Islamic Philosophy of Science
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Introduction

Science is the systematic study of the behavior of certain phenomena (that is, regularities, uniformities) in the physical universe. Scientific study is based on observation, experiment, measurement, and the formulation of universal laws that *describe* these facts and phenomena in general terms and enable *prediction*.

Science has two aspects: the 'research' aspect and the practical aspect (e.g. cell phones, cars, technology, etc). The process of describing regularities (i.e. things that happen in a particular way) is incomplete & never exhaustive because regularities are not exact and deterministic. There is actually quite a lot of approximation and simplification involved in this process. Some fields that are influenced by this approximate process include life science, and non-linear and linear equations. If an exact equation is desired, then these scientific laws, which are useful for prediction, must be formulated in mathematical terms; this represents the whole business of science. The equations obtained are usually non-linear. These non-linear problems can only be dealt with using powerful computers. The problems being analyzed are typically those regarding small measurements where broad approximations would not work.

The popularity of science stems from its practical uses as well as the way it makes use of the world's regularities to produce technology. The use of science affects virtually all aspects of daily life, hence its practical importance. In other words, the huge popularity of science is due to its practical results, such as the previous technological examples stated previously. Science is about studying regularities in the material world and describing those regularities in order to make predictions and the technology that we use daily possible.

It is important to stress that describing and making use in regards to science is not explaining, but rather using it to make sense of something; description is not to be confused with explanation. Therefore, science is about describing, not explaining. The moment a scientist talks about the meaning behind a law or regularity in nature, and our ability to benefit from it, that is no longer science and he is venturing into the realm of metaphysics and the philosophy of science. Just because someone is a great scientist, it does not mean that he has a deeper insight into the meaning of the laws of the physical world and universe; he may know how to utilize the laws, but that doesn't mean he knows what they signify. So there is science which deals with the description of phenomena, and there is something beyond science that entails explanation and it is known as the philosophy of science.

Philosophy of Science

Science does not answer questions of meaning, questions of agency (like who is doing what for what reason? What is responsible for this regularity?), and we cannot criticize science for not dealing with these questions. They may be important questions but it's not the responsibility of

the field of science to answer these questions. For example, consider the Law of Gravity. I drop my pen and the pen falls. Why did it fall? Because of gravity.

I observe that my pen always falls when I lift it and drop it and my mind does not record any exception to this experience. Then I call the connection or conjunction between performing an action (dropping a pen) and its regularity (fall) the law of gravity. This means that the law of gravity is simply the name we gave to this regularity, to this phenomenon; however, it does not mean that the pen is falling *because of* gravity. In other words the physics we create to *describe* this experience is called 'Gravity' and we cannot later use this physics to *explain* the very same phenomenon. Gravity is the *name* given to the process, not an explanation for it, but in our minds both the name and the explanation for the phenomenon have become one and the same.

Other examples in our world that we can consider are the seasons. Think of spring for instance; what does it refer to? It refers to the season and the physical changes and conditions that accompany the season, i.e., weather, flowers blooming, etc. If in April the weather gets warmer (in the North) and I ask why it got warmer, someone may say because it's Spring. But is that an explanation? Why is it Spring? What is Spring? 'Spring' is the name of the occurrence, not the explanation. Words such as 'Spring' are the names attributed to the occurrence but not the explanation. Therefore the question arises: *Is it logically justified to explain an experience through a causal law that is derived through the same experience?* In the beginning, when scientists started asking these questions, it was unclear what the difference was between description and explanation. For a long time science was thought to be a venture competing with religion in providing answers for life.

Regarding natural laws, 19th century American philosopher Charles Peirce stresses the point that natural laws serve as a *description* of natural events, *not* as *explanations* of these very events: "no law of nature makes a stone fall, or a Leyden jar to discharge, or a steam engine to work."[1]

A law of nature left to itself would be quite analogous to a court without a sheriff. A court in that predicament might probably be able to induce some citizen to act as sheriff; but until it had so provided itself with an officer who, unlike itself, could not discourse authoritatively but who could put forth the strong arm, its law might be the perfection of human reason but would remain mere fireworks, brutum fulmen**.** *Just so, let a law of nature- say the law of gravitation-remain a mere uniformity-a mere formula establishing a relation between terms-and what in the world would induce a stone, which is not a term nor a concept but just a plain thing, to act in conformity to that uniformity?* [2]

