

Majma'al Bahrain: Towards a Synthesis of Scientific Methodology for African Muslim Communities

Abdalla Uba Adamu
Department of Education
Bayero University, Kano

Being a paper presented at the International Conference on Islam in Africa sponsored by Bayero University Kano, Nigeria, and Islamic Universities League, Saudi Arabia, July 1993.

OVERTURE

I used the expression Majma'al Bahrain¹ to reflect the philosophical and divine directive to the search for knowledge, as reflected in Surat Kahf, Ayat 60. In my essay, the two seas refer to the scientific knowledge on the one hand, and African Muslim world-view on the other. Both represent distinctive methodologies of interpreting and living with natural phenomena. I will attempt an integration of the two methodologies in order to determine the most effective way in which the methodology of scientific enterprise can be successfully woven within the matrix of the African Muslim world-view. And although I attempted to focus attention on African issues, I prefer to base my arguments of scientific methodology as it affects the wider Muslim *Ummah* as well. I brought out the African element to emphasize the *historical* development of aspects of science in some African communities.

INTRODUCTION

Since the industrial revolution in Europe in the 18th and 19th Centuries, science and technology have assumed important roles as powerful strategies of social and economic transformation. Their acquisition, as well as widespread utilization, have come to be considered the hall mark of modernization in any contemporary social structure. Their role lies in the way their sustained application improves the quality of social and economic life in the society. Diseases can be controlled, and in some cases, totally eradicated. Nature can be tamed and life made more bearable as a result. Environmental awareness has resulted in a more rational use of resources to aid better living, while improved agricultural methods of livestock and crop production can lead to an improvement in the quality and quantity of food available to people. Technology has facilitated transport and has enabled better communication among communities. The list of advantages of science and technology in the modern world is truly impressive.

¹. *The Junction of the Two Seas. Surat Kahf, Ayat 60.*

But equally impressive is the list of doubtful benefits to humanity brought about by activities associated with science and technology. Warfare, not necessarily an outcome of science or technology, easily comes to mind because of its reliance on the products of science and technology for its sustenance and often spectacular effects. Environmental degradation, brought about by industrial pollution as a product of intensive industrialization, is also a source of concern to many people, especially as it relates to the ability of the biosphere to sustain life. Rapid advances in medical science have brought the gifts — or curses — of spare part surgery, prosthetics, in vitro fertilization and biotechnology; and along with them, complex ethical and religious issues concerning the nature and future of man. Nuclear incidents, such as those at the Three Mile Island (Pennsylvania, U.S.A. March 28, 1979) and Chernobyl (Ukraine, Commonwealth of Independent States, April 26, 1986) further serve to emphasize the uncertainties about the extent to which science and technology can be relied on for the sustenance of life.

These possible outcomes are underlined here to emphasize the full implications of massive investment in science or technology. Nevertheless, science and technology remain the major strategies through which the quality of economic life in any society can be significantly improved: their acquisition and widespread use in any society serving as an index of the level of development of that society. Doubtful benefits may be more an outcome of misunderstanding, misuse, or mismanagement of the products of science and technology than a reflection of the inherent nature of science or technology.

Thus, over the past century or so, science as an integrative discipline has acquired a raw persona that makes its acquisition, utilization and control symptoms of a rationalized society. This is because the mainstream of philosophy of science during the second quarter of this century, the logical empiricist or logical positivist movement, was characterized by a heavy reliance on the techniques of mathematical logic for formulating and dealing with its problems. Philosophy of science was pronounced to be the logic of science, meaning the attribution of certain features to the subject, and science itself was conceived of on an analogy of formal logic.

Science, with its twin sibling, technology, has become the most significant advancement of human knowledge from whatever perspective, and has provided those who wield it with enormous powers — to either sustain life or to annihilate it. Centuries after the fruits of science came to be manifested as lights that have come to banish the darkness of collectivist ignorance, it is not clear which direction the fruits of science and technology would lead. And paradoxically, this power to determine human development, and not necessarily always in the hands of those who develop it, has become the measuring meter with which the stability of any society is effectively assessed. An extension of the paradox is that a scientific society is considered a stable society.

