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Philosophy of Science from the Qur'anic Perspective

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By science here we mean the branch of knowledge that deals with the material world. The philosophy of science deals with all philosophical problems that arise in connection with science. Among its most important problems are:

1. How does our knowledge of the physical world expand?

2. What are the principles unswaying scientific research?

Here we intend to discuss these two problems from the Qur'anic point of view.

Epistemological problems from the Qur'anic viewpoint

From the Qur'anic point of view, there is a real world independent of our mind:

وَفِي الْأَرْضِ آيَاتٌ لِلْمُوقِنِينَ وَفِي أَنْفُسِكُمْ ۚ أَفَلَا تُبْصِرُونَ

***And in the earth there are signs for those who are sure; and in your own souls (too); will you not then see?* (*51:20-21*)**

الْحَمْدُ لِلَّهِ الَّذِي خَلَقَ السَّمَاوَاتِ وَالْأَرْضَ وَجَعَلَ الظُّلُمَاتِ وَالنُّورَ

All praise is due to Allah, who created the heavens and the earth and made the darkness and the light . . . (6:1).

۞ أَوَلَمْ يَنْظُرُوا فِي مَلَكُوتِ السَّمَاوَاتِ وَالْأَرْضِ وَمَا خَلَقَ اللَّهُ مِنْ شَيْءٍ وَأَنْ عَسَىٰ أَنْ يَكُونَ قَدِ اقْتَرَبَ أَجَلُهُمْ

Do they not consider the spiritual dimension of the heavens and the earth and whatever things Allah has created? (***7:185***)

And we are ordered to study the physical world to get closer to Allah (through signs in nature), and to use the provisions He has made for us:

قُلِ انْظُرُوا مَاذَا فِي السَّمَاوَاتِ وَالْأَرْضِ ۞ وَمَا تُغْنِي الْآيَاتُ وَالنُّذُرُ عَنْ قَوْمٍ لَا يُؤْمِنُونَ

Say: Consider what is it that is in the heavens and the earth; and the signs and warners do not avail a people who would not believe (***10:101***).

اللَّهُ الَّذِي رَفَعَ السَّمَاوَاتِ بِغَيْرِ عَمَدٍ تَرَوْنَهَا ۞ ثُمَّ اسْتَوَىٰ عَلَى الْعَرْشِ ۞ وَسَخَّرَ الشَّمْسَ وَالْقَمَرَ ۞ كُلٌّ يَجْرِي لِأَجَلٍ مُسَمًّى ۞ يُدَبِّرُ الْأَمْرَ يُفَصِّلُ الْآيَاتِ لَعَلَّكُمْ بِلِقَاءِ رَبِّكُمْ تُوقِنُونَ

Allah is He who raised the heavens without any pillars that you see, and He is firm in power and He made the sun and the moon subservient (***to you***)***; each one pursues its course to an appointed time; He regulates the affair, making clear the signs that you may be certain of meeting your Lord*** (***13–2***) .

وَسَخَّرَ لَكُمُ اللَّيْلَ وَالنَّهَارَ وَالشَّمْسَ وَالْقَمَرَ ۞ وَالنُّجُومُ مُسَخَّرَاتٌ بِأَمْرِهِ ۞ إِنَّ فِي ذَٰلِكَ لَآيَاتٍ لِقَوْمٍ يَعْقِلُونَ وَمَا ذَرَأَ لَكُمْ فِي الْأَرْضِ مُخْتَلِفًا أَلْوَانُهُ ۞ إِنَّ فِي ذَٰلِكَ لَآيَةً لِقَوْمٍ يَذَّكَّرُونَ وَهُوَ الَّذِي سَخَّرَ الْبَحْرَ لِتَأْكُلُوا مِنْهُ لَحْمًا طَرِيًّا وَتَسْتَخْرِجُوا مِنْهُ حِلْيَةً تَلْبَسُونَهَا وَتَرَى الْفُلْكَ مَوَاخِرَ فِيهِ وَلِتَبْتَغُوا مِنْ فَضْلِهِ وَلَعَلَّكُمْ تَشْكُرُونَ

And He has made subservient for you the night and the day and the sun and the moon, and the stars are made subservient by His commandment; most surely there are signs in this for a people who ponder . . . and He it is who has made the sea subservient that you may eat fresh flesh from it and bring forth from it ornaments which you wear, and you see the ships clearing through it, and that you might seek of his bounty and that you may give thanks (***16:12–14***).

If the study of nature were not possible, the Qur'an would not recommend us to study the origin and the course of evolution of beings and phenomena. Moreover, there are verses in the Qur'an that explicitly show this point:

۞ سَنُرِيهِمْ آيَاتِنَا فِي الْآفَاقِ وَفِي أَنْفُسِهِمْ حَتَّىٰ يَتَبَيَّنَ لَهُمْ أَنَّهُ الْحَقُّ

We will soon show them Our signs in the universe and in their own souls, so that it will become clear unto them that this (***revelation***) ***is indeed the truth*** (***41:53***).

