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CHAPTER TWO

RELIGION AND SCIENCE: A CRITICAL EXAMINATION

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Abstract

Since antiquity, humans have been scientifically inclined so much so that man's observation of the growth of new plants and trees from seeds of previously consumed plants evoked his inquisitiveness and creativeness. These two characteristics played significant roles in the development of farming. With the power of reasoning and analysis man has recorded several scientific and technological advancements. Nevertheless, the same innate human characteristics have also led to the denial of faith in Allah which is the purpose of creation. The denial of faith in Allah created a wedge between faith and science for several centuries of Church history but Islam from its onset had held knowledge and science in awe and as tools by which the true essence of faith can be realised. While Islam supports science, it also created boundaries especially on ethical issues. It disallows certain scientific manipulations such as human-animal crossbreed/ hybrid, sex change and reproductive cloning. It emphasises the need for man to always acknowledge the role and power of Allah in all things. This paper examines the relationship between Islam and Science, presents arguments for the boundaries and limits laid by Islam and asserts the importance of the epistemological basis of Science in Islam and

the integration of the Islamic law in scientific and technological investigations and inventions.

Keywords: Science, Ethics, Epistemology, Integration, Islamic law.

Introduction

Religion is a body or structure of a divinely defined coordinated beliefs and actions or activities. Religion deals with humans' moral, social, economic, political and spiritual development. Religion is often interchangeably used as faith. However, faith can be defined as the elements that define a religion. Faith is the strong belief in certain elements of religion, a total trust in specific beliefs or doctrines and an absolute awe for some sacred religious verdicts, edicts or dictates.

Science is an empirical study of assumptions or hypotheses to determine the validity and veracity of such assumptions or hypotheses. Science requires an empirical study or examination of ideas to establish facts and further human knowledge and ease of living.

While religion rests majorly on abstract or knowledge of a supernatural unseen God, science relies on empirically established facts. Therefore, there is an age-long suggestion that science and religion are inherently opposite or enemies.

Among the most popular world religions is Islam, a religion whose root was firmly buried on the basis of knowledge and understanding. Indeed, the first verses that were revealed by Allah to Prophet Muhammad (PBUH) were thematically centred on the significance of knowledge and the interconnectedness between knowledge and Science. The verses thereby affirm the epistemological values of the Qur'an. Allah says: "Read in the name of thy Lord Who created; He created man from a congealed

(clot) of blood; Read! And thy Lord is Most Bountiful; He Who teaches by the pen; He teaches man what he knows not". Qur'an 96: 1-5.

Several verses of the Qur'an constantly invite mankind to reasoning as well as knowledge and action through searching for the truth of knowledge and the enormous wisdom in the cosmos. Through that knowledge, mankind is commanded to accept and acknowledge the role of Allah and glorify His name. This conscious call for man to learn, write and reflect is contained in several verses of the Qur'an. Among such verses are found in Qur'an 13: 3, 16: 44 and 69, 27: 18, 30: 9, 35: 44, 40: 21 and 82, 50: 6, 80: 24, 88: 17-20 and 86: 5.

The Qur'an also contains scientifically inclined statements, discussions on galaxies, embryology, soil and the nature of man, geography, history, economics and numerous others. Corroborating the calls to knowledge by the Qur'an, Prophet Muhammad (PBUH) through numerous Hadith credited to him also affirms the importance of knowledge as a torch that guides the believer to knowing Allah through the cosmos. Adebayo (2010) registers this fact in his work, *The Symbolic Importance of Birds in the Qur'an: Implications for Science* published in the Ife Journal of Religions. He writes: "The call of the Qur'an to ponder on the 'āyāt of Allah' is buttressed by some Prophetic traditions which put high premium of seeking knowledge over worship".

Therefore, while science struggled to survive and suffered greatly in the hands of the early Church-fathers, it enjoys a great support and serves as the basis of faith alongside the belief in One God and the Prophethood of Muhammad in Islam.

This paper therefore seeks to critically examine the epistemological relationship between Islam and science.

Information used in this work is obtained from the Qur'ān and Hadith as primary sources and other print materials and websites as secondary sources.

What is Faith?

The Merriam Webster Dictionary defines faith as:

allegiance to duty or a person : loyalty; fidelity to one's promises; sincerity of intentions; belief and trust in and loyalty to God; belief in the traditional doctrines of a religion; firm belief in something for which there is no proof; complete trust; something that is believed especially with strong conviction; especially: a system of religious beliefs. (<https://www.merriam-webster.com/dictionary/faith>, 2018).

Faith is the basis of religion without which religion cannot exist. Religion requires a total trust in a Supreme Being, pledging sincere allegiance to Him, fulfilling one's duties to Him and hoping to have His mercy. Therefore, the entire structure of religion is built on faith. While religion may support or promote the socioeconomic needs of the people or promote education, its ultimate goal remains the protection of faith and the propagation of a faith based human society.

The Islamic term for faith is *Īmān*. Islam holds that faith (*Īmān*) and worship (*'amal* – action) is the essence of creation. The religion of Islam may be broadly divided into two parts – the theoretical, or what may be called its articles of faith or its doctrines, and the practical, which includes all that a Muslim is required to do. That is to say, the practical course to which he must conform his life. The former are called *Uṣūl* and the latter *Furū'* (Maulana, 1986: 119).