Thus, science can be defined in terms of its *products*, i.e. knowledge in the form of generalizations, principles and so forth; science can also be defined in terms of its *methods*: how

scientific knowledge comes into being; similarly, science can also be defined in terms of its motives, or *ethics*. Selecting only one of these terms to define science would be inadequate and misleading, as science may presently be considered as an enterprise participated in by human beings concerned with the study and parsimonious explanation of the materials and forces of nature. It employs a variety of techniques, is motivated by a desire to know, assumes an orderliness in nature, is governed by understandable and acceptable ethical principles, and terminates in credible concepts in the form of theoretical, correlational, or classificational constructs.

But perhaps this very detached view at the same time reveals the strengths and weaknesses of science; for it gives the impression that science is value-free. Science is a human enterprise, the consequences of which have human implications. Thus while the main *activity* of science itself may, by some stretch of imagination be considered value-free, those responsible for generating its knowledge are *not* value-free, for scientific enterprise is as much a cultural activity as any other, despite the attempted sheen of objectivity lacquered on it. Therefore this casts doubt on any attempt to pass on science as value-free, if its generators and sustainers cannot be considered value-free. As Morley (1978 p. 1) argues,

the pure scientist does not exist in isolation from the rest of the society: he spends its money, educates its children, heals its sick and feeds its hungry, develops its consumer products — indeed, there is almost no aspect of modern life which is untouched by science and the scientist. He is also a human being and a citizen, who makes mistakes, collaborates and competes with his scientific colleagues, tries to persuade others to do what he thinks is right; who, in short, displays all the qualities and failings of the human race. Man is an ethical animal, and so is the scientist.

In a similar vein which brings out the human nature of science and scientists, and consequently the scientific world view, Rose and Rose (1970 p. 241) have also argued that

...science is not an unpredictable act of gods in white coats, nor is it the product of forces of unspecified 'progress' which are outside our powers and control. The sort of science that is done today, in Britain, the U.S.A. and the U.S.S.R., is neither inevitable nor necessary in any abstract sense, 'the best' ...It is the product of certain philosophies, ideologies, economic and political structures. It is thus to a considerable extent modifiable and plannable.

Further, science owes its progress more to economic demands than search for some fabled objective truth. For instance, the emergent capitalism of the industrial revolution in Britain required technological advances in power generation and physicists studied the laws of thermodynamics and conservation and transformation of energy. It is thus not really an accident that many of these fundamental advances in physics were made in Britain in the half century of 1810-60, whilst in chemistry and physiology the major centers were in France and Germany.

SCIENCE, ANTIQUITY AND AFRICA

Thus such economic bases that led to scientific inquiry, innovations, technology and ultimately discovery are prevalent in any organized society, no matter how emergent. In many such emergent societies, the origin of physical science can be traced in the observations of natural occurrences, such as the apparent movements of the heavenly bodies, and in the invention of rude implements, by the help of which men strove to increase the safety and comfort of their lives. Similarly, biological science must have begun with the observation of plants and animals, and with rudimentary medicine and surgery.

A cursory glance at the history of ancient Egyptians, Babylonians, and medieval African civilizations may serve to illustrate how the way in which a society conceives of its world and of its relation to the supreme power or powers that govern the universe may either promote or retard the development of a scientific tradition in that society.

Science in the Fertile Crescent

The Babylonians as a race, occupying the fertile crescent of rivers Euphrates and Tigris, were certainly interested in scientific speculation, and this is reflected in their mythology. They conceived the world as an alien and hostile place, devoid of any order other than what careful observations could discern, despite the apparent arbitrariness of the gods.

The Babylonian people, inhabiting areas that lay at the crossroads of continents, were subject to constant invasions such that continuity in government and patterns of life were lacking. Even the Tigris and Euphrates rivers were unpredictable in their behavior, overflowing their banks irregularly and often bringing death, rather than the gift of life to inhabitants of the areas. In these circumstances, to conceive of nature as obedient to law and natural phenomena as subject to rational analysis was a brave gesture of the Babylonians, who were led by practical considerations to develop the art and skill of land measurement (see also De Camp, 1980).

