

Islamic Theology and the Philosophy of Science

The Metaphysics of Islamic Monotheism

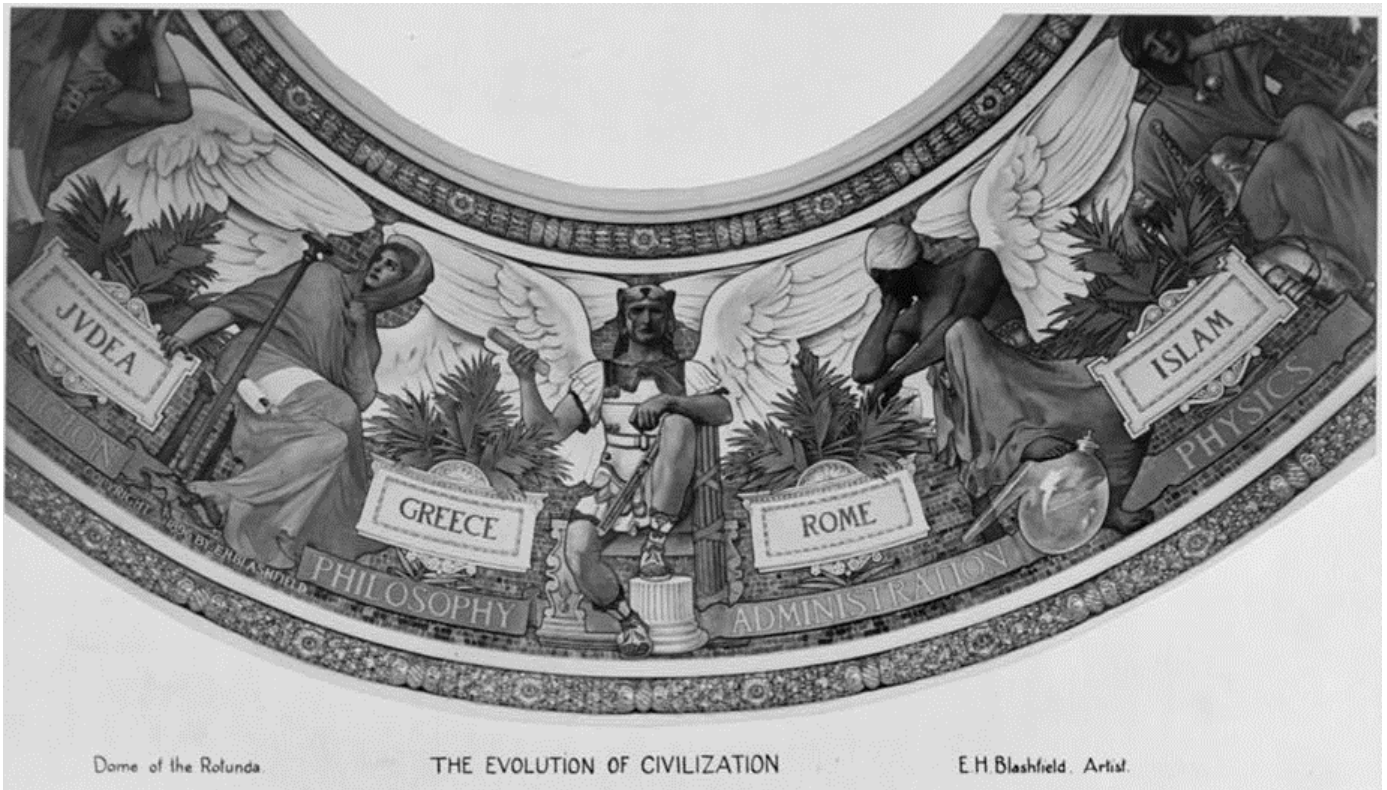
-A.D.

First Draft

You are reading *only* a draft.

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The Evolution of Civilization by E.H. Blashfield (made in 1896). This mural decorates the dome of the main reading room of the Thomas Jefferson Building at the United States Library of Congress in Washington, D.C. It recognizes key societies and their contributions to the development of civilization.

The purpose of this is to relate Islamic theology's relationship with philosophy, specifically the philosophy of science and specifically the orthodox theology, throughout its history and the relationship as it stands today.

While some of this takes on an academic tone, most of it is informal and conversational.

It is intended primarily for a Muslim audience and assumes a rudimentary understanding of basic philosophical ideas, some of which will be covered hastily in the introductory sections. It is written, however, for a non-Muslim audience to be able to follow along. It's also targeted for the layman with regards to knowledge of science (especially physics).