On the other hand, the Qur'an is a book of guidance for all people and has not neglected anything relevant to the conduct of man's life:

> وَيَوْمَ نَبْعَثُ فِي كُلِّ أُمَّةٍ شَهِيدًا عَلَيْهِمْ مِنْ أَنْفُسِهِمْ ۖ وَجِئْنَا بِكَ شَهِيدًا عَلَىٰ هَٰؤُلَاءِ ۚ وَنَزَّلْنَا عَلَيْكَ الْكِتَابَ تِبْيَانًا لِكُلِّ شَيْءٍ وَهُدًى وَرَحْمَةً وَبُشْرَىٰ لِلْمُسْلِمِينَ

and We have revealed the book to you explaining clearly everything and a guidance and mercy and good news for those who submit (***16:89***).

> مَا فَرَّطْنَا فِي الْكِتَابِ مِنْ شَيْءٍ

We have not neglected anything in the Book . . . (***6:38***).

We therefore expect that through a careful study one should be able to deduce from it the tools and prescription for studying nature.

Tools for the Cognition of Nature

According to the Qur'an, the general tools for the study of nature are our senses and our intellect:

> وَاللَّهُ أَخْرَجَكُمْ مِنْ بُطُونِ أُمَّهَاتِكُمْ لَا تَعْلَمُونَ شَيْئًا وَجَعَلَ لَكُمُ السَّمْعَ وَالْأَبْصَارَ وَالْأَفْئِدَةَ

And God has brought you forth from the wombs of your mothers – you did not know anything – and He gave you the hearing and the sight and the heart (***16:78***).

We learn through observation and experimentation backed by reflection:

> قُلْ سِيرُوا فِي الْأَرْضِ فَانْظُرُوا كَيْفَ بَدَأَ الْخَلْقَ ۚ ثُمَّ اللَّهُ يُنْشِئُ النَّشْأَةَ الْآخِرَةَ

Say: Travel on the earth and see how He made the first creation (***29:20***).

> أَفَلَمْ يَسِيرُوا فِي الْأَرْضِ فَتَكُونَ لَهُمْ قُلُوبٌ يَعْقِلُونَ بِهَا أَوْ آذَانٌ يَسْمَعُونَ بِهَا ۖ فَإِنَّهَا لَا تَعْمَى الْأَبْصَارُ وَلَٰكِنْ تَعْمَى الْقُلُوبُ الَّتِي فِي الصُّدُورِ

Have they not traveled in the land so that they should have hearts with which to understand . . . **(*22:46*).**

The first parts of these verses refer to observation and experimentation and the second part to the use of the faculty of reasoning. Thus, experimental work is an indispensable tool for the understanding of nature, but, contrary to what some schools of thought claim, not all of our information about nature comes directly from sensations. If we confine ourselves to sensations and do not use our intellect, we are no better than animals:

وَلَقَدْ ذَرَأْنَا لِجَهَنَّمَ كَثِيرًا مِنَ الْجِنِّ وَالْإِنْسِ ۖ لَهُمْ قُلُوبٌ لَا يَفْقَهُونَ بِهَا وَلَهُمْ أَعْيُنٌ لَا يُبْصِرُونَ بِهَا وَلَهُمْ آذَانٌ لَا يَسْمَعُونَ بِهَا ۚ أُولَٰئِكَ كَالْأَنْعَامِ بَلْ هُمْ أَضَلُّ ۚ أُولَٰئِكَ هُمُ الْغَافِلُونَ

They have hearts with which they do not understand, and they have eyes with which they do not see, and they have ears with which they do not hear; they are as cattle, nay, they are in worse errors; these are the heedless ones **(*7:179*).**

Furthermore, the Qur'an frequently mentions that the perception of divine signs in nature is only possible for men of intellect and reflection:

إِنَّ فِي خَلْقِ السَّمَاوَاتِ وَالْأَرْضِ وَاخْتِلَافِ اللَّيْلِ وَالنَّهَارِ لَآيَاتٍ لِأُولِي الْأَلْبَابِ الَّذِينَ يَذْكُرُونَ اللَّهَ قِيَامًا وَقُعُودًا وَعَلَىٰ جُنُوبِهِمْ وَيَتَفَكَّرُونَ فِي خَلْقِ السَّمَاوَاتِ وَالْأَرْضِ رَبَّنَا مَا خَلَقْتَ هَٰذَا بَاطِلًا سُبْحَانَكَ فَقِنَا عَذَابَ النَّارِ

Most surely in the creation of the heavens and the earth and the alternation of the night and day there are signs for men who understand. Those who remember Allah, standing and sitting and lying on their sides and reflect on the creation of the heavens and the earth . . . **(*3, 190–191*).**

