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Islam and Science: A Preliminary Exploration

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ABSTRACT: *Science and religion are ways of cognizing and interpreting the external world. In spite of significant differences with reference to both the method and content, both provide a framework for understanding external phenomena. This paper is an attempt to explore the nature of relation between Islam and Science. In this article, instead of trying to prove that both science and religion are contradictory, a counter-factual attempt has been made to show on one hand how science is tentative, imaginative, subjective and culturally embedded and on the other hand how several scientific ways are present in Islam.*

Firstly, the nature of science is dealt highlighting the non-objective and contextual characteristics of science. Then a comprehensive overview of fundamentals has been presented. A discussion on the composite relation between Islam and Science brings out the parallels and divergences between them through select examples. Further, this relationship of Islam and Science explored in terms of methodological and epistemological debates. Finally, it is shown that the relation between Islam and Science is neither of simple negation nor of complete reinforcement. There are certain key interdependencies, parallels and divergences making this relation complex, nuanced and organic calling for further understanding in terms of historical, geographical and cultural contexts.

I. INTRODUCTION

Science and religion are but two world views. These are two systems of cognizing and processing information about external phenomena. Though, there are wide ranging differences with reference to the methods and contents, both provide a framework for understanding external phenomena. In this essay, instead of trying to prove that both science and religion are contradictory, a counter-factual attempt has been made to show as to how science is tentative, imaginative, and subjective and culturally embedded a criticism which is often levelled against religion. At the same time an attempt has been made here to show that several strands of scientific ways of knowing and doing things are present in Islam. This has been brought out by presenting the tenants and practices in Islam and drawing parallels between science and Islam in terms of these tenants. The terrain of relationship between religion and science is vast and extensively commented by scholars. However, the author has still ventured to write on the topic of Islam and Science in view of currently surging notion of incompatibility between these two. There are innumerable dimensions and ways of exploring this relationship between Islam and Science. Each view is a kind of snapshot that helps to unravel the large canvas. This paper is organized into four sections. The first section deals with the nature of science and highlights the tentative, subjective and contextual nature of science. Then a comprehensive overview of fundamentals of Islamic religion including the five pillars of Islam has been presented. In the next section, presents a discussion on the composite relation between Islam and Science both in terms of parallels and divergences between them. Finally, this nuanced relationship explored in terms of methodological and epistemological debates leading us to conclude that the notions of Islam as either antiscientific, ascientific or systematically grounded in science are simplistic. This relationship is more complex and nuanced and it has to be appreciated against the backdrop of significant contributions to the medieval technology and thus science in the fields of technology.

فَيَكُونُكُنْ

II. "KUN FA YA KUN"

he took a matter said "Be", and there it was we, us, the earth and the heavens.
Surat Al-Baqarah, Chapter 2 - Verse 11, Qur'an

Modern science explains this as the *big bang*, when a primeval atom exploded and the universe was created. From then, our universe is expanding. Science doesn't yet explain as to *who created the primeval atom.* There are infinite questions about everything around. Science and religion, both give answers to these, sometimes similar, sometimes different and sometimes *contradictory*. Science is based on observations of the world around us from which interpretations are made. Scientists' depends on empirical evidence to produce scientific knowledge. Although it is reliable and durable, it is neither set in concrete nor perfect. It may change

as per the evidences and as per the interpretations of existing evidences. The word, *tentative* fits the meaning perfectly.

Is there a God? And if he is, does he really care? These valid *scientific* questions are enough to generate frown and anger on a priest's face. Every religion is based on some beliefs which are basic to its existence and any questioning of these beliefs is taken as blasphemy. Islamic word for blasphemy is '*Kufr'*. Science, sometimes, also takes assumptions to explain phenomena. But as our thought process propagates, there are many questions to which an answer is sought. Science and religion are often termed as contradictory, and sometimes supplement to each other's limitations, but both of them try to give us an explanation of how and why of the things around us. Science has been used by us for centuries to solve problems, ease our tasks by building machines, eradicate diseases, and understand nature. On the other hand, religion comes with a humanitarian concern. It leads to the path of righteousness throughout one's life, leave aside the count of as to 'how many' follow it properly, which off-course, is not the context of our discussion.

