

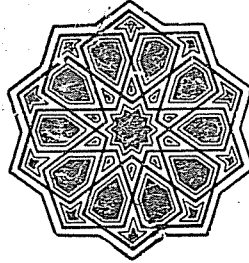
ANKARA ÜNİVERSİTESİ

# İLÂHİYAT FAKÜLTESİ DERGİSİ

ANKARA ÜNİVERSİTESİ İLÂHİYAT FAKÜLTESİ  
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YIL ÖZEL SAYISI



# IS THERE A METHODOLOGY IN THE QUR'AN FOR THE NATURAL SCIENCES?

by Mehmet BAYRAKDAR

## 1. Introduction

Does the Qur'an suggest a methodology for the study of nature? Or in other words, can it show the way of approaching and gaining knowledge of nature? This we will not find out without investigating. This article is an attempt at such an investigation-but this is a task which will never be finished - certainly not by me - and perhaps its main questions may never be fully answered. I can only hope that it might help the reader to think for himself.

The article is intended to be a simple, clear and elementary instruction to the Qur'anic views on the subject. The article as such will be the first source or starting point that does not otherwise exist. I have tried to write for a wider audience and therefore avoided a highly formalised presentation.

Although we, the Muslims, have had a long flourishing history of science, especially from the Eighth century A.D. (Second century Hijrah) to the Fourteenth century A.D. (Eighth century Hijrah) there is no single book on the Qur'anic methodology for natural science that one can recommend to the students of science. This can be explained by two factors.

First, at the time of the rise of Islam it was natural that the early Muslims dealt with the teaching of the new religion-the Islamic way of life-and with the establishment of the new state, rather than paying regard to the problem of how to approach the study of nature and its phenomena. Therefore the early Muslims could not leave us a particular book on the methodology for the study of nature. This is of course not to say that they did not express their views about nature at all.

Second, in this period, especially the Second and Third centuries Hijrah (Eighth and Ninth Century A.D.) the Muslims started to think of natural phenomena and erected many scientific theories and doctrines,

the majority of which are still relevant to this day. The following can be mentioned as examples; evolutionary theories of al-Nazzam, al-Jahiz, al-Biruni and ibn Miskawayh; the theory of matter of many sufis including Ibn al-Arabi and Shabistari; the theory of relativity of al-Kindi. Yet the Muslims could not explore the Qur'an fully as regards its eternal and infallible principles on which a methodology for the study of nature can be based. Because of the quick spread of Islam in all geographical directions and different climates of thought, a rapid transmission of the existing sciences and methods of various civilizations into Islam took place, accompanied by the conversion of many non-Muslim scientists. Besides the ideas which were in conformity with the Islamic perspective, there were some which were introduced which could not be integrated into Islam. Some of the Muslim scientists, instead of exploring the Qur'anic methods, then adopted the foreign methods for their future research - this is not to say that they did not take the Qur'an as source for their scientific inspirations and discoveries but that from the methodological point of view some gave less attention to the Qur'an while others tried to follow it in every sense.

These factors prevented Muslim scientists by one way or other from building a full Qur'anic methodology especially for the study of nature. They had at the same time to avoid creating conflict not only on scientific issues, but also on theological and political ones between those who were totally against foreign ideas and those who favoured at least a partial accommodation of them.

The past is the past. Now I think the time has come for us to immerse ourselves in the Qur'anic methodology for the study of nature.

In view of this century's scientific and technological achievements, and of various existing scientific methods, what is the need for a different approach to the study of nature?

Today there are many scientific theories, explanations and doctrines which are contradictory from some points of view and complementary from yet other points of view. Yet science and its application, technology, go on. However if there is opposition and contradiction in the scientific explanations of phenomena, it means that either all explanations are false or some of them are true and some others are false. If a scientist continues to support the false explanation, science becomes a matter of simple conviction. More importantly, whether a scientist's view or explanation represents the truth of a natural phenomenon or not, if it does

not recognise the presence of Allah, then the explanation rests on the limited framework of personal background, and in this case science becomes ideology. Science can be used to defend ideology even at the expense of moral values.

From this standpoint, today's science, which is in fact western made, bears many dangers:

- separation of man from Allah
- limitations of the horizons of the human mind
- replacement of the moral order by scientific data or theories
- the consequent corruption of the concept of man

Many scientists are becoming aware of this crisis and even the man in the street, who may not believe in the Hell of the Hereafter, is aware of the possibility of a hell in this world: the sceptre of a poisoned environment and worse of nuclear holocaust.