In Babylon also, the systematic measurement of time began at an early date. The importance of a knowledge of the seasons grows as agriculture develops among a primitive people. The cultivation of cereals, which require seasonal treatment and ample water supply, makes a calendar almost a necessity, and we may have here one reason why the beginnings of astronomical observations occurred in the basins of the Euphrates and the Nile (see also Burney, 1977).

The day as a unit of time was imposed on man by nature. When a longer unit was needed, the month was first taken, each month beginning with the appearance of the new moon. Then attempts were made to determine the number of months in the cycle of seasons, in Babylon about 4000 B.C. and in China soon after. About 2000 B.C. the Babylonian year settled down to one of 360 days or twelve months, the necessary adjustments being made from time to

time by the interposition of extra months. The day was divided into hours, minutes and seconds, and the sun-dial was invented to mark passing hours. This eventually led to a more systematic observation of the heavens — which in turn led to the emergence of a powerful Astronomical science.

The Egyptians followed the Babylonians in enriching our understanding of the history of scientific development, although they were more spiritual about it. To them, the universe was a well ordered, unchanging, and beneficent creation of benign powers. These powers, whose chief agent on earth was seen as the divine *pharaoh*, were constantly concerned with the welfare of man on earth. Due to this world-view, and their own assurance of their comfort both in this world and next, they were not particularly motivated to wonder very much about the nature of the universe or the meaning of human experience. Thus, curiosity about the nature of things, about the forces at work in the world, was not a main aspect of their outlook.

The “science” that the Egyptians developed was devoid of speculation: their astronomy, geometry and arithmetic were all directly related to practical matters of daily life. To be able to predict with some degree of precision when the Nile would overflow, the heavens were studied and a lunar, as well as a solar calendar, worked out. In early times Egyptian civilization was comparatively advanced; transport was facilitated by the invention of the wheel and the sailing ship. It seems also that at a very early date, surveyors measured land in Egypt with ropes and *recorded* the results, leading to an early development of Mathematics. But the most important contribution of the Egyptian civilization to science was in medicine, where an elementary knowledge of anatomy was almost forced on them from the practice of embalming the dead.

Similarly, there was evidence of performance of medical operations about 2500 B.C. in Egypt. There were trained physicians, bone-setters for the treatment of fractures, and oculists to cure eye-troubles. The art of dispensing drugs and essences had been brought to a high state of excellence, and many Egyptian remedies became of world-wide repute. Subsequently, Egyptian medicine spread to Greece, Alexandria and then into Western Europe.

Science South of the Sahara¹

The development of scientific thought in Africa south of the Sahara does not seem to have followed the patterns established in Classical Europe. Furthermore, our information about the development of science in Africa, especially from classical times, was quite scanty. This is due, partly, because of the climate of Africa below the Sahara which is generally unfavorable for the preservation of much archaeological data, and partly because not enough archaeological work has been done in sub-Saharan Africa, about the history of science and technology in that region.

². Most of the information in this section is taken from *Journal of African Civilizations*, Vol 5 Nos 1 and 2, April and November 1983. Re-issued as *Blacks in Science — Ancient and Modern*, Sertima, I. V. (1984)(Ed). New Brunswick, Transaction Books. The Journal of African Civilizations is based at African Studies Department, Beck Hall, Rutgers University, New Brunswick, N.J. 08903.

Moreover, the Africans have always been troubled peoples. The four centuries of slave trade alone (1445-1870), the latter part of which coincided with the scientific revolution in Europe, were enough to decimate the intellectual spirit of African scientific development. The slave trade was followed almost immediately by colonial expansion, and this further contributed to the slowing down of organized intellectual pursuits in Africa, comparable to Classical or Renaissance Europe. Again, the troubled political and social climate of African countries after independence from colonial powers has created an atmosphere of social, political and economic uncertainty — which has limited further the extent of the contribution of the African peoples to scientific thought. Thus if we are to seek the original contributions made by African peoples towards the development of science, we have to start our search from the Antiquity. It is at this period, relatively calm in the life of the African, that original contributions, comparable to those made by Babylonians and Egyptians — who contained a liberal sprinkling of African racial elements — were made.