إِنَّ فِي خَلْقِ السَّمَاوَاتِ وَالْأَرْضِ وَاخْتِلَافِ اللَّيْلِ وَالنَّهَارِ وَالْفُلْكِ الَّتِي تَجْرِي فِي الْبَحْرِ بِمَا يَنْفَعُ النَّاسَ وَمَا أَنْزَلَ اللَّهُ مِنَ السَّمَاءِ مِنْ مَاءٍ فَأَحْيَا بِهِ الْأَرْضَ بَعْدَ مَوْتِهَا وَبَثَّ فِيهَا مِنْ كُلِّ دَابَّةٍ وَتَصْرِيفِ الرِّيَاحِ وَالسَّحَابِ الْمُسَخَّرِ بَيْنَ السَّمَاءِ وَالْأَرْضِ لَآيَاتٍ لِقَوْمٍ يَعْقِلُونَ

Most surely in the creation of the heavens and the earth the alter nation of the night and the day, and the ships that run in the sea with that which profits men, and the water that Allah sends down from the cloud, then gives life with it to the earth after its death and spreads in it all **(*kinds of*)** ***animals, and the changing of the winds and the clouds made subservient between the heaven and the earth, there are signs for a people who understand*** **(*2:164*).**

Also, the Qur'an teaches us that there are many realities in the physical world that we do not perceive through our senses:

فَلَا أُقْسِمُ بِمَا تُبْصِرُونَ وَمَا لَا تُبْصِرُونَ

But nay! I swear by that which you see, and that which you do not see (***69:38–39***).

خَلَقَ السَّمَاوَاتِ بِغَيْرِ عَمَدٍ تَرَوْنَهَا ۖ وَأَلْقَىٰ فِي الْأَرْضِ رَوَاسِيَ أَنْ تَمِيدَ بِكُمْ وَبَثَّ فِيهَا مِنْ كُلِّ دَابَّةٍ

He created the heavens without pillars as you see them . . . (***31:10***).

Finally, the Qur'an condemns those who think that our only sources of information about the physical world come through sense perception:

يَسْأَلُكَ أَهْلُ الْكِتَابِ أَنْ تُنَزِّلَ عَلَيْهِمْ كِتَابًا مِنَ السَّمَاءِ ۚ فَقَدْ سَأَلُوا مُوسَىٰ أَكْبَرَ مِنْ ذَٰلِكَ فَقَالُوا أَرِنَا اللَّهَ جَهْرَةً فَأَخَذَتْهُمُ الصَّاعِقَةُ بِظُلْمِهِمْ

The followers of the Book ask you to bring down to them a book from heaven; so indeed they demanded of Musa a greater thing than that, for they said: Show us Allah manifestly; so the lightning overtook them on account of their injustice . . . (***4:153***).

Unfortunately, the wind of positivism that blew in the early part of this century has affected many Muslim scholars' minds, and there are many Muslim scientists who think that our knowledge of the physical world extends no further than mere description of sensory experiences. Concerning this line of thought, we have the following observations:

We never encounter nature with empty minds, and therefore, there is no such thing as pure experimental data. Our interpretation of experimental data and even our view of the reliability of experimental data depends to some extent upon preconceptions and assumptions that are held by the investigator. Planck explains this point beautifully:

Every measurement first acquires its meaning for physical science through the significance which a theory gives it. Anybody who is familiar with a precision laboratory will agree that even the finest and most direct measurements– such as those of weight and current– have to be corrected again and again before they can be employed for any practical purpose.

It is obvious that these corrections cannot be suggested by the measurement process itself. They must first be discovered through the light which some theory or other throws upon the situation; that is to say, they must arise from any hypothesis

As Einstein has rightfully pointed out, the fundamental concepts and postulates of science cannot be derived from sense experience by any process of induction. Rather they are free inventions of the human mind.

Physics constitutes a logical system of thought which is a state of evolution, whose basis cannot be distilled, as it were, from experience by an inductive method, but can only be arrived at by free invention. The justification (truth content) of the system rests in the verification of the derived propositions by sense experiences.

Whereby the relations of the latter to the former can only be comprehended intuitively. Evolution is proceeding in the direction of increasing simplicity of the logical basis. In order farther to approach this goal, we must resign ourselves to the fact that the logical basis departs more and more from the facts of experience, and that the path of our thought from the fundamental basis to those derived propositions, which correlate with sense experiences, becomes continually harder and longer[1].

The reason for this fact is that a theory can be considered to be a direct result of an experiment if we can show that there can be no alternative ex planation for that experiment; but this we can never claim, and past experience has warned us against this type of mistake.

The agreement between a theory and a set of experimental facts does not necessarily mean that it is a correct one, because, logically speaking, a conclusion can be drawn from different premises. Thus, we can never claim that a theory is a direct result of experimental data. Infinitely many theories could be set up to explain a set of experimental facts.