“Those who break the covenant of Allah after it has been established, and sunder what Allah has ordered to be joined, and do corruption on earth: those it is that shall be the losers” (2:27)

“But those who break the covenant of Allah, after it has been established and cut asunder those things which Allah has commanded to be joined and do corruption on earth, in them is the curse and for them is the terrible Home” (13:25).

“Corruption has appeared on land and in sea by the hands of men. He will let them taste some of the things that they are doing, so that they might return (to the right path)” (30:41)

As we will see in this article, not only is science possible, but Allah urges man in the direction of studying nature. But to return to the right path not only in the realm of morals but also in science we need the Qur'anic methodology so that we can show humanity a better knowledge of nature and of man.

## 2. The Qur'anic Concept of Nature: ﴿٤﴾

Before we come to the specific question “Does the Qur'an suggest a methodology for the study of nature?”, it is desirable to state the Qur'anic viewpoint concerning the following questions: “How does the Qur'an define nature?”, “How does the Qur'an define science?”, and “What is the inter-relationship between Nature and Science?”.

May different Qur'anic expressions describe nature. The key expressions can be enumerated as follows: Alam عالم (cosmos, universes, nature, world); Adna أدنى (nearest, below); Makan مكان (Space); Ardh أرضى (nature, earth); Ayat آيات (natural signs); Amr أمر (natural order); Shahada شهادة (physical world) as opposite to Ghaib غيب (spiritual and unseen world); Dunya دنيا (world, earth) as opposite to Akhira آخرة (Hereafter). The key concept among these expressions is *alam* which includes within itself all the rest; and is repeatedly used in the Qur'an. *Alam* in Arabic literally means cosmos, nature and world. It is therefore the most suitable concept for nature.

What does the Qur'an mean by *alam*? Some Qur'anic uses are:

(i) as cosmos or a number of cosmos. This is clear from the following verses, in which the word is used in its plural form:

“Praise be to the Sustainer of the Cosmos” (1:1)

“They said; We believed in the Sustainer of all the Cosmos”(26:47)

“O. Moses, Verily I am the Sustainer of the Worlds” (28:30)

(ii) as earth and skies (heavens). This is well expressed in the following verse:

“And thus, all praise is due to Allah, Sustainer of heavens and Sustainer of the earth: the Sustainer of all the Worlds” (45:36)

(iii) as nation or humanity as a whole. This is pointed out by the following verses:

“Behold, Allah raised Adam, and Noah, and the House of Abraham, and the House of Imran above all mankind” (3:33)

“And (thus, O Prophet) We have sent you as a grace towards all mankind” (21:107)

From all these different uses of the the word of *alam* it follows that the Qur'an defines nature as the whole Cosmos; in other words, nature means the actual totality of whatever exists – organic and inorganic, mankind and other-than-mankind, purely spiritual and material. Whatever is not Allah, is nature or part of nature.

The Qur'anic concept of nature, thus understood in the sense of Cosmos includes many natural orders or systems, only one of which is perceived by us. The Qur'an suggests a numerical multiplicity of nature. Evidence is the use of *alam* in the plural form and the following verses are very significant in this respect.

“Verily, your Sustainer is Allah, who has created the heavens and the earth in six eons, and is established on the throne of His Almightyness. He covers the day with the night in swift pursuit, with the sun and the moon and the stars subservient to His command. Hallowed is Allah, the Sustainer of all the Cosmos” (7:54)

“Allah is He who has created seven heavens, and like them, of the earth. Through all of them flows down from on high, unceasingly, His (creative) will, so that you might come to know that Allah has the power to will anything” (65:12)

This second verse is especially significant, because Allah explicitly says that He has created seven heavens and seven earths.

The Qur'anic concept of nature has its own specific characteristics:

(i) Nature has only a single dimension: Time or *Dahr* (دهر). No doubt nature has been created by Allah in time, and it is His work. Time is the only dimension of nature, there are no other dimensions; because time is created in its turn before nature, and because time is the whole duration of nature. Consequently space is reducible to time, but the latter is not reducible to the former. This is well expressed by the following verses.

“Has there (not) been an endless span of time before man (appeared), a time when he was not yet a thing to be thought of?” (76:1)

In this verse only man is mentioned as part of nature. Here we must add that man, contrary to the rest of nature, has two dimensions: time and spirit of *ruh* (روح). Man is the only being who has *ruh*.