Much of it was assembled from discussions across various online forums and media. I threw it together, polished it up, and added in citations (often not in proper form) wherever I could.

Some parts I obviously gloss over and the explanations suffer for that. I recommend reading the various articles and links I cite for more information.

For those who are unfamiliar with Islamic history in general and its relation to science, then I recommend watching this BBC documentary series before reading this:

[Science and Islam - Episode 1 of 3 - The Language of Science](#)

[Science and Islam - Episode 2 of 3 - The Empire of Reason](#)

[Science and Islam - Episode 3 of 3 - The Power of Doubt](#)

An Important Note: On the definition of **panentheism**: This word has many varying definitions and uses. When used in this work it is used in the sense of:

In panentheism, God is viewed as the eternal animating force behind the universe. ... While pantheism asserts that 'All is God', panentheism goes further to claim that God is greater than the universe. [Wikipedia]

And any theology which espouses as much. In this sense occasionalism (to be explained later) can be seen as a version of panentheism. It is specifically contrasted with pantheism. This, occasionalism and theologies which function similarly, is *only* what is meant by panentheism when the word is used here. It is not meant that God is "in" the universe or vice-versa, or any other such definition of panentheism.

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Theology in Philosophical Terms

What is theology?

What's referred to here is not the traditional definition of theology as its used in the Judeo-Christian context. In Islam, the religion is considered divided into three parts:

- **Iman:** 'Aqeedah / Creed / Doctrine / Beliefs / *Theology* (as I use it here)
- **Islam:** Fiqh / Law (Shariah)
- **Ihsan:** Tasawwuf / Sufism (Spirituality)

This is from the well known *hadith* of the Prophet (صلى الله عليه وسلم) about Jibril (Gabriel عليه السلام).¹

Theology traditionally refers to specific beliefs or doctrine about the nature of God and God's relation to the world. Thus *'aqeedah* encompasses more than just traditional theology. For the most part this discussion does remain restricted to theological issues (and not, for example, issues regarding belief in a Day of Judgment, all the other prophets and revelations, angels, etc).

Which brings me to the purpose of this. How can we relate to a religion on a rational basis? How do you relate to faith via reason? Simply put, the theological component of any religion can be translated into philosophical terms and then be used to compare or relate it to other traditions or philosophies. Theology can also double as a type of philosophy.

Philosophy

There are at least three branches of classical philosophy which generally constitute a worldview. It is into these terms that theology can be translated.

Metaphysics

As per the definition at Wikipedia:

Metaphysics is a branch of philosophy concerned with explaining the

¹<http://www.sunnipath.com/library/Articles/AR00000168.aspx>

fundamental nature of being and the world, although the term is not easily defined. Traditionally, metaphysics attempts to answer two basic questions in the broadest possible terms:

"What is there?"

"What is it like?"

A person who studies metaphysics would be called either a metaphysicist or a metaphysician. The metaphysician attempts to clarify the fundamental notions by which people understand the world, including existence, the definition of object, property, space, time, causality, and possibility.

A central branch of metaphysics is ontology, the investigation into the basic categories of being and how they relate to each other.

Prior to the modern history of science, scientific questions were addressed as a part of metaphysics known as natural philosophy. The term science itself meant "knowledge" of originating from epistemology. The scientific method, however, transformed natural philosophy into an empirical activity deriving from experiment unlike the rest of philosophy. By the end of the 18th century, it had begun to be called "science" to distinguish it from philosophy. Thereafter, metaphysics denoted philosophical enquiry of a non-empirical character into the nature of existence.

The word's etymology itself needs to be taken into account.

The word "metaphysics" derives from the Greek words μετά (metá) ("beyond" or "after") and φυσικά (physiká) ("physics"). It was first used as the title for several of Aristotle's works, because they were usually anthologized after the works on physics in complete editions. The prefix meta- ("beyond") indicates that these works come "after" the chapters on physics. However, Aristotle himself did not call the subject of these books "Metaphysics": he referred to it as "first philosophy." The editor of Aristotle's works, Andronicus of Rhodes, is thought to have placed the books on first philosophy right after another work, Physics, and called them τὰ μετὰ τὰ φυσικὰ βιβλία (ta meta ta physika biblia) or "the books that come after the [books on] physics". This was misread by Latin scholiasts, who thought it meant "the science of what is beyond the physical".