In the same way, the law of gravity is just a formula, just a name. It cannot make a stone, for instance, act in accordance to it. In other words, Charles Pierce is saying that a law of nature is not an agent out there that makes things obey such regularities, it is only a description, "a mere formula," coined by an observer in order to express a particular regularity in nature. It is important to note that the notion of law is closely related to issues of agency and also to the affinity of the human mind to perceive natural phenomena and the possibility of finding patterns in nature beyond science (how is it that we are so in tune to what is happening in the world that we can pick up all these regularities?). These issues announce the 'bigness' of science. When it comes to the affinity of the human mind to realize recurrent patterns in the universe, Peirce says that:

> . . . the mind of man is strongly adapted to the comprehension of the world; at least, so far as this goes, that certain conceptions, highly important for such a comprehension, *naturally arise* in the mind; and, without such a tendency, the mind could never have had any development at all.[3]

There would be no science if one could not grasp the regularities.
In our scientific inquiry, we are justified in searching out these regularities and hoping that they will, for the most part, remain stable, but we cannot assume that we have explained how or why such regularities / laws are in effect. We are justified in saying that there are regularities and hoping that these regularities and the so-called universal laws are going to be in the effect in the future so that technology can be made from predictions. There can only be hope, and **not certainty, because science is based on observation and there may be some instances where the same observation may not occur.** So, although scientific law is advanced and deals with exactitude, there is still that portion of hope/faith that is not logically grounded. However, it is not being said that the philosophy of science is not completely separate from science because whatever worldview is held by scientists, different meanings are ascribed to the experiments; some may even refuse to do certain works as it deals with something they don't agree with.
A scientific law states a repeated observation about nature. How do we come to the conclusion that we have a scientific law? Several events occur, (not just to the researcher) that hold to the certain regularity, according to a certain pattern and a generalized statement is formed. The process of generalization from a limited number of observations to form a universal statement or law is called the process of induction, or looking at a certain number of events and saying that it is going to happen all the time. The assumption under the process of induction is that the more observations made about a particular phenomenon the more it will reinforce the law. My certainty in how something happens will increase. This is related to the feeling of providing a logical reason for this way of thinking.
There is only one way for this to be true, and it has nothing to do with the number of observations. We assume a relationship or connection between the object and what occurs, the cause and effect. The **assumption is that there is a necessary connection between the cause and the effect.** One must be able to explain this connection in a logical way, not as something that depends solely on observation but something that necessitates the event. If this is unable to be done, if it is only based on observations, then induction is a problem. In formulating a scientific law, generalizations made through the method of induction are a problem.
The method of induction in science is well known: we observe an event repeated again and again across time and we judge this regularity to be something we can rely on. Each individual observation reinforces our belief in a characteristic of the world that perseveres beyond a specific time and circumstance. On the basis of these laws, I presume that both an observation has been occurring and that it will continue to be observed on other occasions by other people forever. In other words, these universal scientific laws offer some kind of certainty to my individual observations; what I see on each occasion is grounded by scientific rules. In

short, these laws tell me how the world necessarily is, and as a result I trust in this inductive process.

Thus, the basic application of our inductive reasoning is twofold: firstly we think we can describe what we *have* seen by the use of universal laws, and secondly, that we can use these established laws in predicting what we *will* see. There is however a problem with the mechanics of the inductive process. Are we justified in formulating these universal laws simply on the basis of a discrete number of past observations that have been made?

For example, based on the scientific observation of planetary motion, we could suggest that 'the sun will rise every day'. However, just because the sun has risen in the past, it does not mean that it will continue to do so either tomorrow or the next day. So the induction based off the number of occurrences of a particular phenomenon is illogical. There is no guarantee that we will ever see the sun rise again. The sense of faith we have in the scientific laws of planetary motions is based on the supposition that some kind of necessity has caused the sun to rise in the past and will therefore continue to cause the sun to rise in the future. Somehow we assume that whatever causes the sun to rise does so necessarily, all the time, under all circumstances. We assume that the connection between the cause and the effect are necessarily related. To use another common example, everyone in Europe thought that 'All swans are white' was true because every swan that they had ever seen was white. However, when travelers came back from Australia and New Zealand they reported having seen black swans thus providing real life example of how, just because every swan you've ever seen is white, it doesn't mean that it is necessarily true. This observation negated the previous generalizations.This brings us to the issue of causality.