III. SCIENCE

Science is the pursuit of knowledge and understanding of the natural and social world following a systematic methodology based on evidence. It is a system of acquiring knowledge based on empiricism, experimentation, and methodological naturalism, as well as an organized body of knowledge humans has gained by such systematic research. Scientists maintain that scientific investigation must adhere to the scientific method, a process for evaluating empirical knowledge that explains observable events in nature as results of natural causes, rejecting supernatural notions. Islam, like all religions, believes in the supernatural that is accessible or interacts with Man in this life. Science is a human effort to understand the history of natural world and how the natural world works with observable physical evidence. We can understand this by practically doing it or through experiments.

Science as the study of nature includes everything in the universe. Science builds and organizes knowledge in the form of explanations and predictions. The practitioners of science are called as **scientists**. The **scientific method** is a body of techniques for investigating phenomena, acquiring new knowledge or correcting and integrating previous knowledge. To be termed scientific, a method of inquiry must be based on empirical and measurable evidence subject to specific principles of reasoning.

The Oxford English Dictionary defines the scientific method as: *"a method or procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses."*

There are basic assumptions needed to justify the scientific method:

- that there is an objective reality shared by all rational observers
- that this objective reality is governed by natural laws
- that these laws can be discovered by means of systematic observation and experimentation.

Philosophy of science seeks a deep understanding of what these underlying assumptions mean and whether they are valid. The religious requirement contributed in several ways initially towards the scientific quest. For example: the need for determining accurate time for daily prayers and the direction of Mecca from anywhere in the Muslim world, establishing the correct date for the start of the fasting month of Ramadan and the demands of the lunar Islamic calendar (which required seeing the new moon clearly) led to intense interest in celestial mechanics, optical and atmospheric physics, and spherical trigonometry. Muslim laws of inheritance led to the development of algebra.

Nature of Science: Though science is based on observation, evidence, systematization and verifiability stemming from reliability and validity, there is a significant dimension of the normative science which is tentative, subjective, ever changing and contextual.

Science is tentative: Although it is reliable and durable, scientific knowledge is neither set in concrete nor perfect. Rather, it is subject to change in the light of new evidence or new interpretation of existing evidence. Because of its tentative nature, we cannot claim 'absolute truth' in science. The tentative nature of scientific knowledge also means that laws and theories may change.

Science is empirical: This means that science is based on and derived from observations of the world around us from which interpretations are made. Scientists depend on empirical evidence to produce scientific knowledge. Any scientific explanation must be consistent with empirical evidence and the new evidence brings the revision of scientific knowledge. Scientists make observations ranging from observations with the naked eye to the use of instruments.

Science is inferential, imaginative and creative: However, science is not simply the accumulation of observable evidence and the orderly gathering of knowledge. All observations require interpretation and inference by scientists. To do this, scientists require imagination and creativity to make inferential statements about what they see. In fact, imagination and creativity are needed in every aspect of a scientist's work – making sense of observations, making the creative leap from data to possible explanation, coming up with new ideas, designing investigations and looking at old data in a new light.

Science is subjective and theory-laden: Different scientists can interpret the same datasets differently. How can this be so? Scientists do strive to be objective, but it is just not possible to make truly objective observations and interpretations without any bias. A scientist's mind is not a blank slate. Individual scientists have their prior knowledge, theoretical beliefs, experiences, cultural background, training, expectations and biases, each of which will affect their observations and conclusions. All observation is preceded by theory and conceptual knowledge. Science tries to overcome this lack of pure objectivity through the scientific community, which scrutinizes scientific work and helps balance individual scientists' leanings.