One has to add other assumptions or bring in other information to single out one of them. When Kepler was studying the data about the relative position of Mars against the background of fixed stars, he tried to infer a "good looking" law from the available data, but he failed.

Then after working on the theory of ellipse in another context, he assumed that the orbit was an ellipse. He checked this assumption against the experimental data and found it to work well. Thus, the assumption of an elliptical orbit for Mars was not a direct result of the observed positions of Mars.

The growth of science is, therefore, due to both experimental work and theoretical speculations.

Many concepts are not derivable from sense experience. For example, the concept of "causality" is not derived from sensory impressions. All that we receive through our senses is that, e.g., B comes regularly after A, that there is a casual relation between A and B is a judgment of our intellect.

Even in the physical sciences, many concepts are not direct by-products of observations and have been introduced by scientists to explain experimental facts. For example, we use the concept of the atom to explain thousands of experimental observations, yet no one has ever observed an atom (even with sense-extending instruments). We know atoms by inference. Similarly, our information about distant regions of space and time is not direct.

The conclusion we want to derive from this discussion is that experimentation alone, without theoretical reasoning, cannot give us significant information about nature. Even though observation and

experimentation are a must for having a thorough picture of the physical world, not all of our knowledge about nature is derived from sensory experiences.

The process of getting a correct picture of the physical world is a lengthy one and can be accomplished only through the interplay of experimental work and theoretical enterprise.

Barriers against Correct Reasoning

As we mentioned, the Qur'an commands us to observe nature and reflect on what we observe. Reflection, in turn, involves using existing information and moving toward fresh knowledge. This intellectual movement, however, can lead to a correct result only if certain principles and rules are observed.

Thus we come to logic, which is the study of the principles of correct reason ing. The use of logical principles alone, however, cannot guarantee correct results, unless we make sure that the premises used in the reasoning are faultless. It is for this reason that the Qur'an has warned us about those things that can prevent our intellect from functioning properly. Here we mention the main factors that prevent a correct cognition of nature:

Lack of faith

According to the Qur'an, knowledge without faith cannot lead one to a correct understanding of nature:

> يَسْأَلُكَ أَهْلُ الْكِتَابِ أَنْ تُنَزِّلَ عَلَيْهِمْ كِتَابًا مِنَ السَّمَاءِ ۚ فَقَدْ سَأَلُوا مُوسَىٰ أَكْبَرَ مِنْ ذَٰلِكَ فَقَالُوا أَرِنَا اللَّهَ جَهْرَةً فَأَخَذَتْهُمُ الصَّاعِقَةُ بِظُلْمِهِمْ

Say: consider what is it that is in the heavens and the earth; and signs and warners do not avail people who would not believe (***10:101***).

The principal role of faith in understanding is to restore man's faculty of intellect to its proper state, .away from devilish inducements and temptations.

Partiality in-judgment

Following one's desires, whether in love or hatred, unjustifiable prejudices, and pomposity are the most important factors that prevent the faculty of intellect from impartiality and sound judgment:

> وَلَنْ تَرْضَىٰ عَنْكَ الْيَهُودُ وَلَا النَّصَارَىٰ حَتَّىٰ تَتَّبِعَ مِلَّتَهُمْ ۗ قُلْ إِنَّ هُدَى اللَّهِ هُوَ الْهُدَىٰ ۗ وَلَئِنِ اتَّبَعْتَ أَهْوَاءَهُمْ بَعْدَ الَّذِي جَاءَكَ مِنَ الْعِلْمِ ۙ مَا لَكَ مِنَ اللَّهِ مِنْ وَلِيٍّ وَلَا نَصِيرٍ

And if you follow their desires after the knowledge that has come to you, you shall have no guardian from Allah, nor any helper (***2:120***).

لَقَدْ جِئْنَاكُمْ بِالْحَقِّ وَلَٰكِنَّ أَكْثَرَكُمْ لِلْحَقِّ كَارِهُونَ

Certainty we have brought you the truth but most of you are adverse to the truth (***43:78***).

فَلَمَّا جَاءَتْهُمْ آيَاتُنَا مُبْصِرَةً قَالُوا هَٰذَا سِحْرٌ مُبِينٌ وَجَحَدُوا بِهَا وَاسْتَيْقَنَتْهَا أَنْفُسُهُمْ ظُلْمًا وَعُلُوًّا ۚ فَانْظُرْ كَيْفَ كَانَ عَاقِبَةُ الْمُفْسِدِينَ

So when Our clear signs came to them, they said: this is clear enchantment, And they denied them unjustly and proudly while their soul had been convinced of them . . . (***27:13–14***).

Blind imitation of ancestors and men of authority

وَقَالُوا رَبَّنَا إِنَّا أَطَعْنَا سَادَتَنَا وَكُبَرَاءَنَا فَأَضَلُّونَا السَّبِيلَا

And they shall say: O our Lord! surely we obeyed our leaders and our great men, so they led us astray from the path (***33:67***).