However, once the name was given, the commentators sought to find intrinsic reasons for its appropriateness. For instance, it was understood to mean "the science of the world beyond nature (phusis in Greek)," that is, the science of the immaterial. Again, it was understood to refer to the chronological or pedagogical order among our philosophical studies, so that the "metaphysical

sciences would mean, those that we study after having mastered the sciences that deal with the physical world" (St. Thomas Aquinas, "In Lib, Boeth. de Trin.", V, 1).

There is a widespread use of the term in current popular literature, which replicates this error, i.e. that metaphysical means spiritual non-physical: thus, "metaphysical healing" means healing by means of remedies that are not physical.

I find the best way to relate the idea of metaphysics to actual science, such as physics, is by distinguishing the prefix 'meta-' from 'proto-'. The aforementioned "natural philosophy" could have been said to be a "protophysics". Proto is a prefix that means "first". As Aristotle called metaphysics the "first philosophy", the specific branch of it known as natural philosophy can be said to have been the "first science", in other words a proto-science. Still, the colloquial understanding of metaphysics as "beyond physics" is useful as distinguished from the type of philosophy which would be proto-science or proto-physics; "the first physics" or a precursor to physics, directly leading to the evolution of physics as the science we know it today. Metaphysics itself is not "proto-physics". The latter would constitute one branch or part of the former, but there is an obvious etymological, historical, philosophical, and evolutionary relationship or connection between the ideas of metaphysics and physics.

For that matter, science itself comes from the word for "knowledge". It's been divorced from that general idea into something more specific and all its own in recent times (including how I've used the term thus far), but this isn't necessarily the case as its been understood in Arabic (where *'ilm* means knowledge and science alike). More on that later.

Ontology

Which brings us to the main branch of metaphysics, ontology.

Going to Wikipedia again for the definition:

Ontology (from the Greek *ὄν*, genitive *ὄντος*: "of that which is", and *-λογία*, *-logia*: science, study, theory) is the philosophical study of the nature of being, existence or reality as such, as well as the basic categories of being and their relations. Traditionally listed as a part of the major branch of philosophy known as metaphysics, ontology deals with questions concerning what entities exist or can be said to exist, and how such entities can be grouped, related within a hierarchy, and subdivided according to similarities and differences.

Ontology, in analytic philosophy, concerns the determining of whether some categories of being are fundamental and asks in what sense the items in those categories can be said to "be". It is the inquiry into being in so much as it is being, or into beings insofar as they exist—and not insofar as, for instance, particular facts obtained about them or particular properties related to them.

Some philosophers, notably of the Platonic school, contend that all nouns (including abstract nouns) refer to existent entities. Other philosophers contend that nouns do not always name entities, but that some provide a kind of shorthand for reference to a collection of either objects or events. In this latter view, mind, instead of referring to an entity, refers to a collection of mental events experienced by a person; society refers to a collection of persons with some shared characteristics, and geometry refers to a collection of a specific kind of intellectual activity. Between these poles of realism and nominalism, there are also a variety of other positions; but any ontology must give an account of which words refer to entities, which do not, why, and what categories result. When one applies this process to nouns such as electrons, energy, contract, happiness, space, time, truth, causality, and God, ontology becomes fundamental to many branches of philosophy.

Obviously, feel free to read the full articles on these terms before continuing if you wish.

Epistemology

The last major branch of philosophy relevant here and most important in relation to the philosophy of science is epistemology.

Once again, the definition from Wikipedia:

Epistemology (from Greek ἐπιστήμη (epistēmē), meaning "knowledge, science", and λόγος (logos), meaning "study of") is the branch of philosophy concerned with the nature and scope (limitations) of knowledge. It addresses the questions:

What is knowledge?

How is knowledge acquired?

How do we know what we know?

Much of the debate in this field has focused on analyzing the nature of knowledge and how it relates to connected notions such as truth, belief, and justification. It also deals with the means of production of knowledge, as well as skepticism about different knowledge claims.

The term was introduced into English by the Scottish philosopher James Frederick Ferrier (1808–1864). Many dictionary definitions may give the impression that epistemology is closely related to critical thinking: "the study or a theory of the nature and grounds of knowledge especially with reference to its limits and validity" (Merriam-Webster's Online Dictionary, 11th Edition). But in part because epistemology defines knowledge as being of the truth, unlike critical thinking, epistemology nearly ignores mechanisms, topics, and methods emphasized in critical thinking such as the testing of specific propositions, logical fallacies, bias, and deception found in everyday, real-life conditions and problem solving.

In physics, the concept of epistemology is vital in the modern interpretation of quantum mechanics, and is used by many authors to analyse the works of dominant physicists such as Werner Heisenberg, Max Born and Wolfgang Pauli.