Science is socially and culturally embedded: All scientific knowledge can also be seen as being embedded in a global scientific community. This community has a particular culture, expectations and accumulated knowledge – all of which are essential to increasing scientific knowledge. All scientific knowledge is produced within the context of larger society and culture. This means that the social and cultural elements such as politics, economics, power structures, religion and philosophy will affect the science knowledge produced and how it is accepted. This also means that the direction and the products of science will be greatly influenced by the society and the culture in which the science is conducted. As societies change, so do scientific priorities. For example, during the first half of the 20th century, two World Wars dominated society and so governments made funding available for research with wartime applications. Science moved in that direction and nuclear energy was unlocked. Science changes to reflect shifts in society and its priorities.

IV. ISLAM

The religion Islam has its own worldview system including beliefs about "ultimate reality, epistemology, ontology, ethics, purpose, etc." Muslims believe that the Qur'an is the final revelation of God for the guidance of humankind. Islam is a religion who believes in only one God (Allah). It is the word 'Islam' that means submission to the will of Allah. It is articulated by the 'Qur'an', a book which is sent by the Allah. It is believed that Allah is a supreme power. Neither He has body parts like eyes, nose etc. nor He has son, daughter, wife and has no one created Him. People who follow this religion are called Muslims. Muslims believe in one God and his PROPHET (MUHAMMED). The glorious Qur'an is the last and final revolution which was revealed by the Prophet Muhammed. Previously centuries back it was age of miracles. The glorious Qur'an is the miracle of miracles. Many scholars believe that Qur'an is the best available literature on this earth.

Fundamentals of the Islamic Religion: The fundamentals of the Islamic Religion are brought out in terms of a brief presentation on God, Angels, Scriptures, Messengers, Day of Judgement and the practice of Islam in terms of five religious duties.

God: Islam is predicated on the belief that there is but one God, Allah, the Creator of the universe and of humankind. Mercy and compassion are his principal qualities. The first and most essential element in Islamic theology is the doctrine of God (Allah). True belief demands an uncompromising monotheism.

Angels: Angels are frequently mentioned in the Qur'an. They are God's messengers who exercise a potent influence on both the life of humans and the life of the universe. Angels are said to act as intermediaries asking God to forgive the offenses of believers. At the time of death, the souls of humans are received by angels, who have kept a record of their actions and will witness for or against them on the Day of Judgment.

Books (Scriptures): One of the central doctrines of Islamic faith is belief in all of God's revealed messages, which now consist of four books: Torah, Psalms, Gospels, and Qur'an. These four Books are to be regarded as Holy Scriptures, even though the three Books preceding the Qur'an include certain human imperfections. With the appearance of the Qur'an, the noblest of the Books, these earlier Books, it is believed, were abrogated. It is an article of faith that the purpose of the Qur'an is to preserve original divine revelations by restoring the eternal truth of God. Since the Qur'an abrogates all earlier Books, its ordinances continue to remain in force until the Day of Judgment.

Prophets (Messengers): To all peoples and in all ages, God sent prophets or messengers to proclaim the Oneness of God and to warn humanity of the future judgment. The Qur'an mentions many by name. Most are Old Testament figures (Adam, Enoch, Noah, Lot, Abraham, Ishmael, Isaac, Jacob, Joseph, Moses, Aaron, Elijah, Elisha, David, Solomon, Job, Jonah, and Ezra). Three are from the New Testament (Zacharias, John, Jesus). Just as Adam is regarded by Muslims as the first prophet sent by God, so Muhammad is the 'seal of the prophets' through whom God reveals His eternal message in its definitive form.