However, the relative isolation of Africa from other peoples and races has created a radically different focus in African scientific thought. Whereas speculative philosophy gave rise to science in Classical Europe, the scientific effort of Classical Africans was more utilitarian — aiming itself more on the application of scientific thoughts to the solution of common problems, as well as attempts to explain the observed cosmic phenomena. An exploration of some of the areas of science in which African civilizations have made a significant contribution would provide an insight into the nature of African science before European arrivals.

Astronomy. The pattern of European Classical science seemed to have always started with observations of heavens, which eventually gave rise to the development of astronomy. In recent years, there has been a growing interest among archaeologists and astronomers in the possible relationships between megaliths erected by prehistoric peoples and the positions of constellations and other solar phenomena. Much of this work has centered on European sites such as the Stonehenge in Britain. However, in Africa, especially Ethiopia, megaliths are known that are believed to have been associated with Cushitic speakers. Recent research by Lynch and Robbins in northwestern Kenya has resulted in the discovery of evidence warranting archeoastronomical investigation which probably dates from about 300 B.C. at Namoratunga southwest of Lake Turkana.

The name *Namoratunga* means “stone people” in the language of the local Turkana ethnic group. At one of the sites, evidence was uncovered in the form of stone formation. Although principally a burial area comprising of standing stones circling one grave, 19 large stone columns were found arranged in rows that were not part of any grave. The stone formations were found to correlate with movement of seven star constellations (Trangulum, Pleiades, Aldebaran, Bellatrix, Central Orion, Saiph and Sirius). Thus, this archeoastronomical evidence from Kenya adds significantly to the growing body of evidence attesting to the complexity of prehistoric cultural developments in sub-Saharan Africa. It strongly suggests than an accurate and complex

calendar system, based on astronomical recording, was developed by the first millennium B.C. in eastern Africa. Furthermore, it raises the possibility that other megalith sites will be found that will have astronomical implication (Lynch and Robbins, 1978).

Far more remarkable than the megalithic observatory found in Kenya before Christ is the discovery of extremely complex knowledge of astronomy among a people in West Africa known as the *Dogon* in Mali (Van Sertima, 1977). Van Sertima uncovers evidence suggesting that the astronomer priests of the Dogon had since 15th Century a very modern view of the solar system and of the universe — the rings of Saturn, the moons of Jupiter, the spiral structure of the Milky Way Galaxy. They knew that the moon was a barren world. They knew also of things far in advance of their time, intricate details about a star which no one can see except with the most powerful of telescopes. They not only saw the star — Sirius — but they observed its mass and its nature. They also plotted its orbit almost up until the year 2,000.

Physical Sciences. The history of physics must surely go back to the very origins of human society, as evolving man began to solve the problems of gathering and producing food, shelter, and clothing. The first thought-out, dynamic experiments must have been done in relation to the development of throwing devices for spears, and in inventing the bow and arrow — the first device utilizing the principle of stored mechanical energy and converting it into kinetic energy. The practical mastery of the principles of mechanics — the oldest branch of physics — grew as man learned to make flint weapons, tools, dwellings, boats, etc.

It is in this light that the total exclusion of ancient Africans from the accounts of the history of physics appears surprising. Anthropological evidence shows that the origin of man is to be found in Africa (see, for instance, Time Magazine's November 7, 1977 cover story, *Puzzling out Man's Ascent*) where man first started up along the tool-making path that distinguishes him from the lower forms of life. For instance, some of the oldest artistic castings so far known in Nigeria were excavated around the beginning of 1960 at Igbo Ukwu (present Delta State). They have been radio-carbon dated to about the 9th or 10th AD centuries and seemed to have been for use in ceremonies associated with an important priest. Their compositions fall into two major groups: copper, usually with no more traces of other elements; and alloys, either tin-bronze or leaded tin-bronze. It was observed that the pieces made from copper had been manufactured by smithing technique alone — by twisting, hammering and chasing the metal. The alloys were cast into complicated forms. The surfaces were usually richly decorated with patterns made from thin threads, spirals and pellets of wax often superimposed by stylized representations of crickets, mantids, spiders, birds, etc. These smiths, towards the end of the first millennium AD, clearly knew how their metals would behave (Willett, 1983).