وَقَالُوا رَبَّنَا إِنَّا أَطَعْنَا سَادَتَنَا وَكُبَرَاءَنَا فَأَضَلُّونَا السَّبِيلَا

Nay, we follow what we found our fathers upon. What! and though their fathers had no sense at all, nor did they follow the right way (***2:170***).

Unreasonable negations and confirmations

One of the main sources of error in judgments is due to the replacement of knowledge by conjecture:

وَمَا لَهُمْ بِهِ مِنْ عِلْمٍ ۚ إِنْ يَتَّبِعُونَ إِلَّا الظَّنَّ ۖ وَإِنَّ الظَّنَّ لَا يُغْنِي مِنَ الْحَقِّ شَيْئًا

And they have no knowledge of it; they do not follow anything but conjecture, and surely conjecture does not avail against the truth at all (***53:28***).

An important principle in scientific research is that one should not con firm or reject anything without a reason:

وَمَا لَهُمْ بِهِ مِنْ عِلْمٍ ۚ إِنْ يَتَّبِعُونَ إِلَّا الظَّنَّ ۖ وَإِنَّ الظَّنَّ لَا يُغْنِي مِنَ الْحَقِّ شَيْئًا

And follow not that of which you have not the knowledge; surely the hearing and the sight and the heart, all of these, shall be questioned about that (***17:36***).

A Priori Principles of Scientific Research

We mentioned that scientific research is a combination of experimental work and intellectual activity. In order to make this endeavor meaningful and guarantee the attainment of correct results one has to assume certain principles prior to any kind of scientific activity.

There have been various views about the number and the interpretation of these principles. Using the Qur'an as your guide, we think that, in addition to the basic principles of logic (e.g., the principle of non-contradiction), the following are the principles that one has to assume prior to any kind of scientific activity.

1. The principle of monotheism (al tawh'id)

From the Qur'anic viewpoint the study of nature should not be for the sake of satisfying one's own curiosity. Rather, it should be for the cognition of the wise Creator and Governor of the universe. All natural beings are sign of the Almighty and any study of them should lead us to Him.

Furthermore, there are many references in the Qur'an to the presence of order, harmony, and purpose in the physical world:

الَّذِي لَهُ مُلْكُ السَّمَاوَاتِ وَالْأَرْضِ وَلَمْ يَتَّخِذْ وَلَدًا وَلَمْ يَكُنْ لَهُ شَرِيكٌ فِي الْمُلْكِ وَخَلَقَ كُلَّ شَيْءٍ فَقَدَّرَهُ تَقْدِيرًا

And Who created everything, then ordained for it a measure (***25:2***).

مَا تَرَىٰ فِي خَلْقِ الرَّحْمَٰنِ مِنْ تَفَاوُتٍ ۖ فَارْجِعِ الْبَصَرَ هَلْ تَرَىٰ مِنْ فُطُورٍ

You see no incongruity in the Creation of the Beneficent, then look again; can you see any disorder? (***67:3***)

{وَمَا خَلَقْنَا السَّمَاوَاتِ وَالْأَرْضَ وَمَا بَيْنَهُمَا لَاعِبِينَ 38}

{مَا خَلَقْنَاهُمَا إِلَّا بِالْحَقِّ وَلَٰكِنَّ أَكْثَرَهُمْ لَا يَعْلَمُونَ 39}

And We did not create the heavens and the earth and what is between them in sport. We did not create them both but with the truth, but most of them do not know (***44:38–39***)

This cosmic order and coordination is attributed to the Creator and Coordinator of the universe:

لَوْ كَانَ فِيهِمَا آلِهَةٌ إِلَّا اللَّهُ لَفَسَدَتَا ۚ فَسُبْحَانَ اللَّهِ رَبِّ الْعَرْشِ عَمَّا يَصِفُونَ

If there had been in them [***in the heavens and the earth***] ***any gods except Allah, they would both have certainly been in state of disorder. . .*** (***21:22***).

صُنْعَ اللَّهِ الَّذِي أَتْقَنَ كُلَّ شَيْءٍ ۚ إِنَّهُ خَبِيرٌ بِمَا تَفْعَلُونَ

. . . The handiwork of Allah Who has made everything thoroughly . . (***27:88***) .

أَفَلَا يَتَدَبَّرُونَ الْقُرْآنَ ۚ وَلَوْ كَانَ مِنْ عِنْدِ غَيْرِ اللَّهِ لَوَجَدُوا فِيهِ اخْتِلَافًا كَثِيرًا

Do they not then meditate on the Qur'an? And if it were from any other than Allah, they would have found in it many a discrepancy (***4:82***).