(ii) Nature has been created by a process of creative-evolution' and is still in evolution. The Qur'anic doctrine of creation is creative-evolutionary, because, as many verses explicitly explain, Allah has not created everything at once, but gradually over time. Let us enumerate here some of the verses concerning the subject.

“Your Sustainer, Allah who has created the heavens and the earth in six days (eons) ....” (7:54)

Of course in the light of other verses dealing 'days' and time, we understand these are not the days of our week. We are told that a day in the sight of Allah is like a thousand years of our reckoning (22:47). In other verse of the Qur'an (70:4) the comparison is with 50.000 of our years.

"It is He who brings the process of ceation in the first instance, and then bring it forth anew..." (30:27)

This is proof for natural evolutionary change.

"And (it is He who creates) horses and mules and asses for you to ride, as well for their beauty: and He will yet cerate things of which to-day you have no knowledge" (16:8)

"Limitless is His Glory, it is He who has cerated opposites in whatever the earth produces, and in mens' own selves, and in that of which as yet they have no knowledge" (36:36)

From the last verses, it follows that nature is productive and dynamic.

(iii) Nature has its own laws and with the permission of Allah some creation can be the agent for the manifestation of other ceration. According to the Qur'an, nature and whatever exists in it, has laws general and particular, which are pre-established by Allah according to His knowledge. This is pointed out by the following verses:

"Verily, your Sustainer is Allah, who has created the heavens and the earth in six eons, and is established on the throne of His Almightyness, governing all that exists. There is none that could intercede with Him unless He grants leave thereof..." (10:3)

"...His is all that is in the heavens and all that is on the earth. Who is there that could intercede with Him, unless it be by His leave..." (2:255)

(iv) According to the Qur'an, nature is intelligible. That is to say it should be the subject of human study. Nature is perceivable and observable. Man can know of it, according to his capacity of thinking and reasoning. There are many verses which argue for the intelligibility of nature, and by which Allah urges man to know the secrets of nature. As there are numerous number of references they will not be enumerated here.

Moreover nature is the sign of Allah. Whatever exists in nature is real and represents the proof for the existence of Allah and His presence:

"Behold, in the heavens as well as on earth there are indeed mesages for all who are believers" (45:3)

“Behold, in the creation of the heavens and the earth, and the alternation of night and day, there are indeed signs for men of understanding” (3:190)

(v) According to the Qur'an, nature or universe as a whole is expanding. By a very careful examination of some of Qur'anic verses concerning cosmology and astronomy, it is arguable that cosmos is in a state of systematic expansion. The most important and significant verse in the this respect is this:

“With (our) hands We have built up the sky, in so far as the being expander.” (51:47)

For understanding the Qur'anic concept of nature, the following further studies are suggested

1- As the sayings of our Prophet, peace be on him, are the first and true interpretation of the Qur'an, the concept of nature needs to be explored in different collections of Hadith

2- The concept of time must be studied at length in the Qur'an and in the collections of Hadith. Time is a unique dimension of nature as well as being part of nature

3- The concept of man must be studied both as a natural being and as a being containing within himself divine breath

4- Information on the nature and multiplicity of the cosmos must be drawn from the collections of the Hadith, their main commentaries as well as the books of *tafsir*. The Sahih of al-Bukhari contains some Hadiths concerning the subject. The *tafsirs* of Zamashkari and Fakhr al-Din Razi are particularly important

5- Research into the laws of nature and the relation of nature with Allah and man needs to be defined

6- The creative potential of nature needs to be elaborated. If nature is productive, i.e. if new species are created through a process of 'cosmic evolution', is there any natural balance within nature itself which has been pre-established by Allah?

7- The concept of aya آية must be studied at length

8- Some other Quranic concepts which are related to the concept of Cosmos, such as al-Arsh العرش al-Kursi الكرسي al-Qalam القلم al-Lawh al-Mahfuz اللوح المحفوظ need to be studied very carefully; all



these concepts are, I think, related to the principles and rules of nature pre-established by Allah

### 3. The Qur'anic Concept of Science: علم

After having defined the Qur'anic concept of nature let us now consider the Qur'anic concept of science.