Mathematics. From the mathematical point of view, the most interesting find is a carved bone discovered at the fishing site of Ishango on Lake Edward in Zaire. It is a bone tool handle having notches arranged in definite patterns and a bit of quartz fixed in a narrow cavity in its head, and dates back to the period between 9000 B.C. and 65000 B.C. It was most likely used

for either engraving or writing. This indicates the progress during the Paleolithic era being made in man's ability to use abstract mathematical operations. It is hardly likely that this artifact was unique in the culture of the Ishango area. It is also possible that tallies of this sort were made in a more perishable form — on wood, on animal skins, or by an accumulation of pebbles or seeds; if this was so, the evidence would have been lost in the course of time.

Thus, if science is seen as a product of logical processes, then the African environment had provided sufficient facilities for such logical development. The slave trade, coupled with colonialism and its footnote, imperialism, have all but combined to not only destroy any vestiges of scientific development in African traditional communities, but to also effectively downplay and bury the work that African communities have done in contributions to the development of scientific thought.

Having briefly explored some aspects of the development of science in Africa, I will now turn to my second theme, scriptures and science.

RELIGION AND SCIENCE

It was in the 17th Century Europe that the modern conflict, or apparent conflict, between science and religion, or more accurately, Christianity, had its beginning. Indeed, what did turn out was the drama of Karl Popper's *Conjectures and Refutations* played out in the form of a brilliant opera in which no sooner had one theory of reality been accepted, than it was refuted few years or centuries later by the same community of scientists that accepted it. Claudius Ptolemy, an Alexandrian Greek astronomer of the second century A.D. probably started it with a hazy conception of the solar system which saw a modified geocentric system that places earth not exactly at the center of the solar system. However, by seventeenth century, further observations eroded Ptolemy's simple model, and ultimately over seventy simultaneous circular motions were required to explain celestial motion.

It took a Polish medical student, Nicolau Copernicus (1473-1543) well over forty years to publish his *Six Books Concerning the Revolution of the Heavenly Spheres* in 1543, in which he suggested that Ptolemy's universe was wrong and the sun, not the earth, is the center of the universe. This was the flint that lit the fire of Christian indignity over an accepted paradigm — the then view that the earth was the base of the entire university. No support was given by the Christian church of the Copernican view of the universe. Even scientists such as Denmark's Tycho Brahe, used convincing scientific data to swing the view back to the Christian world-view of existence; namely that the earth was the center of the universe. It took Brahe's German assistant, Johannes Kepler (1571-1630) quite sometime before he could prove that his master's voice was wrong, and through the publication of his two laws in 1609 sought to prove Copernican heliocentric view of the universe. A third law published in 1619 became the cream on his intellectual icing and provided a more convincing proof of his theories to his peers.

When the Italian scientist Galileo Galilei (1564-1642) published *The Sidereal Messenger* in 1610 it confirmed the Copernican sun-centered universe. The earth had been shown not to be the centre of creation, but, in terms of physical space, an utterly insignificant part of it. This discovery did not immediately become known to educated people in general; it was at first confined to a narrow circle of natural philosophers, many of whom, including Bacon — an English lawyer — rejected it. But it was clear that if it did become known, and if it could not be rejected on any rational grounds, popular Christian thought and the imagery and conception of the world that everyone took for granted, would finally be undermined. Copernicus' result, like Galileo's, was condemned by the Church, but it was plain that the truth could not be suppressed for long. This provided the first significant clash with Christendom. In 1616 the Roman Catholic church declared heliocentrism to be contrary to the teaching of the Bible and ordered Galileo neither to hold nor to defend the theory. Galileo's defiant *Dialogue on the Two Chief Systems of the World* published in 1632 was a negation of this papal order since he merely carried his argument further. The exasperated Roman Catholic church tried Galileo in 1633 and was compelled to renounce formally the Copernican theory and was further put in house arrest for the rest of his life. *The Dialogue* became a forbidden book until 1835.