Causality is the relationship between an event (the *cause*) and a second event (the *effect*), where the second event is understood as a consequence of the first. In relation to one another, Induction only has to work sometimes, Causality always has to work. It has little to do with the number of occurrences; it has to work for each cause-effect relationship. A law would not be made from one experiment because somehow we know that causes and effects are not necessarily logically related to each other. The consequence of this model of the world is that empirical knowledge is connected to the causal relations between objects and events. According to this view, the logic of scientific discovery is inductive. In other words, it infers universal laws from particular statements.

These inductive universal statements, it is claimed, constitute knowledge par excellence. From a logical point of view however, it is far from obvious, that universal statements can be inferred from particular ones, no matter how numerous they are. Inductive inferences can only be justified if the causal relation between cause and effect is necessary i.e., a purely logical truth. However, the relation between cause and effect is empirical and can only be established *a posteriori* through observation.

The logic of induction proceeds as follows: First, it conjectures that induction is valid, and then concludes that causation is true. Whereas, from the point of view of logic, it is just the other way around; induction can be justified only by proving that causation is logically valid i.e., that the relation between cause and effect is necessary. Induction is therefore logically not a justified method to attain to universality. As the Australian-British philosopher of science Karl Popper observes, scientific induction is "logically inadmissible,"

scientific “theories are, therefore, never empirically verifiable.”[4] The problem is that any certainty we think we can obtain from an induced scientific law turns out to be of no more use to us in guaranteeing the truth of the world than any individual observation from the point of view of logic.

Can we count on the laws of nature? It depends. We can have faith in them; we can hope that they will continue to hold in the future but there exists no logical certainty. But we cannot prove that they will remain true because we cannot observe something that will occur in the future (the dogma of the experiment).

The British philosopher Bertrand Russell calls the dogma of induction, the “biggest scandal of philosophy.” He provides the example of a farmer and his chicken. The chicken noticed that the farmer came every day to feed it. It predicted that the farmer would continue to bring food every day. According to the principle of induction each feeding event added justification to its prediction. Then one day the farmer came and wrung the chicken’s neck. Russell’s point is that induction cannot justify any conclusions! In other words, just because something is observed to happen over and over again, it in no way necessitates that it will carry on like that forever.

Critical problems with the method of induction have been in discussion long before the more recent debates, and are often connected with the concept of causality. The same issue was also at the center of a heated debate among Muslim philosophers and theologians as early as the 12th century. Those who held the purse-strings (the majority of those involved in the discussion) debated heatedly and it was the minority that was for induction because it has to be necessary, or else what of the laws of science, the laws of nature? This critical problem with the method of induction was also pointed out earlier by the 18th century Scottish philosopher David Hume. Hume stated that when we observe two events to be causally related, say a seed (A) resulting in the growth of a shoot/ tree (B), what we in fact observe is only a contingent conjunction of two events. That is, the causation that we think we perceive is not actually ‘out there in the world’ for us to observe. When we see two events and *judge* them to be causally related, it is merely through a habit of the mind, something we project onto the world. A necessary causal link, as such, is not guaranteed. Hume writes:

> Were any object presented to us, and were we required to pronounce concerning the effect, which will result from it, without consulting past observation; after what manner, I beseech you, must the mind proceed in this operation? It must invent or imagine some event, which it ascribes to the object as its effect; and it is plain that this invention must be entirely arbitrary. The mind can never possibly find the effect in the supposed cause, by the most accurate scrutiny and examination. For the effect is totally different from the cause, and consequently can never be discovered in it.[5]