Therefore, the entire cosmos is divinely fashioned in a way that helps human beings to reflect, learn and acknowledge the essence for which he has been created to as to achieve faith and use his actions with the divine guide of faith to explore the earth and benefit from all that is in it. In Islam, faith also includes the belief in the existence of things and concepts of the unseen (*Al-Ghayb*) such as Hell and Paradise, Angels and Demons, God and Satan etc. Qur'ān 2:2 unequivocally describes faith as a belief in the “unseen”. Hence, the cardinal description of faith is to trust in the existence of things seen and unseen with the aim to establish the existence of a supernatural Being Who is believed to be in charge of all human affairs (i.e. Allah).

In Islam, faith is the belief in the existence of only One God and His divine Messengers and Prophets (first of whom was Adam and last, Muhammad), the Holy Scriptures (Qur'ān, *Injīl* of Jesus, *Zabūr* of David and *Tawrah* of Moses), existence of Angels, the Day of judgment and predestination. Also, In Islam, faith is further defined by the observance of the five daily prayers, alms giving and general kindness to all. It is strongly believed that knowledge (science) is a guide to faith (in Islam), hence scientific or knowledge based discourses remain central to religious teachings in Islam. Therefore, the first six verses revealed to Muhammad (Qur'ān 96: 1-5) are direct commands for him to write, an indication to learning, science, reasoning and knowledge, which is expected to guide him and the believers to the knowledge and understanding of God and the human environment. The verses read as follows: "Read: In the name of thy Lord Who created man from a clot. Read: And thy Lord is the Most Generous Who taught by the pen, taught man that which he (man) knew not." Qur'ān, 96:1-5.

Similarly, the Qur'ān explicitly stated that the only factor that elevated Adam in status ahead of Angels and other creatures was knowledge. It reads: "And He taught Adam the names – all of

them. Then He showed them to the angels and said, "Inform Me of the names of these, if you are truthful". Qur'ān 2: 31.

Several other verses of the Qur'ān and authentic sayings of Prophet Muhammad extol the significance of knowledge (science) and reasoning as tools of faith. Salah (2018) compiled some of the verses of the Qur'ān that have direct correlation with science. Among them are:

"(God) is the One who made the earth a couch for you and the heavens an edifice, and sent down water from the sky. He brought forth therewith fruits for your sustenance. Do not join equals with God when you know" (Qur'ān 2:22).

Behold! In the creation of the heavens and the earth, in the disparity of night and day, In the ship which runs upon the sea for the profit of mankind. In the water which God sent down from the sky thereby reviving the earth after its death, In the beasts of all kinds He scatters therein, In the change of the winds and the subjected clouds between the sky and earth, Here are Signs for people who are wise. (Qur'ān 2:164).

"(God) is the One who spread out the earth and set therein mountains standing firm and rivers. For every fruit He placed two of a pair. He covers the day with the night. Verily in this there are Signs for people who reflect." (Qur'ān 13:3).

(God is) the One Who has made for you the earth like a cradle and inserted roads into it for you. He sent water down from the sky and thereby We brought forth pairs of plants, each separate from the other. Eat! Pasture your cattle! Verily in this are Signs for people endued with intelligence. (Qur'ān 20:53 and 54).

"After that (God) made the earth into a spheroid. Wherefrom, He drew out water and pasture. And the mountains He has anchored: goods for you and for your cattle" (Qur'ān 79:30-33).

The place of science in Islam shall be highlighted under the following headings:

- Scientific explanation for human development in the Qur'ān (Embryology);
- Scientific explanation on water in the Qur'ān;
- Scientific explanation for the stars and planets in the Qur'ān.

1. Scientific explanation for human development in the Qur'ān (Embryology) According to www.Britannica.com (2018), embryology is the study of the formation and development of an embryo and foetus. Güzel (nd) defined it as: "the study of the developmental process from a single cell to a baby in 9 months. In other words: investigations of the molecular, cellular and structural factors contributing to the formation of an organism." Human embryology is inferred and broadly explained in the Qur'ān through several verses scattered across the Qur'ān. While Muslim scientists from the past have made frantic effort to translate the verses, the emergence of modern science has made it easier for present day scholars and researchers to appreciate the scientific nature of the Qur'ān and Islam even more. That is because, modern scientific discoveries have confirmed and helped researchers to achieve better understanding of the scientific verses of the Qur'ān which were revealed at a time when science was yet to reach its current height. In reference to that, Maurice (1995) wrote:

For many centuries, humankind was unable to study certain data contained in the Qur'ān because they did not possess sufficient scientific means. It is only today that numerous verses of the Qur'ān dealing with natural phenomenon have become comprehensible.

Hence, the scientific appreciation of the Qur'ān and Islam on subjects such as embryology will continue to guide mankind to further research and make new discoveries about the human body and other natural phenomenon. Some of the embryological verses of the Qur'ān are:

"He makes you in the wombs of your mothers in stages, one after another, in three veils of darkness." (Qur'ān 39: 6).

Picture (1) below explains the three veils as stated in the verse above:

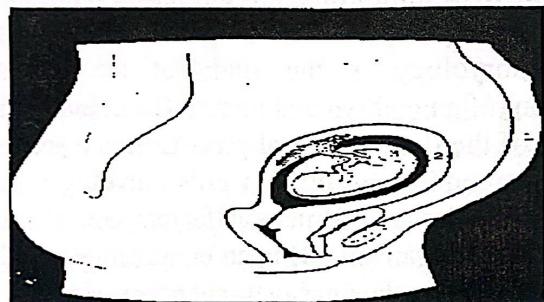


Fig. 1: Drawing of a sagittal section of a female's abdomen and pelvis showing a fetus in utero. The "veils of darkness" are: (1) the anterior abdominal wall; (2) the uterine wall, and (3) the amniocchorionic membrane. (Keith, 1986).