Islam, however, did not have the same effect as Christianity on the development of the nature of science. Islam has at the outset far less cramping effects on human thought. After the turbulent century of conquest, even the leaders of Islam sought avidly for the old knowledge of the Greeks, and as much of their culture as the Quran would allow.

The impact of foreign influences coincided with the fall of the Omayyad Dynasty in Damascus and the advent to power in A.D. 749 of the Abbasids, who, though not themselves Persian, depended on Persian support and liberated the traditional learning and science of that ancient and cultured people (with direct roots to Babylonians, and subsequently, Africa). Learned Persians, Jews, Greeks, Syrians and a few from farther lands met in the new capital of Baghdad and it was there, and in Jundishapur, that began the translation into Arabic of the main books of Greek science. These translations were made either directly from Greek or, as often, from Syriac, and the work was subsidized from the start by the Caliphs. The books that were translated were nearly all of science and philosophy because, naturally enough, the Arabs had no particular interest in the history of the Greeks. It was from these Islamic sources that science arrived in the West.

It is difficult to estimate the value of the actual contributions to this fund of learning that were provided by Islamic scholars themselves. Certainly, the learning of the Greeks was brought to life again and not merely transmitted without change. In fact, it was subjected to a process similar to that undergone by the learning of the ancient East in the hands of the Greeks. Because Islamic scholars had no emotional identification with the old Greek legends, they approached Greek learning with a much more detached attitude than the Greeks themselves were able to do.

On the other hand, the Muslims were equally, if not more, attracted to the mystical aspects of late classical philosophy, particularly Neoplatonism.

The social position of scientists in early Islamic culture was not essentially different from what it had been in late classical times. With the coming of the Abbasid dynasty, there was a short period between 754 and 861 under the Caliphs when science was encouraged on a scale unequaled since the early days of the Museum at Alexandria. The Omayyad Caliphs at Cordova (A.D. 928-1031), and wealthy merchants of the period prided themselves in encouraging the development of science. It was this courtly and wealthy patronage that enabled Muslim doctors and astronomers to carry out their experiments and make their observations. It also protected them, while it lasted, from the active disapproval of religious bigots who suspected that all this philosophy would shake the beliefs of the faithful. This association with kings and wealthy merchants was immediately the source of strength and ultimately of weakness, since science became, as time went on, completely cut off from the people, who suspected that the learned advisers of the great were up to no good, and this made them an easy prey to religious fanaticism. As long as the cities and trade flourished, there was a sufficiently large, cultivated middle class interested in science to ensure discussion and progress. As this broke down, however, the scientists became more and more wandering scholars, dependent on the varying fortunes of local dynasties.

Thus, though individuals might specialize, science formed a unity cemented by philosophy. It comprised the twin disciplines of astronomy and medicine, united by a more or less admitted astrology which furnished the link between the outer big world of the heavens — the *macrocosm* and the inner small world of man — the *microcosm*. Consequently, although Islam exalts the use of reason, it also placed reason under the control of revelation. Reason in Islam must therefore be placed within the matrix of the Islamic world-view. Ironically, it is the excessive use of reason which led to the fall of Islamic science. As Sardar (1980 p. 215) pointed out,

revelation in Islam is above reasoning, but not above reason. Neither is reason above revelation. This rather subtle relationship was overlooked by a movement of Muslim scientists and scholars, the Mutazilites (circa 700 AD) who believed that not just the mysteries of nature but also the profundities of religious belief could be explained and expressed in terms of human reason.