The Day of Judgement: The Last Day, or the final Day of Judgment, occupies a very important place in Qur'an and in the Hadith. The vivid description of the events leading up to the Last Day and the elaborate portrayal of the final judgment are very similar to the book of Revelation. Islamic doctrine associates the coming of 'The Guided One' (*Mahdi*) with signs that foreshadow the Last Day. Some Sunni Muslims believe that an individual from the family of the Prophet Muhammad will appear and reign for seven years to make the religion of Islam triumphant throughout the world before the end comes. Most Sunni scholars, however, identify this Messianic figure with the Prophet Jesus. Muslims believe that on the Last Day, the graves will be open, the dead will resurrect and a judgment will be pronounced on every individual according to his or her deeds.

The five pillars of Islam (Religious Duties)

The Creed of Islam (*Shehada*)
This is the profession of faith in Islam: "There is no other god but God; and Muhammad is the Prophet of God" *(la ilahaill'Allah, Muhammad rasul Allah).*
Professing this creed is sufficient to make one a convert to Islam, provided the following conditions are met:

- To repeat it aloud
- To understand it perfectly
- To believe it in the heart
- To profess it till death
- To recite it correctly
- To declare it without hesitation

Prayers (*Salat*): The next most important religious duty after the profession of faith is prayer. Qur'anic texts prescribe only three prayers a day, but Islamic tradition requires five: *at dawn, noon, mid-afternoon, evening, and night.* Muslims may not waive the obligation to pray five times daily even if they are sick or on a journey. The sick are to pray in bed and if necessary, lying down. Travellers are enjoined to pray at dawn, to combine noon with mid-afternoon prayer, and evening prayer with prayers that follow nightfall, thus praying three times daily. Prayers may be said either in private or in public worship. All public or ritual prayers must be preceded by ritual purification both of the individual and the place. Muslims pray on a mat or rug in token of purity secured for the spot or place. Shoes or sandals are removed before devotees step on their prayer rugs. A worshipper prays facing in the direction of Mecca (*qibla*) a direction which is indicated in mosques by a niche in the wall (*mihrab*).One day in a week is set aside as a day of public prayer (Friday). Muslim women do not attend public prayers, although some mosques have a room or section set aside for them. Prayer is the heart and essence of Islam. Any Muslim who wilfully avoids prayer is considered to have forsaken Islam.

Religious Tax (*Zakat*): The third duty of a Muslim is to give alms to the poor as an outward sign of true piety. There are two kinds of almsgiving: legal (*zakat*) and voluntary (*sadaqa*). In Muslim canon, law legal alms are assessed at one-fortieth (2.5%) of an individual's income in kind or money. Legal almsgiving is now more or less defunct, because many Muslim states follow Western systems of taxation.

Fasting (*Siyam*): The fourth duty of a Muslim is to fast during the twenty-nine days of the ninth month of the Islamic lunar calendar (the month of Ramadan). During the day Muslims abstain from food, drink, and sexual intercourse; but these proscriptions are lifted between sunset and sunrise. All adult male and female Muslims fast from sunrise to sunset. Only children, the sick, nursing or pregnant mothers, the aged and travellers are

exempt, though anyone exempted by reason of temporary disability or circumstances is expected to make up an equivalent period of fasting. The end of each daytime abstention is celebrated joyfully after sunset. Those who observe the fast faithfully and in a spirit of sincere repentance are assured of a remission of sins. Voluntary fasts at various times during the year other than the month of Ramadan are also considered as meritorious acts. None, however, other than Ramadan, may last any more than three consecutive days.

Pilgrimage (*Hajj*): The fifth prescribed religious duty of every Muslim is to make a pilgrimage to the holy shrine of Ka'ba in Mecca. It is an obligation to be fulfilled at least once in a lifetime by every adult who is sane, healthy, financially capable of supporting his family during his absence and able to underwrite the expenses of the journey. The pilgrimage can be performed only on specified days (the seventh to the tenth) in the last month (*Dhu'lHijja*, the twelfth month) of the Islamic calendar. A cross-section of Muslims from all walks of life and of varying colour, race and nationality realize their equality before God as they meet on common ground at least once a year.