The Qur'an uses many expressions for science. These key expressions, which may be regarded as complementary, are *ilm* علم (science, knowledge); *urf* عرف (knowledge, recognition); *hikma* حكمة (wisdom, true knowledge); *khavar* خبر (knowledge, information, revelation); *hadith* حديث (fact, advent, information); *qissa* قصة (narrative); *hukm* حكم (Judgement); *kitab* كتاب (book). Among these key expressions, *ilm* is the broadest one, which can stand for science. It includes within itself all the other expressions which mean science or knowledge and is used repeatedly in the Qur'an and Hadith:

#### (i) What does the Qur'an mean by science?

The Qur'an points to two kind of science: First, Allah's exclusive knowledge: He is the All-Knowing, of the seen and unseen (*alim-ul-ghaib wash-shahada*); He is the most Knowledgeable علم. Second, the science given by Allah to man and that acquired by man himself. Let us consider this second kind of science in more detail.

Science given by Allah to Man: All the sciences about Allah, nature and himself, that man cannot truly and easily acquire by his faculties have been directly given by Allah to man. The Qur'an defines these sciences as *wahy* وحى (revelation), *hikma* حكمة (wisdom), *hukm* حكم (judgement), *qissa* قصة (narrative).

This is well expressed by the following verses:

"And to Lut too We gave judgement and knowledge..." (21:74)

"Allah has sent to you the Book and the wisdom, and has imparted unto you the knowledge of what you did not know" (4:113)

"We do relate unto you the most beautiful of narratives in that We reveal to you this (portion of the) Qur'an (12:3)"

"... And if you should follow their errant views after all the knowledge that has come unto you, You would surely be among the evildoers" (2:145)

“O my father! To me has come knowledge which has not reached you...” (19:43)

Of course, science given by Allah is absolutely true and exact knowledge. In this sense, science is truth.

**Science Acquired by Man:** It is interesting to notice that although according to the Qur'an it is possible for man to acquire knowledge or science by his own means and through instruments, the Qur'an does not use the word *ilm*, nor the other key expressions in their noun form for describing this type of science. From this we can conclude that man and other creatures cannot have absolute and eternal knowledge of things, except that which Allah has giving them through revelation. The Qur'an itself points this out by the following verses:

“He said: Knowledge rests with Allah alone...” (46:23)

“They said: Glory to you. Of knowledge we have none, save what you have taught us; in truth it is You who are perfect in knowledge and wisdom” (2:32)

“And He taught Adam the names of all things” (2:31)

The last verse is especially important in this respect, because Allah has given Adam nominal (or formal) knowledge of things, not their absolute knowledge.

But from what we have just said, it does not follow that man cannot know or obtain any knowledge or science of nature. It is also the Qur'anic teaching that man has been created with enough capacity to know and to obtain the science of things. He can have knowledge or science, but this knowledge cannot be absolute and eternal truth. This is due to two reasons. Firstly, man's capacity to know and his instruments of knowing are limited; secondly, nature is in a state of change; when a thing changes, accordingly man's science about it must change too. Therefore, man can know things relatively. His science is relative to time.

#### (ii) Man's instruments for the acquisition of science

The Qur'an enumerates the following as man's instruments for the acquisitions of science: *qalb* قلب (heart); *fuad* فؤاد (insight); *albab* الاباب (mind); *hawa* هوى (speculation); *ayn* عين (eye); *basar* بصر (sight); *udhun* اذن (ear); *yad* يد (Hand); *riql* رجل (foot).

It is interesting to notice here that *aql* in its noun form is not mentioned as an instrument for the acquisition of science. As we will see, the Qur'an uses the root AQL in its adverb form as a function of some of the instruments mentioned above; most of the time as a function of the heart (*qalb*).

For understanding the above - mentioned instruments, we need to know their functions and roles in the acquisition of science.

### *Qalb*

The Qur'an refers to the heart frequently in different contexts. Most of the time the Qur'an means by it an instrument or a faculty for acquiring science.

"Verily, in this is a (true) lesson for (one) who has heart or who gives ear; he is the true witness" (50:37)

According to the Qur'an, the heart has at least four main functions in the acquisition of science:

— centre of thinking

"Thus does Allah seal up the hearts of those who think not" (30:59)

— understanding

"Many are the Jinns and men We made for Hell; They have hearts wherewith they understand not....." (7:179)

— learning and reasoning

"Do they not travel on the earth while they have hearts wherewith they can reason and learn" (22:46);

— remembering

"... Nor obey any whose heart we have permitted to neglect the remembrance of us..." (18:28)

From these verses (and many similar to them) it follows that the heart is the means not only of knowing Allah but also of knowing nature.