The Qur'ān (23:13) further states: "Then We placed him as a drop in a place of rest". The drop or *Nutfah* has been interpreted as the sperm or spermatozoon, but a more meaningful interpretation would be the zygote, which divides to form a blastocyst that is implanted in the uterus ("a place of rest"). This interpretation is supported by another verse in the Qur'ān which states that "a human being is created from a mixed drop." The zygote forms by the union of a mixture of the sperm and the ovum ("The mixed drop").

Qur'ān (23:14) also says: "Then We made the drop into a leech-like structure." The word *'alaqah* refers to a leech or bloodsucker. This is an appropriate description of the human embryo from days 7-24 when it clings to the endometrium of the uterus, in the same way that a leech clings to the skin. Just as the leech derives blood from the host, the human embryo derives blood from the decidua or pregnant endometrium. It is remarkable how much the embryo of 23-24 days resembles a leech (Fig. 2). As there were no microscopes or lenses available in the 7th century, doctors would not have known that the human embryo had this leech-like appearance. In the early part of the fourth week, the embryo is just visible to the unaided eye because it is smaller than a kernel of wheat.

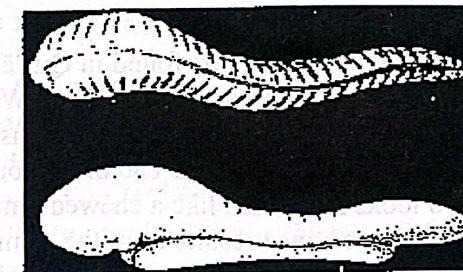


Fig. 2: Top, a drawing of a leech or bloodsucker. Below, a drawing of a 24 day-old human embryo. Note the leech-like appearance of the human embryo at this stage.

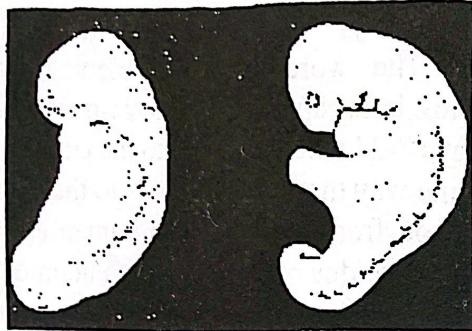


Fig. 3: Left, a plasticine model of the human embryo which has the appearance of chewed flesh. Right, a drawing of a 28 day-old human embryo showing several bead-like somites which resemble the teeth marks in the model shown on the left.

Reference to Fig. 3 above can also be found in Qur'ān (23: 14) which states: "Then of that leech-like structure, We made a chewed lump". The Arabic word *Mudghah* means "chewed substance or chewed lump." Toward the end of the fourth week, the human embryo looks somewhat like a chewed lump of flesh (Fig.3). The chewed appearance results from the somites which resemble teeth marks. The somites represent the beginnings or primordial of the vertebrae.

"Then We made out of the chewed lump, bones, and clothed the bones in flesh."

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"Then We made out of the chewed lump, bones, and clothed the bones in flesh. Then We developed out of it another creature" (Qur'ān 23: 14).

2. Scientific explanation on water in the Qur'ān

Water is a natural liquid substance made of molecules. Every drop of water contains between billions of molecules. Water is the very essence of life. It is the liquid that every class of humans and animals must take to survive. Water is a source of life for humans, animals, birds and aquatic creatures. It is of great economic as well as spiritual and social values. Scientifically, the formula for water is H₂O. Water is also the most important component of the earth as it covers over 70% of the total land mass of the earth (The USGS Water Science School, 2016). In reference to the great significance of water, the Qur'ān says:

It is He Who sends down rain (water) from the skies: with it We produce vegetation of all kinds: from some, We produce green (crops) out of which We produce grain, heaped up (at harvest); out of the date-Palm and its sheaths (or spathes) come clusters of dates hanging low and near: and (then there are) gardens of grapes (in kind) yet different (in variety): when thy begin to bear fruit, feast your eyes with the fruit and the ripeness thereof. Behold! In these things, there are signs for people who believe.

The above verse among many others encapsulates the great significance of water. The Qur'ān also asserts that water is the very essence from which all lives emerged through the decree of God. The Qur'ān 21: 30 says: "Have those who disbelieved not considered that the heavens and the earth were a joined entity, and We separated them and made from water every living thing? Then will they not believe?"

This fact has been proven indisputably by modern science. It has also been affirmed that the human body contains over 70% water in various forms and for various purposes. Making reference to Lang and Waldegger (1997), Jequier and Constant (2010: 115) further affirm the significance of water in their review *Water as an essential nutrient: the physiological basis of hydration*: “Water is the major constituent of the cells, tissues, organs and vital for life”. Despite the natural water composition of mankind and animals, neither can survive without intermittent water intake. Humans and animals need to constantly drink and use water to sustain life. Water is also a source of healing and purification. The various types of waters in the human body are:

1. Aquenos humour and vitreous humour.
2. Bile.
3. Blood serum.
4. Breast milk.
5. Cerebrospinal fluid.
6. Ceramen (ear wax).
7. Endolymph and Perilymph.
8. Female ejaculate.
9. Gastric juice;
10. Mucus (including nasal drainage and phlegm).
11. Peritoneal fluid.
12. Pleural fluid.
13. Saliva.
14. Sweat.
15. Semen.
16. Tears;
17. Vaginal secretion.
18. Vomit.
19. Urine.
20. Sebum (skin oil). (Narendra *et al.*, 2017).