This means that causal laws of nature are not true logically and there is no concrete evidence that these will continue to hold in the future. If we return to our example of the sun rising every day and the related scientific ‘explanation’ in terms of the causal effects of planetary motions, Hume’s objection takes the following meaning: Whatever scientific explanation I give regarding the observation of regularities in planetary behavior, no number of observations gives me the right to postulate a universal law. There is no built-in necessity with which we can observe that tells us the planets will always move in such a fashion, and that the sun will thus appear to rise

every day. We simply cannot postulate universal laws that tell us the way the world irrefutably is and will always be unless we have some good reason to trust such generalizations. And even if we could trust such universal laws as 'the sun will always rise', it is not clear how many times we would need to see the sun rise in order to justify proposing this law. How many 'repeated observations' will be enough to allow for certainty that something is going to continue to occur, either in everyday life or in the lab? Scientific observation, although detailed and informative, has no claim to being the irrefutable truth of the matter. And if the scientific method is restricted to induction, it seems our claims to operational knowledge are not as certain as we may think they are.

The Solution?

Sir Karl Popper offered a potential solution to this problem by thinking about the way we do science in a new light. Essentially, Popper turned science on its head by claiming that we are looking at science in the wrong way. Instead of looking to science to provide us with theories that are definitely true, Popper said that we should be looking to science to provide us with theories that we have failed to prove false for a very long time. This approach to science is called Falsificationism. Less of a solution and more of a shortcut, it is a tool we're allowed to use in the game of science. He describes the Falsification approach thusly: for the scientific method to be rational, it must make claims to knowledge that is logically sound. That is, science is not about making grand universal laws, but about the examination of individual observations. According to the model of falsification, science is concerned with evaluating and refining. What we commonly think of as scientific claims to knowledge, are only hypotheses that we accept till they are proved wrong.

Fundamentally, Popper accepts that science can never provide us with complete 100% certainty but, he claims, this is not really a problem because that is not actually science's job. Science's purpose is simply to provide us with a theory that is likely to be true based on the fact that we haven't yet managed to prove it wrong. One unfortunate consequence of this, however, is that you can only ever be certain of the things that you have proved wrong. We know, for example, that the world definitely is not flat. The problem with this fact is that, although certain, it is not particularly useful to know that something is definitely false. The practice of induction goes beyond what is strictly logical. This does not mean that it is irrational, but rather that it is non-rational or non-logical. And so, for Popper, the best we can hope for is that a given claim is corroborated at one instance in time and if we presume otherwise, we are begging the question of the uniformity of nature: that what has always been, will (for apparently no good reason) continue to be.

To recapitulate, science does not deal with explanation; this is the realm of metaphysics. How we explain things depends on our beliefs and worldview (which we rationalize later, as Max Weber explains).

Islam and Science

When I attempt to answer questions of agency, causality and universality from an Islamic perspective, then what I am doing may be referred to as the Islamic philosophy of science. In answering these questions from an Islamic perspective, there are hundreds of verses in the

Qur'an talking about the world, about computing, and observing the universe that can be drawn from.

In the case of Islam, the Qur'an does not separate between the physical and the spiritual, or between matter and meaning. They are all on one continuum. Matter is the vehicle conveying meaning like the material of a book for instance, the paper and ink and shapes of the letters etc., all mean something; they convey meaning and there cannot be meaning without the matter. From the Qur'anic perspective that is what nature is about. Everything is seen as a sign or a symbol meaning something pointing to a transcendent reality, i.e. something that transcends the material, transcends what is here. There is an ontological continuity with the world to the very concept of God.

And this connection between the spiritual and the physical, the Divine and the Creator, imparts a certain degree of sanctity to the world of nature. Just as the scripture is sacred, so the world is sacred in the Islamic interpretation. In fact, just as the Qur'an presents the world of nature as a sign, it also calls its own verses *signs*, using the same words. The verse in the Qur'an is talking about natural phenomena; it means both the verse and what the verse relates to in the outside world. This semantic connection is further strengthened through various Qur'anic descriptions. According to the Qur'an, God communicates by 'sending' His *signs.* There is basically no essential difference between linguistic and non-linguistic (phenomenological) signs; both types are equally divine *signs*. All that we usually call natural phenomena, such as rain, wind, the structure of the heaven and the earth, alternation of day and night, the turning about of the winds, etc., all these would be understood, not as simple natural phenomena, but as the many 'signs' or 'symbols' pointing to the Divine intervention in human affairs, as evidences of the Divine Providence, care and wisdom displayed by God for the good of human beings on this earth.[6]