The Mutazilite rationalism was nipped in the bud by the Asharite scholasticism (circa 900) which challenged what it believed was the corruption of religious dogma by excessive use of reason. Philosophy was suspect. Al-Ghazzali's (1058-1111) book, *The Incoherence of the Philosophers*, was a warning of the futility of this attempt. Despite the spirited answer of Ibn Rushd (1129-1198), in his forceful and extremely eloquent counter attack, *The Incoherence of the Incoherence*, the warning remained effective, and inevitably forced the doctrine of two truths — a

higher spiritual and a lower rational truth — which ultimately sterilized both in Islamic countries as surely as it had done among the Greek Christians.

During the most flourishing period of Islamic science, in the 9-11th Centuries, these considerations did not yet weigh heavily. Indeed, one may suspect that religion was taken for granted by some of the greatest scientists, and not allowed to interfere with the pursuit of secular knowledge. The unity of science was further ensured by the tradition of encyclopedism, which drove all the great and a number of minor Islamic writers to compose comprehensive treatises like the *Compendium of Astronomy* of al-Fargani and the *Canon* of Ibn Sina — which were still being used as textbooks in 17th Century Europe.

However, the ultimate failure to associate science with the enduring features of Islam was probably a major reason for its withering away in the later centuries of Islam, thus enabling the great tradition of scientific scholarship to pass from Muslim hands to the West. The failure to sustain science as a methodology within Islamic world-view contributed to this stagnation. The Asharite stab in the rationalist back of Islamic science has been effective. So died Islamic science!

SCIENCE, SOCIOLOGY AND MUSLIM IDENTITY

Thus, by 19th century, and with the advent of the Industrial Revolution, science has become a Western economic product. The fertile laboratories where science grew up in the Islamic lands were themselves under either captious warfare with each other, or under some form of Western colonial subjugation.

The European Industrial Revolution provided science with a metallic natural philosophy that enabled science to become the ultimate characteristic of statehood. Keen to cash on this, the Muslim community, initially dismayed that the fruits of its centuries of intellectual efforts have been snatched away, started to “rediscover” science in Islam. And subsequently, one of the most dangerous trends in Islamic philosophical thought was established with this bandwagon, reflected in new intellectual pursuit that dissect the Quran and the Ahadith and suddenly discovered “science” buried in the scriptures.

Leading the pack in this venture of “rediscovery” of Islamic science is a slew of books written by various individuals, purported to either prove or illustrate how “scientific” Islam is, particularly the Quran. Most of the books were written with the gorged satisfaction of “proving” wrong the negative occidental perception of Islam as a chronicle of dark age behaviors. Ziaudeen Sardar aptly summarizes some of these books which included:

1. “Quranic Scholar confirms Qur’an and Ahadith on Human Embryology” (*Africa Events*, May 1985; *Bulletin of the Islamic Medical Association of South America*, April 1985).
2. *Cosmic Verses in the Qur’an*. Muhammad Jamaluddin El-Fandy (Supreme Council of Islamic Affairs, 1961).
3. *The Quran and Modern Cosmology*. Shamsul Haq (Science and Technology in the Islamic World Vol 1 No 1 1983 pp 47-52).

4. *Miracle of the Quran*. Rashad Khalifa (Islamic Publications International, St.Louis, Missouri, 1973).
5. *The Bible, the Quran and Science*. Maurice Bucaille. (Seghers, Paris, 1976).
6. *The Quran and Mental Hygiene*. Azizul Hassan Abbasi (Karachi, undated).

All these writings attempted in one way or the other to legitimate the scientific validity of Islam through an analysis of either the verses of the Quran or the traditions of the Prophet Muhammad (S.A.W.). Their banality ranges from the view that “the best example of scientific expression is found in the Quran” (El-Fandy), to finding modern cures in the Quran about diabetes, tuberculosis, stomach ulcers, dysentery, and paralysis.