### *Fuad*

*Fuad* is commonly understood in the sense of heart -it is very difficult to give its equivalent in English or any other language. According to the Quran it is either a particular organ inside the body or a particular function of the heart. In any case, *fuad* is a centre of knowing, and is

the strongest and the most powerful among the instruments for acquisition of science:

“And Allah has brought you forth from your mothers’ wombs knowing nothing – but He has endowed you with hearing and sight and insight...” (16:78)

“It is He who has created for you (the faculties of) hearing and sight and insight...” (23:78)

*Albab*

The Qur’anic expression *albab* is also difficult to translate into English. *Albab* can be mind, intelligence or a subtle organ of knowign inside of the body. It has a function of understanding and reasoning, as the Qur’an points out:

“Verily, in the creation of the heavens and the earth, and in the succession of night and day three are indeed messages for all who are endowed with understanding” (3:190)

“And none will grasp the message except men of understanding” (3:7)

*Hawa*

In the Qur’an, *hawa* is described as a center of unfounded speculation and may be located in the human ego. It is the cause of ignorance and denial of the truth. Whatever man imagines or speculates about without using the other faculties, it is *hawa*.

Of the many Qur’anic verses concerning the definition and function of *hawa*, two are noted below:

“And why should you not eat of that over which Allah’s name has been pronounced, seeing that He has so clearly spelled out to you what He has forbidden you (to eat) unless you are compelled (to do so)? But, behold, (it is precisley in such matters that) many people lead others astray by their own errant speculations, without (having any real) knowledge...” (6:119)

“But if the truth were in accord with their own imagination, the heavens and the earth would surely have fallen into ruin, and all that lives in them (would long ago) have perished...” (23:71)

*The sensory organs*

In the Qur’an some sensory organs, such as the eye, ear and hand are presented as instruments for the acquisition of science. They have

the function of enabling and supporting perception and understanding. As many Qur'anic verses make allusions to this point, only a few are enumerated here.

(iii) Degrees of Certitude of Science

Science acquired by man himself, as we have pointed out, is not always true and does not correspond to the reality of things. Therefore in such science, error and truth are both always possible. From the point of view of certitude, Science can be categorised as:

— Erroneous science

— Science in which certitude is obtained through scientific research (*ilm al-yaqin*)

“Nay, were you to know with certitude knowledge” (102:5)

— Science in which certitude is obtained through insight (*ayn al-yaqin*)

“Again, you should see it with certitude sight” (102:7)

— Science in which certitude is, or will be given as absolute by Allah (*haqq al-yaqin*)

“But verily it is truth of assumed certainty.” (69:51)

From what we have said it follows that Qur'anic concept of science is comprehensive. However science is not the imposition of man's speculation upon nature, but rather it is the discovery of the truth of nature. The subject of science is at once nature, man himself and Allah. The Qur'an also puts forward the principles of an ethics or morality of science.

For further clarifying the Qur'anic concept of science, the following types of studies need to be undertaken:

1- All the key concepts of science in the Qur'an that we have enumerated at the beginning of this chapter must be studied in detail; their different uses must be researched in different collections of Hadith

2- A study on the ethical principles of the Qur'anic concept of Science must be undertaken

3- Some further research is needed to elaborate the degrees of certitude of science in accordance with the ultimate aim of science

4- According to the Qur'anic concept of science, there is an inter-relation between all the branches of science. It is impossible to separate

the domain of physics from that of metaphysics. A deeper study is needed to clarify this point

5- In some Qur'anic verses and many Hadith, dreams or visions (*ruya as-sadiqa*) are mentioned as true science or knowledge. So the concept of the dream must be studied to establish how science (or knowledge) and dreams are related; this could be a very interesting study.

6- The Qur'anic concept of *ghayb* must be studied in connection with science. This will help to determine the limits of human knowledge, and of suitable subjects for scientific investigation.

#### 4. Inter-Relationship of Nature and Science

From Qur'anic study one can conclude that there is a divinely established unity between science and nature. According to the Qur'an nature is nothing but the manifestation of Allah's knowledge. From the linguistic point of view, the Qur'anic expression for science and nature are two derivations of the same verbal root ع ل م

Allah describes whatever exists in nature as His signs, and it is in this sense it is said that He is present in every single thing. To know the truth and reality of a thing is in fact to know Allah's purpose and plan for its existence. Two methods are available for acquiring this knowledge. One is based solely on sense experience. As a method this is relatively easy but it can only be partially true. The second is based on obtaining Allah's illumination. As a method this is very difficult but the outcome is of greater certainty.