God speaks through words in the scriptures and through actions in the world; both of these are seen as modes of communication. That is why nature is also called the cosmic Qur'an in the Islamic tradition. God speaks through verbal speech and through creative activity. Both of them are signs and one does not exist without the other because the Qur'an always refers to the world out there. God speaks as He creates and in order to understand His verbal speech, one needs to observe the creational activity in the world. The reverse is also true: in order to understand what's going in the world, one needs to listen to the scripture (verbal speech). Like a movie and its script, if the movie is in another language or there is no sound, how are you to understand? That would be the same as looking at nature without scripture. Inversely, if we were to hear the sound of the movie but the screen was blank, that would be like listening to the scripture but not being involved in the world. As nature is viewed as the cosmic Qur'an, the two must be read together. It is viewed less as a book and more as a speech; there's the idea that everything is dynamic and constantly in creation.

The Qur'an has a very clear view of nature and a coherent view of causality. It tells of the causal relationship of science that is assigned to the Divine Attributes. For instance, the difference between seeing an inanimate egg versus seeing a living, flying bird that has come from something apparently lifeless, makes one wonder. Because of the polarity between the two i.e. the cause being very simple yet the outcome is dynamic, the relationship and the connection is seen to exist.

The Qur'anic text mentions the heavens 310 times, the earth 451 times, the process of rain, the clouds and water more than 50 times etc…it talks about seas, trees, vegetation, the formation of the human embryo, etc.

> *Behold, in the heavens as well as on earth there are indeed signs for all who are willing to believe And in your own nature, and in [that of] all the animals which He scatters [over the earth] there are signs for people who are endowed with inner certainty. And in the succession of night and day, and in the means of subsistence which God sends down from the skies, giving life thereby to the earth after it had been lifeless, and in the change of the winds. These signs of God do We convey unto you, setting forth the truth. In what other tiding, if not in God's signs, will they, then, believe?* (45:3-6)
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> *IT IS GOD who has made the sea subservient [to His laws, so that it be of use] to you so that ships might sail through it at His behest, and that you might seek to obtain [what you need] of His bounty, and that you might have cause to be grateful. And He has made subservient to you, [as a gift] from Himself, all that is in the heavens and on earth. In this, behold, there are signs indeed for people who think!* (45:12-13)
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> *Behold! in the creation of the heavens and the earth, and the alternation of night and day,- there are indeed Signs for people of understanding who celebrate the praises of God, standing, sitting, and lying down on their sides, and contemplate the creation in the heavens and the earth, "Our Lord! You have not created this without meaning and purpose! Glory to Thee! …..* (3:190-191)
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> *And are they not aware that We have set up firm mountains on earth, lest it sway with them and [that] We have set up the sky as a canopy well-secured? And [do they fail to see that] it is He who has created the night and the day and the sun and the moon – all of them floating through space!* (21:31-33)
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> *Verily, We have created [every one of] you out of dust, then out of a drop of sperm, then out of a germ-cell, then out of an embryonic lump complete [in itself] and yet incomplete and you can see the earth dry and lifeless – and [suddenly,] when We send down waters upon it, it stirs and swells and puts forth every kind of lovely plant! All this [happens] because God alone is the Ultimate Truth.* (22:5-6)

It also makes ample use of phrases like, "So look at…," "Do they not see…?", "Do they not think…?", calling repeatedly on its audience to look at the world.

> *Say: "Go all over the earth and behold how He originated creation." (29:20)*
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> *Let the human look at his food! And how We pour the water generously. Then we split the soil open. We grow in it grains. Grapes and pasture. Olives and palms. A variety of orchards. Fruits and vegetables. To provide life support for you and your animals.* (80:24-32)
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> *Do they not look at the Camels, how they are made? And at the Sky, how it is raised high? And at the Mountains, how they are fixed firm? And at the Earth, how it is spread out?* (88: 17-20)