All of the above listed fluids are divinely placed natural waters in the human and animal body. The absence of any of the above

listed fluids in human body can lead to malfunctioning and in severe cases, death. This further asserts that water is the source of life and life cannot be renewed, reproduced or sustained without the necessary waters.

Water also prevents the human body from dehydration. Medical treatments cannot be achieved without either a direct or indirect use of water. Hence, Prophet Muhammad was reported to have recommended the use of water in various physical and spiritual situations.

It is worthy of note that the human and animal brain is 75% water, blood is 82% water and our lungs contain 90% water. Hence, our survival is constantly hinged on water and the ways we use it. These are facts which Islam has affirmed through the Qur’ān before the renaissance of modern science (www.reservoir.co.za, 2019; www.civiltacqua.org, nd; <https://articles.mercola.com>, 2009).

3. Scientific explanation for the stars and planets in the Qur’ān

“Have those who disbelieved not considered that the heavens and the earth were a joined entity, and We separated them and made from water every living thing? Then will they not believe?” Qur’ān 21:30.

The verse quoted above gives a glimpse to the nature of the earth and the sky. It highlights what scientists later refer to as the Big Bang. Peace Propagation Centre through her website (Peacepropagation.com, 2009) affirmed:

The creation of the universe is explained by astrophysicists as a widely accepted phenomenon, popularly known as ‘The Big Bang’. It is supported by observational and experimental data gathered by astronomers and astrophysicists for decades. According

to 'The Big Bang', the whole universe was initially one big mass (Primary Nebula). Then there was a 'Big Bang' (Secondary Separation) which resulted in the formation of Galaxies. These then divided to form stars, planets, the sun, the moon, etc. The origin of the universe was unique and the probability of it happening by 'chance' is nil.

The Qur'ān also relates the movement of the star when it referred to it as *Thāqib* which indicates that it burns and consumes itself as it pierces through the shadows of the night. This explains that the stars are independent bodies producing their own lights and moving independently like the Sun. The Qur'ān referred to the planets as *Kawkab*, the celestial bodies that reflect light but have no power to produce their own light without the aid of the Sun. Examples are the Mars and Moon. The Qur'ān made reference to this in chapter 37: 6. It reads: "We have adorned the lowest heaven with ornaments, the planets". (Maurice, 1995).

Therefore, the Qur'ān is a pointer to the enormous knowledge embedded in astronomy and other related sciences. The essence of the knowledge and pointers to it are divine designs created to guide mankind to Allah. In the Qur'ānic relation of the journey of Prophet Ibrahim to knowing and acknowledging Allah, the roles of the galaxies are well established. This is recorded in Qur'ān 6: 75 - 79.

Muslim Scientists

Since Islam is inherently a religion that calls to knowledge and reasoning as tools to knowing Allah and serving Him, several Muslim philosophers and scientists have emerged over the centuries. Muslim governments have also invested heavily in the propagation of science and philosophy. Muhammad (2018) reechoed this as he writes:

The Islamic scholar Muhammad ibn Idrīs al-Shāfi'i (d. 204/820) classified science into two broad categories, science of the bodies ('ilm al-abdān) and science of the religions ('ilm al-adyān). In the hierarchy of science, Islamic scholars placed religious subjects at the top of their list, although secular sciences, such as mathematics, physics, chemistry, astronomy and philosophy were recognised as useful branches of knowledge. From the 'Abbasid period onwards, Muslims were avid readers of religion, science and philosophy. In fact, religious and philosophical sciences developed in parallel. Although some religious scholars (the '*ulamā'* and *fūqahā'*) undervalued philosophical sciences, such secular subjects were, however, widely tolerated, allowed to flourish in Islamic society and were accommodated in the educational curriculum. The critical attitude of the '*ulamā'* towards the philosophical sciences has belatedly attracted severe criticism from some Orientalists. More often than not, it seems quite clear that there was no clear division between sacred and profane sciences. Usually, scholars of the calibre of Ibn Khaldūn divided science into two classes, namely the traditional sciences ('ulūm *naqliyah*) and the philosophical sciences ('ulūm *aqliyah*).

The Islamic golden era dated between 8th to 14th centuries witnessed a great improvement in the expansion of science and technology during the Abbasid reign. Notable among them as listed by Zahoor (2002) are:

Jābir Ibn Hayyān (Geber)	Chemistry (Father of Chemistry)	Died 803 C.E.
Al-Asmāī	Zoology, Botany, Animal Husbandry.	740 - 828