هُوَ الَّذِي جَعَلَ الشَّمْسَ ضِيَاءً وَالْقَمَرَ نُورًا وَقَدَّرَهُ مَنَازِلَ لِتَعْلَمُوا عَدَدَ السِّنِينَ وَالْحِسَابَ ۚ مَا خَلَقَ اللَّهُ ذَٰلِكَ إِلَّا بِالْحَقِّ ۚ يُفَصِّلُ الْآيَاتِ لِقَوْمٍ يَعْلَمُونَ

It is He Who made the sun a radiance, and the moon a light, and ordained for it mansions, that you might know the number of the years and the reckoning. Allah did not create that save with the truth . . . (***10:5***).

A firm belief in the principle of monotheism causes the research scholar to cast a comprehensive look at nature as a whole rather than while the isolated pieces and enables him to explain the harmony and order present in the physical world.

On the other hand, without a firm belief in the presence of order and coordination in nature, scientific research will not have any universal significance, and, at the most, will have a temporary value only.

There are some scientists who believe in the presence of order and coordination in nature without believing in or paying attention to the principle of the monotheism; but, in our view, without belief in al tawhid , there is no satisfactory explanation for cosmic order.

2. The reality of the external world

As we mentioned earlier, from the Qur'anic standpoint there is a real external world independent of the perceiving subject:

وَاللَّهُ أَخْرَجَكُمْ مِنْ بُطُونِ أُمَّهَاتِكُمْ لَا تَعْلَمُونَ شَيْئًا وَجَعَلَ لَكُمُ السَّمْعَ وَالْأَبْصَارَ وَالْأَفْئِدَةَ ۙ لَعَلَّكُمْ تَشْكُرُونَ

And Allah has brought you forth from the wombs of your mothers-you di not know anything-and He gave you hearing, sight and minds . . . (***16-78***)

الَّذِي جَعَلَ لَكُمُ الْأَرْضَ مَهْدًا وَجَعَلَ لَكُمْ فِيهَا سُبُلًا لَعَلَّكُمْ تَهْتَدُونَ وَالَّذِي نَزَّلَ مِنَ السَّمَاءِ مَاءً بِقَدَرٍ فَأَنْشَرْنَا بِهِ بَلْدَةً مَيْتًا ۚ كَذَٰلِكَ تُخْرَجُونَ وَالَّذِي خَلَقَ الْأَزْوَاجَ كُلَّهَا وَجَعَلَ لَكُمْ مِنَ الْفُلْكِ وَالْأَنْعَامِ مَا تَرْكَبُونَ

He who made the earth a resting place for you, and made in it ways for you that you may go aright . . . and He Who created pairs of all things, and made for you of the ships and the cattle, what you ride on (***43:10-12***).

The belief in an objective world is the basis of all physical and natural sciences, and without it any scientific endeavor would be only a play or idle sport. This belief has always been one of the strongest motivations for scientists' activities. Planck expresses this point beautifully:

"The choicest and most original minds, men like Kepler, Newton, Leibniz, and Faraday, were inspired by the belief in the reality of the external world and in the rule of a higher reason in and beyond it:'

3. Limitation of human knowledge

We learn from the Qur'an:

That human knowledge is limited:

قُلِ الرُّوحُ مِنْ أَمْرِ رَبِّي وَمَا أُوتِيتُمْ مِنَ الْعِلْمِ إِلَّا قَلِيلًا

And you are not given aught of knowledge but a little (***17:85***). ***that there are many things that our sensory organs do not perceive:***

فَلَا أُقْسِمُ بِمَا تُبْصِرُونَ وَمَا لَا تُبْصِرُونَ

I swear by what you see and what you do not see (***69:38-39***) .

اللَّهُ الَّذِي رَفَعَ السَّمَاوَاتِ بِغَيْرِ عَمَدٍ تَرَوْنَهَا ۖ ثُمَّ اسْتَوَىٰ عَلَى الْعَرْشِ

Allah is He Who raised the heavens without any pillars that you see (***13-2***) .

سُبْحَانَ الَّذِي خَلَقَ الْأَزْوَاجَ كُلَّهَا مِمَّا تُنْبِتُ الْأَرْضُ وَمِنْ أَنْفُسِهِمْ وَمِمَّا لَا يَعْلَمُونَ

Glory be to Him Who created pairs of all things, of what the earth grows, and of their kind and of what they do not know (***36-36***).

And that we should believe in the unseen, that is, in the supernatural truth:

ذَٰلِكَ الْكِتَابُ لَا رَيْبَ ۛ فِيهِ ۛ هُدًى لِلْمُتَّقِينَ الَّذِينَ يُؤْمِنُونَ بِالْغَيْبِ وَيُقِيمُونَ الصَّلَاةَ وَمِمَّا رَزَقْنَاهُمْ يُنْفِقُونَ

This Book, there is no doubt in it, is a guide to those who guard (***against evil***)***, those who believe in the unseen and keep up prayer and spend out what We have given them*** (***2:2-3***).