There is less interest in ‘why’ but rather in ‘how’. Thus science, as a systematic study of nature that developed in Islamic civilization, could not treat nature and its study as an entity *separate* from the Islamic worldview; this includes the sciences that were inspired by the very worldview of Islam – the concept of time, space, functions (everything is relational). These things all happened in the 12th century; functions like sine, cosine, all have a background to a particular worldview. **The regularities, the laws of nature are actually mirroring the laws of the Divine Names.**

In this Qur’anic view, nature is a dynamic system rather than an inert body. Nature accepts and acts upon Divine Commands, like all else between the heavens and the earth. This view of nature grants it distinct metaphysical qualities. Rather than being self-subsisting, autonomous, or random, nature is described by the Qur’an as a sophisticated system of interconnected, consistent, uniform, and highly active entities, all of which are ontologically dependent on the Creator and exalt Him in their own specific ways. As the Qur’an often repeats “*The seven heavens and the earth and whatever is between them sing the glories of God”*.

This dependence and subservience of nature to God however does not occur haphazardly, since God’s ways and laws are unchanging (Qur’an, 33:62). Actually, t**hat is how the Muslim is supposed to reach belief in the divine i.e., through observing the uniformity of nature, which is a sign to the divine activity.** Thus the entire world of nature operates through immutable laws that can be discovered through the investigation of nature. Since these laws are both uniform and knowable, and since nature points to something higher than itself—indeed, to the Creator Himself—it follows that the study of nature leads to an understanding of God, and is in fact a form of worship.

Historian of science Professor Briffault wrote about the scientific enterprise as it was carried out centuries ago in the Muslim civilization:

> The method of continuous observation was systematically carried out-some observations extending over twelve years- at the observatories of Damascus, Baghdad, and Cairo. So much importance did they attach to accuracy in their records that those of special interest were formally signed on oath in legal form. (Briffault, 143)[7]

He also wrote:

> Not only did the Arabs create those mathematics which were to be the indispensable instrument of scientific analysis, they laid the foundation of those methods of experimental research which in conjunction with mathematical analysis gave birth to modern science (Briffault, 144-145)

Actually the emergence of science within the Islamic civilization is interconnected to the phenomenon of the Qur’an which provides a clear conception of nature, the laws of nature and causality, thus giving a coherent view of the subject of scientific investigation (i.e. nature). Sciences that emerged in Islamic civilization can be shown to have intrinsic links with the Islamic worldview including Islamic rituals such as five daily canonical prayers and the pilgrimage to Mecca.

Many branches of science were directly related to Islamic practices and emerged from a specific view of nature anchored in Islam: astronomy used to determine the distance and direction

toward Makkah (the direction Muslims face for their obligatory prayers five times a day); geography; cartography, and more. At the time, when the earth was generally thought to be flat, Idrisi (12 century) drew it as spherical.
Muslim scientists were concerned more with the infinite than the finite. Time and space were no longer static concepts (Greeks), but dynamic. Since God reveals himself in this world at every moment of existence, and this world is continuously coming into existence, they regarded the universe not as finite, not as being, but as becoming. They expressed this conviction by elevating numbers to the status of functions that imply movement, dynamism, and relational connections (rather than separate, static entities).
The Qur'an continuously states in the clearest terms that nothing at all other than God possesses the attributes of Divinity, and that under whatever name, no cause has attributes like maker, creator, giver of sustenance, bringer down of rain from the skies, and raiser of plants from the earth.

> *Say: "Who is it that sustains you [in life] from the sky and from the earth? Or who is it that has power over hearing and sight? And who is it that brings out the living from the dead and the dead from the living? And who is it that rules and regulates all affairs?" They will soon say, "God." Say, "Will you not then show piety [to Him]?"*[8]