Integration of Knowledge Across Disciplines

Al-Khwarizmī (Algorizm)	Mathematics, Astronomy, Geography. (<u>Algorithm</u> , Algebra, calculus)	770 - 840
‘Amr ibn Bahr Al-Jāhiz	Zoology, Arabic Grammar, Rhetoric, Lexicography	776 - 868
Ibn Ishāq Al-Kindī (Alkindus)	Philosophy, Physics, Optics, Medicine, Mathematics, Metallurgy.	800 - 873
Thābit Ibn Qurrah (Thebit)	Astronomy, Mechanics, Geometry, Anatomy.	836 - 901
‘Abbās Ibn Firnas	Mechanics of Flight, Planetarium, Artificial Crystals.	Died 888
‘Ali Ibn Rabbān Al-Tabarī	Medicine, Mathematics, Calligraphy, Literature.	838 - 870
Al-Battānī (Albategnius)	Astronomy, Mathematics, Trigonometry.	858 - 929
Al-Farghanī (Al-Fraganus)	Astronomy, Civil Engineering.	C. 860
Al-Rāzī (Rhazes)	Medicine, Ophthalmology, Smallpox, Chemistry, Astronomy.	864 - 930
Al-Farābī (Al-Pharabius)	Sociology, Logic, Philosophy, Political Science, Music.	870 - 950
Abul Hasan ‘Alī Al-Masu‘dī	Geography, History.	Died 957
Al-Sūfi (Azophi)	Astronomy	903 - 986
Abu Al-Qāsim Al-Zahravi (Albucasis)	Surgery, Medicine. (Father of Modern Surgery)	936 - 1013
Muhammad Al-Buzjani	Mathematics, Astronomy, Geometry, Trigonometry.	940 - 997
Ibn Al-Haitham (Alhazen)	Physics, Optics, Mathematics.	965 - 1040

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Al-Mawardī (Alboacen)	Political Science, Sociology, Jurisprudence, Ethics.	972 - 1058
Abū Raihān Al-Birūnī	Astronomy, Mathematics. (Determined Earth's Circumference)	973-1048
Ibn Sīnā (Avicenna)	Medicine, Philosophy, Mathematics, Astronomy.	981 - 1037
Al-Zarqali (Arzachel)	Astronomy (Invented Astrolabe).	1028 - 1087
‘Umar Al-Khayyām	Mathematics, Poetry.	1044 - 1123
Al-Ghazālī (Algazel)	Sociology, Theology, Philosophy.	1058 - 1111
Abū Bakr Muhammad Ibn Yahya (Ibn Bajjah)	Philosophy, Medicine, Mathematics, Astronomy, Poetry, Music.	1106 - 1138
Ibn Zuhr (Avenzoar)	Surgery, Medicine.	1091 - 1161
Al-Idrīsī (Dreses)	Geography (World Map, First Globe).	1099 - 1166
Ibn Tufayl, Abdubacer	Philosophy, Medicine, Poetry.	1110 - 1185
Ibn Rushd (Averroes)	Philosophy, Law, Medicine, Astronomy, Theology.	1128 - 1198
Al-Bitrūjī (Alpetragius)	Astronomy	Died 1204
Ibn Al-Baitar	Pharmacy, Botany	Died 1248
Nāṣir Al-Dīn Al-Tūsī	Astronomy, Non-Euclidean Geometry.	1201 - 1274
Jalāl Al-Dīn Rūmī	Sociology	1207 - 1273
Ibn Al-Nafis Damishqui	Anatomy	1213 - 1288
Al-Fida (Abulfeda)	Astronomy, Geography, History.	1273 - 1331

Muhammad Ibn Abdullāh (Ibn Battūta)	World Traveler. 75,000 mile voyage from Morocco to China and back.	1304 - 1369
Ibn Khaldūn	Sociology, Philosophy of History, Political Science.	1332 - 1395
Ulugh Beg	Astronomy	1393 - 1449

It is pertinent to note here that like in Christianity, a number of classical Muslim scholars oppose the use of scientific facts to explain verses of the Qur'ān arguing that the human intellect is not equipped enough to fully comprehend the words of Allah.

Such scholars argued that Islam and Science are exclusively independent of each other. The scholars held that view in the bid to protect faith from the possible changes in nature and subsequent future findings that may oppose initial faith inspired opinions. Popular among such scholars was Al-Birūnī who argued that the ever changing natural phenomenon should not be used to interpret or explain the meanings of the Qur'ān because it causes misunderstanding and subjects revelation to science.

There are however many disagreements traceable to interpretations of the Holy Qur'ān. On one hand, we have classical Qur'ān commentators who assigned to the Qur'ān a separate and autonomous realm of its own. Al-Birūnī (973-1048 CE), one of the most celebrated Muslim scientists of the classical period, held that the Qur'ān does not interfere in the business of science nor does it infringe on the realm of science. The main arguments presented by this group of Muslims is the possibility of multiple scientific explanations of the natural phenomena, the ever changing nature of the science and the considerable differences in the interpretation of the verses that may have a connection

to science or the natural phenomena. On the other hand, many contemporary Muslims, both amateurs and intellectuals, have gone as far as arguing that "Islam is a religion of science" urging others to explore the Qur'ān for scientific truths which are now discoverable by Modern science. (http://shodhganga.inflibnet.ac.in/bitstream/10603/3762/10/10_chapter%203.pdf: 103-104).

Epistemological relationship between science/reason and faith in Islam

The position of science/knowledge and reasoning is essentially attached to the doctrines and acts of worship in Islam. Islam makes it mandatory for believers to reason and make efforts to understand nature in order to be able to appreciate the supremacy of God (Allah) and serve Him in the prescribed manner. It also demands that in every facet of the lives of Muslims, the role of Allah must be acknowledged. Islam does not accept that man should become lazy or fail to make effort to explore the universe because the exploration is one of the reasons which will eventually strengthen man's understanding of the universe and teach him to appreciate the Creator even more. Faruqi (2013: 4-5) writes:

For creation to have a purpose – and this is a necessary assumption if God is God and His work is not a meaningless *travail de singe* – creation must be malleable, transformable, capable of changing its substance, structure, conditions, and relations so as to embody or concretize the human pattern or purpose. This is true of all creation, including man's physical, psychic, and spiritual nature. All creation is capable of realization of the ought-to-be, the will or pattern of God, the absolute in this space and in this time.