The faith in the limitation of human knowledge and the unseen is an incentive for us not to stop our mind at the sensory stage and never to think that we have discovered everything.

The Principle of Causality

This principle states that every event has a cause. The principle has two important corollaries:

The principle of determinism: any cause has effect, and without a cause has an effect, and without a cause it is impossible to have an effect.

The principle of uniformity of nature: similar causes entail similar effects.

It has been a 'long-time assumption by many scientists of all times that there are certain laws governing our physical universe. The principle of causality is the postulate that gives meaning to the application of any law used to ex plain natural phenomena.

In the Qur'an, we find reference to this principle in several contexts:

There are several verses that speak about unchangeable patterns of Allah in the universe:

وَلَا يَحِيقُ الْمَكْرُ السَّيِّئُ إِلَّا بِأَهْلِهِ ۚ فَهَلْ يَنْظُرُونَ إِلَّا سُنَّتَ الْأَوَّلِينَ ۚ فَلَنْ تَجِدَ لِسُنَّتِ اللَّهِ تَبْدِيلًا ۖ وَلَنْ تَجِدَ لِسُنَّتِ اللَّهِ تَحْوِيلًا

Then should they wait for aught except the way of former people? For you shall not find any

alternation in the Course of Allah (***35:43***).

فَأَقِمْ وَجْهَكَ لِلدِّينِ حَنِيفًا ۚ فِطْرَتَ اللَّهِ الَّتِي فَطَرَ النَّاسَ عَلَيْهَا ۚ لَا تَبْدِيلَ لِخَلْقِ اللَّهِ

The nature made by Allah in which He has made men; there is no altering of Allah's creation (***30:30***).

There are many verses that talk about fixed mechanisms for the occurrence of certain events:

وَلَقَدْ خَلَقْنَا الْإِنْسَانَ مِنْ سُلَالَةٍ مِنْ طِينٍ

And certainly We created man of an extract of clay (***23–12***).

الَّذِي جَعَلَ لَكُمُ الْأَرْضَ فِرَاشًا وَالسَّمَاءَ بِنَاءً وَأَنْزَلَ مِنَ السَّمَاءِ مَاءً فَأَخْرَجَ بِهِ مِنَ الثَّمَرَاتِ رِزْقًا لَكُمْ

And (***Who***) ***sends down rain from the cloud then brings forth with it subsistence for you*** (***2:22***).

Some of the Qur'anic verses explain the intermediary role of some events in the appearance of others:

وَأَرْسَلَ عَلَيْهِمْ طَيْرًا أَبَابِيلَ تَرْمِيهِمْ بِحِجَارَةٍ مِنْ سِجِّيلٍ

And sent down upon them birds in flocks, casting them against stones of baked clay (***105:3–4***).

قَاتِلُوهُمْ يُعَذِّبْهُمُ اللَّهُ بِأَيْدِيكُمْ وَيُخْزِهِمْ وَيَنْصُرْكُمْ

Fight them, Allah will punish them by your hands . . . (***9:14***).

On the other hand, there are some verses in the Qur'an that attribute the creation and direction of the world to Allah:

قُلْ مَنْ رَبُّ السَّمَاوَاتِ وَالْأَرْضِ قُلِ اللَّهُ

Say: Allah is the Creator of all things (***13:16***).

وَالنُّجُومَ مُسَخَّرَاتٍ بِأَمْرِهِ

Surely His is the Creation and Command (***7:54***).

Putting these two sets of verses together, one can conclude that everything is realized by Allah's will, but through special channels. Verses of the following type confirm this interpretation:

وَالْبَلَدُ الطَّيِّبُ يَخْرُجُ نَبَاتُهُ بِإِذْنِ رَبِّهِ ۖ وَالَّذِي خَبُثَ لَا يَخْرُجُ إِلَّا نَكِدًا

And as for the good land, its vegetation springs forth (***abundantly***) ***by the permission of its Lord; and*** (***as for***) ***that which is inferior*** (***its herbage***) ***comes forth but scantly*** (***7:58***).

This verse indicates that although Allah's will is necessary for the growth of the plants, the fertility of the land is important, too. Net every sort of plant, can be raised in every sort of land.

Some well-known Muslim theologians (like Imam Ghazfili and Imam Razi) of the Asharite school rejected necessary causal relations (determinism) in the physical world and said that physical means have no role in the realization of natural phenomena.

The cause of any occurrence is Allah's will, except that it is Allah's habit to create what we call "effect" after what we call "cause;' without any relation between them that necessitates the "effect" to follow the "cause." If Allah does not want it, the so-called effect will not follow the so-called cause.2

The reason these theologians denied determinism is that they thought the assumption of necessary causal relations would negate Allah's unlimited power and leave no room for miracles. This conclusion, however, is not right, because what is commonly called a cause is simply an intermediary or preparing cause, rather than the efficient cause.