But the ultimate and most influential Islamic scientific apologia must surely come from Maurice Bucaille’s book which Sardar believes is an “essential reading for Muslims with larger than life inferiority complexes” (Sardar 1985b p. 39). The book analyses the holy scriptures in the light of modern scientific knowledge especially on four topics: Astronomy, the Earth, Animal and Vegetable kingdom, and Human Reproduction. Quranic verses were quoted and then given a scientific commentary, and subsequently such verses were considered as confirmatory of contemporary scientific knowledge.

All this gorge of intellectual rediscovery of science in Islam is fine and good. Except that a vital element seemed to have been missed by the apologia bandwagon, and that is scientific facts, theories and methodologies are susceptible to radical shifts, revisions and changes. Thomas Kuhn’s albeit imperfect, but nevertheless classic account of the trauma of scientific revolutions in the growth of scientific knowledge attests to this. The growth of astronomy, from Ptolemy to Galileo provides a historical illustration of the futility of accepting any natural observational finding as eternal.

Thus, there are two dangers to this rediscovery. First, it makes scientific knowledge sacred and undermines any criticism of science. Second, it ignores the fact that the Quran is not a science textbook, but principally a book of guidance, even though it contains passing references to natural facts. The Quran provides a motivation to pursue knowledge.

But perhaps the most dangerous direction of this trend, which I refer to as *Islamica scientia apologia* is the subjection of Quranic verses to scientific verification. By finding scientific “facts” theories and principles in Quranic verses, a legitimacy is given to science. And the big question is, what happens, as Kuhn’s *Structure of Scientific Revolutions* clearly prove, when the very same scientific facts have to be abandoned in the light of new discoveries and altered methodologies? What do we do with the *object linked* (and in many cases, embedded) Quranic verses to these discoveries and methodologies — do we also go back to the Quran to seek to alter those verses to reflect the current revolutionary state of science? Unfortunately the authors of *Islamica scientia apologia* do not provide any clues as to what we should do in cases where a scientific theory they link to the Quran is no longer tenable in the light of the growth of knowledge.

THE CONCLUSION

It is therefore all forgotten that scientific knowledge is human manufactured knowledge. No matter how esoteric, elegant and seductive, it is a reflection of the world-view of the scientist who manufactured it, and the community of scientists that endorsed it and make it part of mainstream generalized knowledge. It is a problem-solving activity, a technique, a methodology and works only within certain parameters and with certain apparent values. And it is often too easily forgotten that the frailty and fallibility that characterize human scientists reflect themselves in some of their endeavors. Thus, if the scientific method has been elevated to scientific truism, it should be pointed out that along the way, scientists are just as human as any other group of people. Often scientific findings were falsified deliberately to give wrong impressions by scientists. As Silberner (1982) pointed out, “fraud in science isn't a modern invention. Scientists have a long history of shaping data to fit their theories. Based on modern recalculations of Ptolemy's data, the great astronomer stands accused of faking data to fit his theory of a geocentric universe.” (Silberner 1982 p. 40). Similarly, Broad and Wade (1982) have argued for widespread fraud in modern scientific methods by stating that

“fraud [in science], is common enough so that some scientific groups have their own terms for it. “Drylabbing it” is one expression for the activity of scientists who derive their data from imagination rather than from laboratory. Over the past few years, at least a dozen major cases of fraud have come to light in as many institutions. p. 51).

Admittedly, not every scientific knowledge is the result of fraudulent science or methodology. But the rapidly changing nature of scientific knowledge (Kuhn's Revolutions), and the often fraudulent practices of scientists to enhance their image among their peers, and even the old-boy network of the peer review system to endorse scientific discoveries, surely cast doubts on any attempt, as engaged by *Islamica scientia apologia* to find scientific validation of the Quran and other Islamic sources.

It is not that one is against the use of scientific methodology. But it must be appreciated for what it is — the world-view perception of its generator. Rational, thorough, and systematic pursuit for knowledge and its validation is not a scientific methodology: it started with Islam. To subject Islam to a latter day corruption of rationalism is a danger which Muslim communities must avoid at all costs. This is because this trend, if allowed to sustain itself in the Muslim world, would only make the Majma'al Bahrain rather muddy.

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