* p-51

civilizational contribution several names come to our mind. Ismail Raji Faruqi wants to tell us that the Muslim scientists of today are obliged to the Muslim *ummah* to bring the spirit of sciences back in accordance with the spirit of Islam. Concrete proposals with specific plans ought to be further pursued, both academically and practically in the process of Islamisation. Moreover, Islamic philosophy as such which is being taught in our universities and educational institutions is devoid of the Islamic content as whatever has been passed on the name of philosophy from the Muslim adherents of Greek like Ibn Sina and Farabi is considered Islamic by the students or they are made believe that it is so. While as from Ghazali to Ibn Taimiyah and Ibn Qayyim, this corpse of knowledge, including epistemology has been severely criticized for inclusion in it of the pagan Hellenistic and un-Islamic elements. The process of Islamisation of Knowledge has given impetus to this desire that we need to purge epistemology and Muslim philosophy from all these foreign and un-Islamic influences which have been received by it from time to time .

C. Conclusion

In light of the above discussion the students of colleges and universities are to be told that the solution of the crisis of duality between world sciences and religious sciences can be found by integrating Islamic values and concepts in all disciplines of learning. Therefore the epistemology and curriculum reform is the basis for knowledge/education renaissance in the *ummah* and we have to embark on education reform as it is the basis for social reform, *islah and tajdid*.

Clarification of basic epistemological issues and relations and an Islamic critique of basic paradigms, basic assumptions, and basic concepts of various disciplines using criteria of Islamic methodology and Islamic epistemology is a very important task. Islamic reviews of

existing text-books and teaching materials to identify deviations from the *tauhidi* episteme and the Islamic methodology are needed.

The most important manifestation of the knowledge crisis is dichotomy in the education system: traditional Islamic vs. imported European. Integration of the two systems has failed. Secularization of education eliminated the moral dimension and violated the aim of Islamic education to produce an integrated and perfect individual, *Insan kaamil*. The ummatic malaise due to the knowledge crisis that started with the fall of the *khilafat rashidah* when the authentic 'ulama were marginalized. Society became 'secularized' because the rulers were in one valley and the scholars in another valley. This dichotomy between the sources of Islamic guidance and the political leadership of society eventually led to and nurtured the knowledge crisis we have today.

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