It is believed that through reason and knowledge, mankind can find the true meaning and essence of creation and admit his role as the vicegerent of God on earth.

From an Islamic standpoint, science, the study of nature, is considered to be linked to the concept of *Tawḥīd* (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. The Islamic view of science and nature is continuous with that of religion and God. This link implies a sacred aspect to the pursuit of scientific knowledge by Muslims, as nature itself is viewed in the Qur'ān as a compilation of signs pointing to the Divine. (Arion, 2018: 58-59).

Islam holds that every knowledge and reasoning must guide to the knowledge and acknowledgment of God as the sole Owner and Master of all that exists. Therefore, science and reason are often guided to further affirm the existence of God and the truth of His promises and threats.

And in the words of Al-Fārūqī, God created the world and implanted in it His immutable patterns that make it a cosmos. He designed it in a way calling for wonder: perfect, orderly, malleable, its parts casually and theologically bound to one another. He invited man to study and investigate nature to make the necessary deduction and then recognize and serve Him. The Qur'ān calls upon this "widest possible scholarship, confident that man will find Islam's claim for God and His providence for man, for nature and history, confirmed. It made a point of faith to discern the patterns of God in nature, an act of piety to articulate those patterns

correctly and accurately and an act of charity to teach them to others. (Salah, 2002: 4).

Therefore, in Islam, the objective of science or reason is not detachable from the objective of faith. While faith seeks to establish the truth of the existence of God and man's need to serve Him as He decrees, science or reason seeks to establish the truth through scientific experiments and multiple tests to understand the nature of all things and their origins. Faith and reason therefore seek the truth in different pattern and use them both as means for humanity to know God and acknowledge His Lordship over all things. The significance of incorporating and integrating faith into the knowledge of science is also espoused in the work of Adebayo (2008). Asserting the significance of revelation (Qur'ān and Sunnah) to knowledge (Science), Adebayo (2008: 10) quotes Mutahheri (1977: 29) who writes:

Knowledge without faith is a sharp sword in the hand of a drunken brute. It is a lamp in the hand of a thief to help him pick up the best articles in the midnight. That is why there is not the least difference in the nature and conduct of the faithless man of today who has knowledge and the faithless man of yesterday who had no knowledge. After all, what is the difference between the Churchill, the Johnsons, the Nixons and the Stalins of today and the Pharaohs, the Genghis Khans and the Atillas of yore.

Modern Scientific and Technological Inventions and The Position of Islam

Science involves a continuous search for truth and ease for the benefit of mankind and his immediate environment. Islam believes that the Almighty has endowed mankind with the necessary knowledge and ability to invent, create, advance and elevate the status of knowledge and science based discoveries. The Qur'ān says:

O company of Jinn and mankind! If you have the power to go beyond the realms of the heavens and the earth, pass beyond them: you cannot pass beyond them but with (Our authority i.e. knowledge inspired or given by God). Which of the wonders of your Lord will you deny?

The above verse is an indication of the natural prowess given to mankind to transcend all limits in his search for knowledge and truth, aimed to knowing Allah through His creations and serving Him accordingly. It explains that God has given man the wisdom, knowledge and ability to lord over the earth and all therein and to exploit the heavens (the galaxies). However, a limitation has also been placed to check and balance the activities of man and prohibit transgression. Hence, Islam permits the believers to venture into all kinds of knowledge and find the goodness in all things for the benefit of mankind and his environment.

Like the theory of evolution propounded by Charles Darwin, the recent scientific and technological advancement aptly confirms the significance of the limitations placed by Islam and other world religions. Science and technology have both advanced to cloning, sex change, euthanasia (mercy killing), human-animal hybrids, surrogate motherhood, sex toys and so on.

Cloning: it is the act of creating something identical from an already existing one. In the simplest language, cloning is photocopying. It involves the use of certain natural elements (DNA) obtained from an original (human or animal or plant) to create something exactly same as the original. Undeniably, cloning has several benefits for humans and animals but the development in human and mammal cloning has placed it on the wrong side of faith. Larijani and Zahedi (2004: 3118) wrote:

Cloning is a field of medical science that can both have an enormous potential impact on human health and quality of life and be a fount of new basic research discovery. Recent advances in cloning have offered new hope for curing diseases such as diabetes, Parkinson's, neurologic degeneration, congenital heart, Alzheimer's, cardiomyopathies, osteoporosis, and so forth. But this technology has been accompanied by social, political, economic, legal, religious, and ethical questions worldwide. The debate over cloning became further complicated when medical scientists were able to isolate human embryonic stem cells for the first time in 1998.¹ Research with embryonic stem cells has enabled investigators to make substantial gains in developmental biology, therapeutic tissue engineering, and reproductive cloning. There are two areas of the use of cloning in which the ethical and social issues differ: cloning to produce human beings (reproductive cloning) and cloning to produce human cell lines or tissues (therapeutic cloning). The majority of scientists, bioethicists, religious scholars, policy makers, and international and national regulatory bodies favour a prohibition of reproductive cloning, but they differ over therapeutic cloning and stem cell research.