The universe exists in order to make the Creator known. By considering the manner in which beings are created, those who think may find attributes which pertain to their Creator. These divine attributes are known in the Islamic traditions as the Beautiful Names. As such, Muslims are supposed to study the universe in order to get to know their Sustainer through it. Both causes and effects, and particularly their orderly relationships, mirror the Divine Names.
The Qur'an points out the numerous and significant benefits in the effects so that it will be understood that unconscious causes are infinitely distant from intending the effects. It may also be understood that causes are only veils and these wise aims are the work of One Who is All-Knowing, Wise, and Powerful, possessing infinite knowledge, wisdom and power etc. In this way, the Qur'an dismisses causes from owning their effects. A Muslim scholar explains this point with a metaphor: when seen from afar, mountain peaks on the horizon appear to be adjacent to the sky. But as one approaches, it is understood that there is an infinite distance between the earth and the sky. Similarly he says, when seen from afar, that is, when seen superficially without questioning, causes and effects appear to be adjacent. But on drawing close, and scrutinizing the relationship intentionally, it may be realized that there is a great distance between the cause and the effect. That is, it is understood that even an apparently powerful cause such as the sun has not the slightest influence on a most simple effect.
The so-called cause of the effect does not possess the knowledge and will necessary for the occurrence of the effect. Cause and effect occur together but they have no relationship by which they affect each other. In fact their purposeful arrangement is a sign from the Creator that has created them side by side. The Qur'an says that should all causes unite even they would be powerless to create the least significant being, for instance a mosquito.
The general logic of the Qur'an concerning causality is that:

i. Since causes are extremely commonplace and powerless and the effects attributed to them are significant and full of art, this dismisses causes.
ii. And the aims and benefits of effects also discharge ignorant and lifeless causes, and hand them over to an All-Wise Maker.
iii. Also, the adornment and skill on the face of effects indicates a Wise Maker Who wants to make His power known to conscious beings and desires to make Himself loved.[9]
This conception of the world by no means denies the uniformity of the world. It's actually quite the opposite; order is itself a proof of unity. Each relation between cause and effect is itself considered to be a sign pointing to the Maker and ascribing all the rest of creation to Him. The crucial point is that these relations are vertical and directly connected to the Maker. The remarkable ordering of the universe is understood to proceed from God's Wisdom. The rules and ordinances of the creation proceed from the Divine Attributes. The uniformity of sequence of cause and effect is also a sign (*aya*) pointing to God and making Him known with His Names and Attributes.
Given the inherent relationships between God, humanity, and nature it is impossible in Islam to conceive of nature as an independent, self-subsisting entity. Likewise, science—as an organized enterprise that studies and explores the natural world—is conceived as an entity integral to Islam. In fact, the lack of separation of state and religion in Islamic polity is applicable to all other domains, as Muslims believe that Islam is not merely a set of commandments and rituals but a complete way of life, encompassing all domains of knowledge and human activity.
This worldview is based on the principle *Tawhid*, the Oneness of God, a concept that lies at the heart of the Islamic tradition. Oneness or *Tawhid* unifies all realms of being and of knowledge, making them branches of the same tree. Everything is interconnected and stems from One Unique source. It may be difficult for the modern Western mind—accustomed to regarding religion solely as set of personal beliefs—to understand this aspect of Islam.
Meaning of phenomena and regularity is intentional and there is mercy in this. Order is not a given but is a *gift* and sign of care and love. When a baby comes out of the womb, mother's milk is ready. There is always the same arrangement for any baby's life; it is a given. This is where philosophy and science begin to 'touch' one another, and where Islam provides a philosophy to what science observes.

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[1] Online Past Masters text, *The Collected Papers of Charles Sanders Peirce*, (University of Virginia E-text Center), 1.323. (The online texts is drawn from *The Collected Papers of Charles Sanders Peirce*, Vols. I-VI ed. Charles Hartshorne and Paul Weiss (Cambridge, MA: Harvard University Press, 1931-1935), Vols. VII-VIII ed. Arthur W. Burks (same publisher, 1958).
[2] Ibid., 5.48.
[3] Ibid., 6. 417.
[4] Popper, Karl. (1959). *The Logic of Scientific Discovery.* Hutchinson & Co. (Original work published in 1935).
[5] Hume, David. (1772). *An Enquiry Concerning Human Understanding.* Hackett Publishing Co.

[6] Toshihiko Izutsu. God and man in the Koran: semantics of the Koranic Weltanschauung. Keio Institute of Cultural and Linguistics Studies, 1964, 142–143.
[7] Robert Briffault. The Making of Humanity. G. Allen & Unwin Ltd, 1928.
[8] Qur'an, 10:31; see also, 13:16; 29:61; 39:38; 43:9; 15; 87; 12:105-6.

[9] Nursi, The Words, 435-6.