V. PARALLELS AND DIVERGENCE

This section briefly presents the parallels and divergence between Islam and Science with the help of selective evidence. The religion Islam has its own worldview system including beliefs about "ultimate reality, epistemology, ontology, ethics, purpose, etc." Muslims believe that the Qur'an is the final revelation of God for the guidance of humankind.

Scientific facts in Qur'an: From an Islamic standpoint, science, the study of nature, is considered to be linked to the concept of Tawhid (the Oneness of God), as are all other branches of knowledge. In Islam, nature is not seen as a separate entity, but rather as an integral part of Islam's holistic outlook on God, humanity and the world. This link implies a sacred aspect to the pursuit of scientific knowledge by Muslims, as nature itself is viewed in the Qur'an as a compilation of signs pointing to the Divine. It was with this understanding that the pursuit of science was respected in Islamic civilizations, specifically during the eighth to sixteenth centuries, prior to the colonization of the Muslim world.

Example: Creation of Man: What is the matter with you that you hope not for greatness and wisdom from Allah? And He has created you in different forms and different conditions. See you not how Allah has created seven heavens in perfect harmony, and has placed the moon, therein a light and made the sun a lamp? And Allah has caused you to grow out of the earth as a good growth. Then will He cause you to return, thereto, and He will bring you forth a new bringing forth (71:14-19, Qur'an). This is the description of the origin and emergence of man given in the Qur'an. The law of evolution working in the universe which Europe claims to have discovered was clearly defined in the Holy Qur'an more than fourteen hundred years ago that man was not created in an instant in the form in which he is today. God did not make a model of clay and breathed life into it to become the first man. No! Man has reached his present stage after passing through many intermediary stages. Man originated from and on this earth---Allah caused you to grow out of the earth as a good growth.
According to Elbert Einstein science without religion is lame and religion without science is blind. Qur'an is not a ***book of science but it is a book of signs***. It is a book of AYAT. More than 6000 AYAT speaks about science. In the field of astronomy, scientists described the creation of universe through a 'big bang.' They hold that initially our universe was a primary nebula and then there was big bang which gave rise to stars, galaxies, earth, planets, etc. The Qur'an mentions this in Surah Al-Anbya Chapter No. 21 "awalam yaral lazina kafru an nas sama wa ti wal arda" means the heavens and the earth were joined together. This word of Glorious Qur'an speaks about Big Bang 1400 years ago.

Previously the human being thought that the ***earth on which we live is flat***. It was in 1577 Sir Francis Drake proved that earth is spherical. Qur'an mentions in Surah Luqman Chapter No. 31, it is Allah (Subhana Watala) who merges the night into day and merges the day into night. Alamtara An-nal-laha means merging is the gradual and slow process. And day slowly and gradually merges into night and night slowly and gradually merges into the day. If the earth was flat, there has been a sudden change. It wouldn't have been a gradual process of night merging into day and day merging into night. Similar message is there in Surah al-Zumar Chapter No. 39. It is Allah (SubhanaWatala) who over lapsed the night into day and over lapsed the day into night. The Arabic word used is '*schewara*' which means to overlap a coil. Qur'an says it is Allah who over lapsed coils night into a day and over lapsed coils day into a night. Coiling the word '*qawwara*' is used means how you coil a turban into your head. So this overlapping and coiling of the night into day and day into night is only possible if the shape of the earth was spherical. If it was flat it was not possible. In Surah Naaziyaat Chapter No. 79 says that we have made the earth as an expanse and we have made the earth egg shaped. 'Waal arda bada zalika badaha' means we made the earth egg shaped. One of the meanings of '*daha*' is an expanse and the other meaning which derived from the Arabic word '*duyiya*' which means an egg. And we know today that the earth on which we live is not completely round like a ball. It is geo-spherical shaped.