Although, the word "create" has often been used in religious and non-religious circles to describe cloning, it is widely believed that cloning is not exactly the creation of new things, hence not a challenge to faith or to the orthodoxy of the Holy Scriptures. Nevertheless, Muslim scholars have issued varieties of Religious edicts (*Fatwa*) denouncing cloning because of the complicity involved and the potential danger it poses when a single human can be made in multiples and the ideological threat it has on the psyche of the believers. Hence, the argument against cloning

stemmed from theological and moral or ethical concerns. Ebraheem (2003: 23) captured it when he wrote that:

The theological arguments centre on two questions, human dignity and Satan's pledge to distort and change humanity, which both have their origins in the Muslim story of genesis. The Qur'anic narrative insists that human beings are the best of creation, and the children of Adam have been singled out for a specific privilege of honour and dignity (*takrīm*). All human beings were endowed with the inalienable moral attribute of human dignity (*karāmah*) at creation. Satan, in his standoff with God over his refusal to honour Adam by bowing, vowed in pre- eternity to take revenge on all humans by seducing them to sin to the point that "they will corrupt God's creation.

Therefore, with the aim of protecting the sanctity of creation and faith, Muslim scholars unanimously consider cloning and similar scientific programmes as dangerous and heretic. This view is held on issues such as organ transplantation and genetic engineering (most especially when it involves the manipulation of humans or has the potential of causing harm to the people). Nevertheless, while the vast majority of Muslim scholars frown at cloning, organ transplantation and genetic engineering, some scholars are lenient on the subjects and have partially permitted it. This is because Islam seeks to protect the family lineage and considers the cause of procreation as a very important institution which must not be corrupted. Hence, the decision is aimed at protecting paternity and ensuring the continuity of kinship which is an integral part of all moral teachings in Islam. This subject remains a controversial issue among Muslim theologians and Muslim scientists in the 21st century.

Sex Change: Sex Change is considered a perversion as far as Islam is concerned, especially in cases where the desire to switch sex was whimsical. Though, a recent scientific and technological breakthrough that solves the problem of hermaphroditism, it is generally prohibited in Islam except in cases where there are explicit evidences of sex mix-up or confusion with distinct prevalent signs of a particular sex above the other. Below is an excerpt from a religious edict issued on sex change:

Firstly:

It is not possible for anyone, no matter who he is, to change the creation of Allah, may He be exalted, from male to female or vice versa. Whoever Allah, may He be exalted, has created as a male can never become a female who menstruates and gives birth!

Yes, the doctors may tamper with him to satisfy his perversion so that he will think that he has become a woman, but he will never be truly female and will live in a state of anxiety and worry, which may lead him to commit suicide.

Secondly:

What a person may feel in his mind and heart, that he is of a gender other than what he appears to be to us does not give him an excuse to change his gender; rather it comes under the heading of following the *Shaytaan* in changing the creation of Allah – outwardly but not truly – and those feelings do not make it permissible for him to undergo surgery or take medicines and hormones to change his outward appearance. Rather he must be content with the decree of Allah, may He be exalted, and treat his case on the basis of faith and obedience to Allah. It is not permissible for him to make himself appear outwardly to be of a gender other than his real gender

with which Allah created him, otherwise he will be committing a major sin; if this person is really female then she will be masculinised and if he is really male then he will be effeminate. (*Fatāwa al-Lajnah ad-Dā’imah*, 2018).

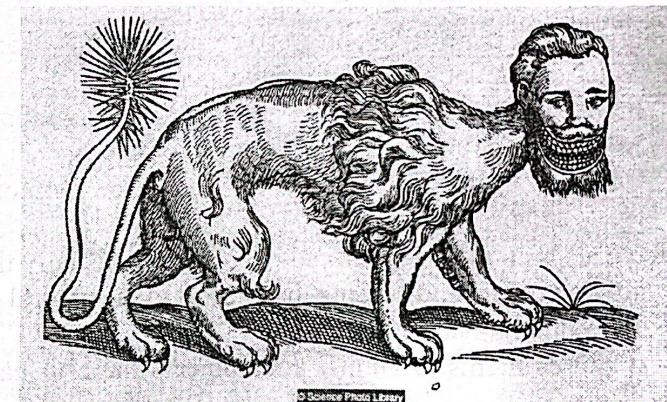
As stated above, sex change is permitted only in cases where the organs and attributes of one sex are prevalent in the body of a person who also possesses the organs of the other sex. In this, corrective surgeries are recommended. The *Fatwa* reads:

The surgery that is permissible in such cases is if a person was originally created male or female, but his genital organs are hidden. In that case it is permissible to do surgery in order to make those organs appear, and to give him or her medicine or hormones to strengthen the characteristics with which Allah originally created him or her.

But in the case of one who was created with both female and male genitalia – this is what is called ambiguous intersex – it is not permissible to be hasty in removing one and making the other more apparent. Rather we should wait until it is known what Allah, May He be exalted, will decree for this individual, which may become apparent after some time have passed. (*Fatāwa al-Lajnah ad-Dā’imah*, 2018).

Human-Animal Hybrids (*Chimera*) or Hybridization: while hybridization and genetic engineering in plants for the aim of providing more food for mankind and animals are considered permissible in Islam, the idea of human-animal hybrid or cross-bid (*Chimera*) is not a recent phenomenon in science. Information obtained showed that the idea has spanned centuries of human’s existence most especially in the ancient Greek

mythology (Brock, 2017). However, the sophistication of science in recent times has given it strength and made it a reality. It is an effort to create animals with certain human features and ability or humans with animal features. Human-animal hybrids can be created through human mating with animals (sexually) or through the use of technological and scientific instruments.