The role of intermediary means is to prepare the ground for the creation of everything, but He creates everything through definite intermediary and preparing causes, and these are themselves created by Allah. The need for the presence of intermediaries is not due to any deficiency in the Creator, but is related to deficiencies in the receivers of Allah's effusion.3

After the appearance of quantum theory in physics and the presentation of the principle .of uncertainty by W. Heisenberg in the 1930s, some of the founders of this theory denied the principle of determinism and the principle of uniformity of nature in the atomic realm. In their view all laws of microphysics have a statistical status, referring to averages drawn from numerous similar observations, and admitting exceptions for single observations.

Most physicists, with the exception of some prominent ones like Planck and Einstein, accepted the new theory and its orthodox interpretation, a situation that still exists, although the lapse of time has increased the number of opponents.

Einstein and Planck and other prominent physicists could not accept that laws of probability are

governing the universe. For them the events in nature should ultimately be explained in terms of absolute laws, and a deterministic foundation should underlie the apparent statistical behavior. One uses the laws of probability either because the underlying laws are not precisely known or because of the difficulties in handling large numbers.

In this regard, Einstein made the following comment:

I cannot but confess that I attach only a transitory importance to this interpretation. I still believe in the possibility of a model of reality–that is to say of a theory which represents things themselves and not merely the probability of their occurrence[4].

And in his letter to Max Born of December 1926, Einstein wrote:

Quantum mechanics is certainly imposing. But an inner voice tells me that it is not yet the real thing. The theory says a lot, but does not really bring us any closer to the secret of the 'old one'. I, at any rate, am convinced that He is not playing dice[5].

Unfortunately, in recent years we have come across some Muslim scholars who have revived the forsaken theory of the haris, citing quantum mechanics as a proof of their claims. We refute this kind of outlook on the following grounds:

If we deny the validity of the principle of causality in the atomic and subatomic world, this would mean defacing this principle in relation to the whole world, because causality relates different parts of the world together.

Should the principle of causality tum out to be untrue, there would be no relationships between the premises of an argument and its conclusion, because the premises are the cause of one's accepting the conclusion. Without the principle of causality, nothing should be the conclusion of an argument, and from any set of premises one can derive any conclusion, and there would be no difference between proving something and not proving it.

It is for this reason that even those who refute the principle of causality ae implicitly using this principle, because if they did not believe that their argument would cause a change in our belief, they would not attempt to argue with us[6].

As martyred professor Murtada Mutahhari[7] and martyred Ayatollah Sadr[8] have pointed out, the impossibility of prediction in the atomic domain is not due to lack of determinism, but is a result of our ignorance about the deterministic laws governing atomic phenomena, and this could be either because our present experimental and theoretical knowledge is incomplete or because we cannot measure the effect of the observer on his measurement precisely.

In any event, one should be aware that our failure to discover determinism in the atomic domain does not imply that necessary causal relations do not hold and we do not have any right to claim that we have

discovered all parameters relevant to this domain.

At this point it seems appropriate to quote what Dirac wrote in 1979:

It seems clear that the present quantum mechanics is not in its final form. some further changes will be needed, just about as drastic as the changes which one made in passing from Bohr's or bits to a quantum mechanics. Someday a new relativistic quantum mechanics will be discovered in which we don't have these infinites occurring at all.

It might very well be that the new quantum mechanics will have determinism in the way that Einstein wanted. This determinism will be introduced only at the expense of abandoning some other preconceptions which physicists now hold, and which it is not sensible to try to get at now.

So under the conditions I think it is very likely, or at any rate quite possible, that in the long run Einstein will tum out to be correct, even though for the time being physicists have to accept the Bohr's probability interpretation–especially if they have examinations in front of them9.

In short, by the negation of causality nothing would be a requisite for another, and anything could be derived from anything; so there would be no room for science. Science has to accept the principle of causality with all its corollaries, so that its existence could be meaningful.

1. Albert Einstein, Ideas and Opinions, trans. Sonja Bargman. New York, Crown Publishers (1954), pp. 322–323.
2. Max Planck, The New Science (1959), p. 250.
3. Sadr al–Din Shiriizi, Asfar, vol. 6, p. 371.
4. Ideas and Opinions by Albert Einstein, p. Zl6.
5. Einstein, A Centenary iblume, p. 310.
6. Averroes, Tahafut al–Tahafut (The Incoherence of the Incoherence), trans. S. Van den Bergh, London, Luzac & Co., 1954, pp. 316–319.
7. M. H. Tabatabai, Usul Falsafah. vol. 3, p. 217 (Mutahhari's footnote).
8. M. B. Sadr, Falsafatuna, Dar al.:faaruf Beirut, 1980, pp. 305–309.
9. Some Strangeness in the Proportion, Woolf ed. Addison–Wesley, p. 65.

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