It is flatten from the pole and bulging from the centre. And the Arabic word '*duiya*' doesn't mean a normal egg, it specifically means the egg of an ostrich and if we analyse the shape of the egg of an ostrich, it's also geo-spherical in shape. The Qur'an mentions 1400 years ago that the shape of the earth is geo-spherical. Previously the scientist thought that the light ***of the moon was its own light***. But in Qur'an, Surah Al-Furqan, it is Allah who has made constellation in the sky and sun that has its own light and moon having borrowed light. The Arabic word used for the sun in the Qur'an is 'shams' and its light is always described as '*Sirajwahaj'* or '*diya*' which means a torch having a light of its own or you can say a shining glory. The Arabic word for moon is '*Qamar*' and moon light in the Qur'an is described as borrowed light or reflected light. There is not a single place in the Qur'an where the light of the moon is described as its own light. And the Arabic word for star is '*Najam*' and its light is described as '*safir*' meaning the light by the time it reaches the earth, it loses its brightness. The message that the sun has its own light describing as '*wahajsiraj'* or '*diya*' and the moon having borrowed light that is '*muneer*' is mentioned in several places in the Qur'an including Surah Yunus as well as Surah Noor.

Also **blood circulation and production of milk** is mentioned in the Qur'an in Surah An-Nahl. In the field of medicine previously we did not know that the honey was obtained from the belly of the bee. The Qur'an says in 'Surah An-Nahl,' from the belly of the bees, we give you a drink of varying colours in which there is healing for human kind. It was only 300 years before approximately we came to know that honey was obtained from the belly of the bee and now we have come to know that honey is rich in vitamin K as a fructose and also has got some mild antiseptic properties. The Russian soldiers in World War II used the honey to cover up the wounds, which prevented the evaporation of moisture. Due to the density of honey, germs and bacteria are prevented to grow in the wound and if a patient is suffering from the allergy of a particular plant and if honey is obtained from that plant and given to that patient, that patient starts developing resistance to it.

In the **field of embryology**, a group of Arab students collected all the information from Qur'an and Hadith related to embryology and translated that into English and presented it to Prof. Keith L. Moore who was the authority in the field of embryology and was the Head of the Department of Anatomy in the University of Toronto in Canada. When he went through the translation of Qur'an and Hadith, he said that most of the words of Qur'an which speaks about embryology are in perfect conformity of latest advancement of embryology. But there are couple of words about the creation which he initially thought as the one which cannot be termed as either right or wrong. Two such words were the first words of the Qur'an to be revealed of Surah Ikra and Surah Alak means read, recite, proclaim in the name of lord who has created, who has created from something which clings a leach like substance. He said that he does not know whether initial stage of embryo, that is the initial stage of human being, it looks like a leach or not. So he went to a laboratory and observed the early stages of embryo and compared it with the photograph of a leach. And he was astonished to find the striking resemblance and later when 80 questions were asked to him regarding embryology in the Qur'an. He said that if you asked me these questions 30 years ago, I would not be able to answer more than 50% questions because embryology is a new branch of medicine which developed recently. He incorporated the new information in his book (3^{rd} edition), *The Developing Human, Clinically Oriented Embryology, With Islamic Additions, 1983* which he got from Qur'an and Hadith which got the award for best medical book written by a single author. Later this book was translated into several languages of the world. And Prof. Keith L. Moore said that this information in the Qur'an cannot come from human source. The author of this Qur'an has to be Almighty God. And he said that he has no objection in agreeing that prophet Mohamed was the messenger of God. It is interesting to note that Prof. Keith L. Moore was a Christian.

Islam and science of meat-scientific reason behind Zabiha Method: Cut the throat, wind pipe, and the vessel of neck without damaging the spinal cord. Because if the spinal cord cut is damaged, the nerve going to the heart may get cut. This increases the rate of cardiac arrest. Due to this, blood will stagnate in the body. When you cut the throat, wind pipe and vessel of the neck, the heart still pumping and animal doesn't die immediately. And majority of blood flow out of the body because blood contains germs and bacteria. Zabiha Method is much more merciful because the blood supply going to the nerve which is responsible for feeling the pain stops and the animal doesn't feel pain.