Further studies to explore the Qur'anic concept of the inter-relationship between nature and science could consider:

1- The claim of the sufis in epistemology is that it is possible to know nature by illumination from Allah

2- If there is a unity between science and nature and consequently between truth, nature and science, is it possible to argue for the existence of Allah from scientific discoveries?

3- The Qur'an states that Allah taught Adam the names of the things. Is it possible that linguistic studies can help man approach the truth? Or in other words, should the method of science consider linguistic analyses?

### 5. Seeking Method in the Qur'an

In the Qur'an Allah says:

"Today have I perfected your religion for you, and have completed my favour upon you, and have chosen for you Islam as your religion." (5:4).

Islam is an all - encompassing religion, and so it is not strange at all to search for a methodology in the Qur'an. The Qur'an uses several names to describe itself. Two of them are *huda* هودا (guidance) and *furqan* فرتان (criterion). These two names, besides others, stand for methodology, since methodology is by definition the means approaching the truth of things.

The Qur'an is *huda* :

"This book is no doubt guidance for all the conscious (of Allah)" (2:2)

"It was the month of Ramadan in which the Qur'an was bestowed from on high as a guidance unto man and a self-evident proof of that guidance, and as the standard by which to discern the true from the false..." (2:185)

The Qur'an is *furqan* :

"Hallowed is He who sent down the criterion to His servant so that it may be a warning to all the world" (25:1)

The Qur'an can be studied in this respect by two different techniques:

- Linguistical and Structural research
- Factual Research

#### (i) Linguistical and Structural Research

Although the Qur'an is not a book of say physics or chemistry, there are many verses containing scientific data and descriptions concerning the cosmos. We need to clarify these verses, relate them to each other, and analyse them in their context and circumstances of revelation. Of course, this is a difficult task because it needs time to go through the Qur'an as well as our knowledge. Nevertheless, by doing a selective study we can reduce the verses to a small number, and then formulate the Qur'anic methodology.

Some verses of the Qur'an could be understood as generalisations. For example:

"...We made out of water every living thing..." (21:30)

While others can be considered to be specific:

"Verily We created man from (a quintessence) of clay" (23:12)

It is only by collecting all the Qur'anic verses referring to water and clay that a knowledgeable scholar could begin to distinguish the metaphorical concepts and so isolate the scientific truths which may be contained.

#### (ii) Factual Research

In the Qur'an there are many verses which we call *qasas*. In such verses Allah not only gives us true knowledge but by examining the processes of different narrations, we can also determine some insight into method.

To illustrate our point of view, we refer to the following verses:

"Then, when the night overshadowed him (Ibrahim) with its darkness, he beheld a star; he exclaimed; This is my Sustainer! But when it went down, he said: I love not the things that go down."

Then, when he beheld the moon rising, he said: This is my sustainer! But when it went down, he said: Indeed, if any Sustainer guide me not, I will most certainly become one of the people who go astray!

Then, when he beheld the sun rising, he said: This is my sustainer! This one is the greatest (of all)! But when it (too) went down, he exclaimed: O may people! Behold, far be it for me to ascribe divinity, as you do, to aught beside Allah" (6:76)

As we know, in these verses, Allah describes how Ibrahim found Him. It is clear that Ibrahim used external observation and reasoning as a method to impress the truth on people.

Moreover in some instances, methods are directly formulated by Allah Himself:

"Do then they never gaze at the camels how they are created?" (88:17)

Observation and reasoning are a method suggested by the Qur'an.

Further studies for determining whether the Qur'an contains general methodological principles could be two-fold:



1- All the Qur'anic verses in which scientific data are pointed out could be collected classified and analysed

2- The early Muslim scientists, whether working as physicians, biologists or chemists, obtained inspritaion from Qur'anic verses and made extensive references to the Qur'an in their books. Some study is needed to examine whether these verses influenced their methods of work and in what way.

### 6. Elements of a Methodology

According to the Qur'an, the methodology of scientific enquiry is based the question *kayfa* كيف (how?) rather than the questions 'why?' or 'what?'

In the Qur'anic context, 'how?' implies sense experience, perception, observation and intuition. *Kayfa* is used especially with the verbs *nazara* نظر (to look at, to search for, to examine, to perceive) and *ra'a* رأى (to see, to observe, to perceive) and their different derivations.