Human-lion hybrid with human head and lion body sourced from: <http://www.bbc.com/future/story/20170222-the-uneasy-truth-about-human-animal-hybrids>, 2018).

Articulating the claim of scientists on the drive and purpose for creating cross-bids or hybrids of human-animal, Bob (2018) stated that:

The current researchers say the purpose of creating the human-animal hybrid was to find out if it might be possible to grow human organs in animals to replace defective ones in humans. Such patients would not reject the organs, because the cells used to create them would be their own.

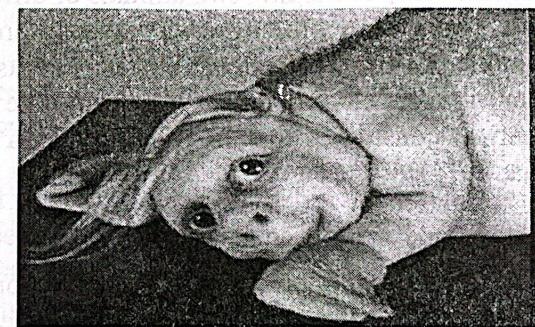
Aside human-animal cross-bids or hybrids, scientists have also successfully created animal-animal hybrids giving dogs the features of ferocious beasts like tigers, lions, hyenas and wolves. For scientists, it is a mixture of excitement to try new things and co-opt in creation with God, a flagrant arrogance as far as religion is concerned. The dangers of hybrids are as follows:

1. It changes the natural creation of God.
2. It takes the features of one creature and presents in another, which is not entirely what it appears to be.
3. It puts mankind at the risk of attack by animals supposedly considered domestic as situations have shown.
4. It causes distortion to the natural God-given hormone and genes of humans and animals.
5. It causes animals and animals to behave unusually thereby altering nature and causing discomfort to the natural design of God in humans and animals.
6. It causes harms to animal and subjects them to hate and danger.

For those and several other reasons, Islam totally abhors this aspect of science and technology and considers it *harām* in all its facets.

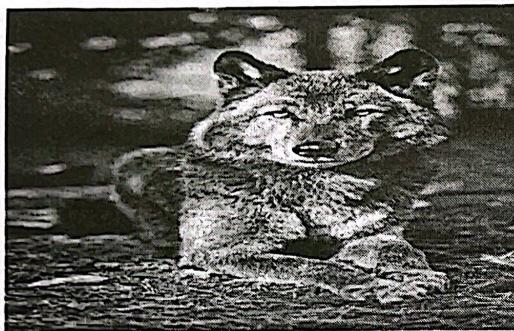


A lion-tiger cross-bid/hybrid. Picture obtained from: <https://www.providr.com/how/rare-animals-that-were-crossbred/>.



The picture above is a pig-human hybrid. Picture obtained from Wesley Smith article titled Scientists Make Human-Animal Hybrids That are Part Animal and Part Human Being published on <http://www.lifenews.com/2018/02/20/scientists-make-human-animal-hybrids-that-are-part-animal-and-part-human-being/>.

Domestic animals have also been made into hybrids and several cases of the beasts eating up a human have suffered across the world (Taylor, 2018). Such animals are often called Wolf-dog, Lion-dog or similar names to connote their hybrid nature. The pictures below show a dangerous hybrid dog:



Picture was obtained from: <http://www.insidedogsworld.com/top10-most-dangerous-dog-breeds-intheworld/>.

Therefore, the scientific way of making two animals of different nature mate in order to produce a hybrid or engineer it through technology is prohibited in Islam. Whatever brings benefits and removes harm for humans and animals is permissible and whatever causes harm is considered *harām* (prohibited) (Da'wah Institute of Nigeria, 2014).

Conclusion

The current world has seen a tremendous growth in reasoning, science and the acceptance of Islam across Asia, Europe and other continents of the world. With the expansion of scientific and technological advancements, more challenges are posed to faith and more questions continue to emerge. At the forefront of the propagation of science and reason comes Islam, a religion whose foundation is knowledge and reason. Therefore, science/reason is projected to protect faith while faith is also

expected to protect science and reason. Science or reason without faith is therefore similar to a man walking the darkness with his eyes opened while faith without science is similar to a man walking the daylight with eyes shut. Neither of the two will suffice without the other. Therefore, although Islam encourages exploration of scientific and technological advancement and inventions for the benefit of mankind, it holds that every new scientific breakthrough or discovery must be subjected to reason and revelation, using the principles of the *Shari'ah* as a compass to determine or ensure that:

1. It leads humanity to God.
2. It helps to achieve the intention of God for mankind.
3. It does not contradict or flout any of the principles, rules and regulations placed by God.
4. It does not cause harm to humans, animals or plants.
5. It yields benefits for mankind.

Scientific discoveries that scale through the tests of the *Shari'ah* and accrue benefit for humanity and remove hardship are acceptable, while those that flout the order of nature or puts humans and animals at peril are speedily rejected and condemned. Therefore, science, knowledge, reason and revelation must be adequately integrated in order to continuously produce Muslim scientists who are ethically guided and profound in their disciplines. While Islam embraces the growth of science and technology as part of the basis of its ideology, it places restrictions to ensure that ethical values are not eroded for the reason of science. The Qur'an and Sunnah therefore remains the guide for scientific and technological investigations and inventions. This work has also proven beyond doubt that the institutions of faith cannot reach its full potential without the use of reason, science, knowledge and faith as entrenched in the Qur'an and Sunnah. This is because knowledge and reason without the guide of faith is capable of misleading mankind and breed arrogance and disbelief.

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