VI. ISLAM AND MODERN SCIENCE: METHODOLOGICAL AND EPISTEMOLOGICAL DEBATES

Islamic world in encounter with modern Western had to deal with science for practical and intellectual reasons. During 18^{th} and 19^{th} centuries, the main concerns were practical. The Muslim world needed power, especially military power, to stand back on its feet, and new technologies powered by modern science were the only way to have it. The modern conception of science as a medium of power had profound impact on the relation between the Muslim world and modern science represented by technology, progress, power and

prosperity. This mode of perception still is widely prevalent among the masses in the Islamic world (Osman Bakar, 2005). Another dimension of encounter between traditional beliefs and modern science was intellectual nature having consequences for re-shaping of the self-perception of the Islamic world. One of the recurring themes of this incompatibility of traditional beliefs with modern science is forcefully stated by Kamal Ataturk, who said: 'We shall take science and knowledge from wherever they may be, and put them in the mind of every member of the nation.... For a nation that insists on preserving a host of traditions and beliefs that rest on no logical proof, progress is very difficult, perhaps even impossible.' The debate on conflict between the premises of modern science and Islamic world view has reached a different level with the publication of Renan's lecture '*L'Islamisme et la science*' (1883), through which Renan's racist spur has triggered the Muslim intelligentsia to correct this distorted understanding. This is presented by writers like Afghani who held that there is no clash between Islam and science and the Western science is nothing but Islamic science shipped back via Renaissance and Enlightenment (Michelangelo Guida, 2011). Renan's attack also triggered reaction by Namik Kemal who brought out the scientific achievements in the Muslim countries of the past. The third reaction to the discourse of Renan have been from the host of Christian writers in Arab world including JurjiZaydan, Shibli al-Shumayyil, Farah Antunand Ya'qub Sarruf whom around 1920s have advocated that secular outlook of modern science as the path to modernisation. These writers advocated a philosophical and secular stand in the debate between science and religion. In this entire debate, it may be observed that the bottom line is about the technology rather than the science as Islamic countries vied for the transfer of technology sans the philosophical – scientific dimension.

The belief that 'modern science' is the only way of doing science has led to two developments. Firstly, the reaffirmation of the so called scientific method and secondly the evaluation of all pre-modern sciences including Islamic science through the yardsticks of positivist "universal attributes" of modern science. The Muslim response to this has been to demonstrate that the Islamic civilisation with its great scientific contributions has preceded the modern science. Some writers have in fact tried to demonstrate the presence of several elements of modern science in the Islamic civilisation and science. Whereas there was another school of thought that led by Prof. Nasar and others have presented that Islamic science as an independent, scientific and intellectual tradition which has applied diverse methods in tune with the nature of subject and the modes of understanding required for that subject. This was made possible in Islamic science as it encompassed wide ranging pursuits ranging from ratiocination and interpretation of scriptures to that of observation and experimentation. This view has gained lot of ground in the backdrop of the developments within modern science where the adoption of single methodology has come under serious questioning by a host of writers in the last few decades. Alternatively, the pluralistic methodology has gained ground in the writings of historians and philosophers. The postmodernist wave and the relativist and the antirealist stance of writers like Kuhn or Feyeraband has opened the new ways in which truth is neither formed nor can be pursued by truth value dichotomy. As a result of this several scholars on Islam and science see no problem in reconciling Islam and science by moving in this direction. Some of the scientists like Oppenheimer and Fritz of Capra have tried to identify the solutions to modern scientific dilemmas in the oriental science.