By 'How?' one can only explain structure and fiunction. Man cannot have full causal knowledge of nature. This is because he has only limited faculties and instruments; moreover the object under observation is in change and evolution and not alway the same. As a matter of fact, there is no constant science of a thing for ever: as the thing changes so its science changes. In Qu'ranic verses concerning nature, *ma* ل which means 'what' and *li* ل which mean 'why' are not mentioned as scientific and methodological enquiries except in some instances concerning the knowledge of matters which are of a metaphysical and religious order:

"The sure Reality. What is the sure Reality? And what will make you perceive what the sure Reality is?" (69:2-3)

"The sudden Calamity. What is the Sudden Calamity? What will make you perceive what the Sudden Calamity is?" (101:1-3)

As Man cannot understand things as they are in reality, Allah provides the explanation by description rather than by direct and causal knowledge.

Therefore according to the Qur'an, the only possible and effective way of obtaining knowledge and science of natural phenomena is to raise the question 'how is this?' not 'what is this?' or 'why is this?'. The Muslim scientist does not need to question things by 'what' and

'why' because these enquiries will lead him to search for the causality and absolute truth of things. The answer to such kinds of questions is his faith in Allah. Allah is the ultimate cause and truth of everything. If the scientist persists, whatever he tries to answer will be purely speculation or personal conviction. All the questions of a causal order cannot be solved but by conviction or ideology. That is the reason for Aristotle's saying: "One has to stop somewhere".

'How?' invites man to use his faculties in various ways in order to acquire science.

(i) Sense experience

First of all, the Qur'an directs man to search for knowledge with his external senses and faculties. Sense experience not only gives man the simple science of things but leads him to think more about them.

"Say: Go all over the earth and search (wondrously) how He originated the creation..." (29:20)

"Have they never looked at birds how they fly in the air of the sky..." (16:79)

"Say: travel through the earth and see how was the end of those who rejected the truth" (6:11)

The Qur'an urges man to think deeply about what ever he sees. This is well expressed by the following verses:

"Do they not travel through the earth being endowed with hearts with which they do reason and with ears with which they do hear...?" (22:46)

"Behold! In the creation of the heavens and the earth; in the alteration of the night and the day; in the sailing of the ships through the ocean for the profit of mankind; in the rain which Allah sends down from the skies, and the life which He gives therewith to the earth; in the beast of all kinds that He scatters through the earth; in the change of the winds and the clouds which they trail like their slaves between the sky and the earth; Indeed there are signs for a people who do reason" (2:164)

"See you not how Allah has created the sevens Heavens one above another" (71:15)

Allah also urges man to perceive and to consider the truth of things:

“Do they not look at the camels, how they are created? And at the sky how it is raised aloft? And at the mountains how firmly they are fixed? And at the earth how it is spread out?” (88:17-20)

“See they not how Allah originates creation, then repeats it....” (29:19)

“Say: have you ever considered (this): if Allah had willed that there should always be night about you until the Day of Resurrection— is there any god other than Allah that could bring you light?” (28:71)

### (ii) Empiricism

The second method that the Qur'an suggests is empiricism. According to the Qur'an, scientific explanations derive from observations and experiences:

“He has created the skies without any pillars that you could see, and has set on the earth mountains standing firm, lest it sway with you, and has scattered through it beasts of all kinds. We send down water from the skies and produce on the earth every kind of noble creature, in pairs”. (31:10)

“Observe the manifestation of Allah's mercy: how He gives life to the earth after its death...” (30:50)

The Qur'an alludes to experience:

“Or (take) the similitude of one who passed by a hamlet, all in ruins to its roofs. He said: Oh! How shall Allah bring it to life after its death? But Allah caused him to die for a hundred years, then raised him up (again). He said: How long did you tarry (thus)? He said: (perhaps) a day or part of a day. He said: Nay, you have tarried thus a hundred years; but look at your food and your drink; they show no signs of age? And look at your donkey, and that we may make of you a sign unto the people, look further at the bones how we bring them together and clothe them with flesh: When this was shown clearly to him, he said: I know that Allah has power over all things” (2:259)

“He who created the seven heavens, one above another: No want of proportion will you see in the creation of the Most Gracious. And turn your vision again, can you see any flaw? Yea, turn your vision again and yet again: Your vision will come back to you dull and discomfited in a state worn out” (67:3-4)

(iii) Illumination

In the Qur'an there is certainly another way of acquiring true knowledge that we can call 'illumination'. In many verses, the Qur'an makes clear that the prophets' visions and experiences were not a delusion but true knowledge. This is because the prophets were fully aware of the spiritual character of their experience: there was no conflict between their mind and their intuitive perceptions. Apart from prophets, the category of people whose hearts are purified could have intuitive perceptions; but this is conveyed to them only by means of symbols and allegories, which sceptics all too readily dismiss as fancies.