The current debates on Islam and science have been classified under three headings i.e. ethical, epistemological and ontological/metaphysical views of science by Kalin. The ethical/puritanic view considers modern science as a neutral and objective pursuit dealing with nature sans philosophical and ideological components. The problems related to materialism, positivism and environmental crisis are attributed to lack of ethical dimension in modern science. The epistemological view concerns the epistemic view of modern physical sciences, their truth claims and methods for achieving knowledge. Epistemic school views science as a social construction. Thus, the debate on Islam and science has to be understood in terms of the context and construction of respective sciences. This takes us to identification of even more fundamental differences between Islamic and modern science in terms of different epistemologies. More so, in the wake of need for a new epistemological paradigm that can provide coherent view of world revealed by modern science. So far as the empirical way of knowledge is concerned there may not be many significant differences between Islamic and modern science. But the scope and moorings of empirical knowledge are not looked at in the same manner in both traditions. It may also be noted that pluralistic methodology does not encompass the totality of methodologies of Islamic science. It is not possible to reconcile the epistemological foundation of modern science with Islamic science which adopts sacred scriptures and intellectual intuition as part and parcel of its methodology. This is even more difficult as the modern scientific epistemology is essentially a revolt against the idea of revelation and the pursuit of truth within that framework. In the traditional Islamic scientific view, the methodology itself is conceptually inseparable from purpose of human cognition and the spiritual destiny. Even if the sacred scriptures have to be adopted as elements in the modern scientific methodology, they cannot be accorded the status of modern science.

Prof. Nasar has demonstrated the organic relation between Islam and Islamic sciences in terms of an epistemological paradigm based on the idea of unity (*al tawh id*) which integrates the multiplicity of methodologies. The Unicity of Nature, which is the goal as well as the basis of the Islamic sciences, is derived from the application of the principle of al-Tawhid (Unity) contained in the first Shahādah, Lāilāhailla'Llāh, to the domain of Nature. It is understood to mean the interrelatedness of all things that exist. In the wake of call to search for interrelatedness in the modern world and the organic nature in the modern world, it is argued that paying due attention to this unity and interrelatedness leads to the revival of Islamic science. The ontological/metaphysical view represented by thinkers such as Seyyid Hossein Nasr and Naquib al-Attas takes this debate from philosophy to the metaphysics of science, leading to a great deal of further debate. Whether Islamic culture has promoted or hindered scientific advancement is disputed. Islamists such as Sayyid Qutb argue that since "Islam appointed" Muslims "as representatives of God and made them responsible for learning all the sciences," science cannot but prosper in a society of true Muslims. Many "classical and modern sources agree that the Qur'an condones, even encourages the acquisition of science and scientific knowledge, and urges humans to reflect on the natural phenomena as signs of God's creation." Some scientific instruments produced in classical times in the Islamic world were inscribed with Qur'anic citations. Many Muslims agree that doing science is an act of religious merit, even a collective duty of the Muslim community.

Others claim traditional interpretations of Islam are not compatible with the development of science. Author Rodney Stark argues that Islam lags behind the West in scientific advancement after (roughly) 1500 AD was due to opposition by traditional ulema to efforts to formulate systematic explanation of natural phenomenon with "natural laws." He claims that they believed such laws were blasphemous because they limit "*Allah's freedom to act*" as He wishes, a principle enshrined in *ayah 14:4:* "*Allah sendeth whom He will astray, and guideth whom He will*," which (they believed) applied to all of creation not just humanity. Abdus Salam, who won a Nobel Prize in Physics for his electroweak theory, is among those who argue that the quest for reflecting upon and studying nature is a duty upon Muslims, stating that 750 verses of the Quran (almost one-eighth of the Book) exhort believers to do so.

VII. CONCLUSION

Thus as seen from the above discussion, it needs to be appreciated that the relation between Islam and Science is neither be characterised as simple negation nor as complete reinforcement. Based on the state of the understanding as on today, there are certain key interdependencies, parallels and divergences making this relation complex, nuanced and perhaps organic. This paper is only a preliminary exploration. This question needs to be dwelt upon further through the historical, geographical and cultural dimensions.

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