It is important to note here that prophets have acquired knowledge or science through this kind of method as this verse amongst others points out:

"The (servant's) heart did not give lie to what he saw" (53:11)

The Qur'anic methodology based on the principle of 'how?' employs the twin approaches of sense experience and empiricism. Abstract speculative reasoning is apparently not favoured: the scientist is encouraged to keep the real world in focus. Given this framework, the following features should be noted: the scientific result is not regarded as a set of special kind of beliefs arising from a particular method, and a method does not determine or condition the scientific result.

The Qur'anic methodology is by nature simple. After giving the necessary instructions about methodology, the Qur'an asks man to work and study, because only work is valuable:

"Without doubt man can have nothing but what he strives for. Without doubt his striving will be seen" (53:39-40)

Further studies in defining the Qur'anic method is suggested in these areas

1- According to the Qur'an, the observer must be open-minded so that he can observe nature, otherwise it is said that he cannot perform this task; thus the Qur'an draws our attention to the psychological and moral conditions of the scientific methodology. Further study is needed to elaborate this issue.

2- A special study is also needed to know whether the method of 'illumination' such as visions and divine inspirations mentioned in the Qur'an and hadiths, and through which direct or indirect knowledge has

been given in different circumstances, can be an objective scientific approach.

3- Research could verify the thesis presented in this chapter through studies of the Qur'an and Hadith

4- A study could clarify the difference between the Qur'anic approach and positivism. While a common feature may be the emphasis on 'how?' one major difference between the Qur'anic method described in this chapter and Positivism is that the latter limits its field of enquiry to material objects.

### 7. How to Build a Scientific Theory

From this study we conclude that Allah has made nature intelligible for man. More than this, man has been actively encouraged to study nature.

According to the Qur'an pursuit of the natural sciences is esteemed because Man needs knowledge of nature for strengthening his faith in Allah and for inviting others to the message of Allah. Science is considered as the sister of faith. Science is, at the end, only to enable man to recognize the existence of Allah and His Power and Greatness. According to the Qur'an, ignorance is the cause of *kufur* :

"And yet some (people) come to attribute to all manner of invisible beings a place side by side with Allah -although He has created them (all) and by their ignorance they have invented for Him sons and daughters. Praise and glory be to Him! (for He is) above what they attribute to Him" (6:100)

"But do not revile those (beings) whom they invoke instead of Allah, lest they revile Allah out of spite; and in ignorance: for goodly indeed have We made their own doings appear unto every community..." (6:108)

Moreover Allah does not allow people without knowledge to speak about Him and His existence:

"And yet, among men there is many a one who argues about Allah without having any knowledge (of Him), and follows every rebellious satanic force" (22:3)

"And yet, among men there is many a one that argues about Allah without having any knowledge (of Him), without any guidance, and without any enlightening Book" (22:8)

“Are you not aware that Allah has made subservient to you all that is in the heavens and all that is on the earth, and has lavished upon you His blessings, both outward and inward? And yet, among men there are many that argue about Allah without having any knowledge (of Him), without any guidance, and without any enlightening Book” (31:20)

Finally Allah does not allow people without knowledge to call on Him, or to make *jihad* or *da'wa* in His name:

“Ye do call upon me to blaspheme against Allah, and to join with Him partners against Allah, and to join with Him partners of whom I have no knowledge...” (40:42)

According to the Qur'an knowledge of nature is based on sense perception, observation and experience. All these methods supply a secure basis upon which scientific theories can be built and scientific knowledge derived. But this is not enough. According to the Qur'an, the scientist must not take his ego for all; his heart and other faculties must be open to the truth. Moreover he must remain attuned to Allah through His revelation. That is to say, his personal and psychological behaviour is also important for the building up a true theory in science.

Thus from what has been said, it follows that the Muslim scientist must know the teachings and precepts of the Qur'an and Hadith on creation, nature and natural phenomena. With an open mind he must search into nature, examining what is happening around him.