I would highly recommend doing some further reading on this, both at Wikipedia and the Stanford Encyclopedia of Philosophy (plato.stanford.edu), before continuing.

What is required for science?

In other words, what necessary philosophical ingredients are required for the practice or a tradition of science? I don't mean the scientific method but rather what precipitates the scientific method.

The Political / Social / Economic conditions and factors required for science

Let's get the obvious out of the way. For a society to engage in scientific pursuits (whether at all or simply more effectively than another), certain prerequisites exist before we can talk about philosophy. The sort of environment in which science can foster needs to promote critical thinking, have an abundance of need to solve various problems (such as the sort run into by a fast expanding society), not to mention (and most importantly according to some) have economic or financial conditions in its favor. After all, science can be expensive. Political conditions need to also include security (a decent law and order situation) and a lack of political interference at minimum. On the flip side, political patronage of the sciences can be a good thing though the possibility

of disproportionately promoting the evolution of its various fields becomes an issue (so scientific pursuits get concentrated in certain areas and suffer in others).

On the social side, with regards to what I mentioned of critical thinking, perhaps no one put it better than Richard Feynman, the famous 20th century American physicist.

During a commencement address delivered in 1974, Feynman introduced the idea of "cargo cult science" to describe one of the most necessary ingredients for a successful scientific tradition.

The full text of the address can be found online.

A synopsis of the idea from Wikipedia:

The term cargo cult science refers to an analogy between certain fields of research in the sciences, and cargo cults—i.e. the religious practice that has appeared in many traditional tribal societies in the wake of interaction with technologically advanced cultures. The cults focus on obtaining the material wealth (the "cargo") of the advanced culture through magic and religious rituals and practices.

The term cargo cult science was first used by the physicist Richard Feynman during his commencement address at the California Institute of Technology, United States, in 1974, to negatively characterize research in the soft sciences (psychology and psychiatry in particular) - arguing that they have the semblance of being scientific, but are missing "a kind of scientific integrity, a principle of scientific thought that corresponds to a kind of utter honesty".

[...]

He based the phrase on a concept in anthropology, the cargo cult, which describes how some pre-scientific cultures interpreted technologically advanced visitors as religious or supernatural figures who brought boons of cargo. Later, in an effort to call for a second visit the natives would develop and engage in complex religious rituals, mirroring the previously observed behavior of the visitors manipulating their machines but without understanding the true nature of those tasks. Just as cargo cultists create mock airports that fail to produce airplanes, cargo cult scientists conduct flawed research that superficially resembles the scientific method, but which fails to produce scientifically useful results.

Feynman cautioned that to avoid becoming cargo cult scientists, researchers must first of all avoid fooling themselves, be willing to question and doubt

their own theories and their own results, and investigate possible flaws in a theory or an experiment. He recommended that researchers adopt an unusually high level of honesty which is rarely encountered in everyday life, and gives examples from advertising, politics, and behavioral psychology to illustrate the everyday dishonesty which should be unacceptable in science

Because it's so important, I'll reproduce the key passages from the speech here:

In the South Seas there is a cargo cult of people. During the war they saw airplanes land with lots of good materials, and they want the same thing to happen now. So they've arranged to imitate things like runways, to put fires along the sides of the runways, to make a wooden hut for a man to sit in, with two wooden pieces on his head like headphones and bars of bamboo sticking out like antennas--he's the controller--and they wait for the airplanes to land. They're doing everything right. The form is perfect. It looks exactly the way it looked before. But it doesn't work. No airplanes land. So I call these things cargo cult science, because they follow all the apparent precepts and forms of scientific investigation, but they're missing something essential, because the planes don't land.

Now it behooves me, of course, to tell you what they're missing. But it would be just about as difficult to explain to the South Sea Islanders how they have to arrange things so that they get some wealth in their system. It is not something simple like telling them how to improve the shapes of the earphones. But there is one feature I notice that is generally missing in cargo cult science. That is the idea that we all hope you have learned in studying science in school--we never explicitly say what this is, but just hope that you catch on by all the examples of scientific investigation. It is interesting, therefore, to bring it out now and speak of it explicitly. It's a kind of scientific integrity, a principle of scientific thought that corresponds to a kind of utter honesty--a kind of leaning over backwards. For example, if you're doing an experiment, you should report everything that you think might make it invalid--not only what you think is right about it: other causes that could possibly explain your results; and things you thought of that you've eliminated by some other experiment, and how they worked--to make sure the other fellow can tell they have been eliminated.

Details that could throw doubt on your interpretation must be given, if you know them. You must do the best you can--if you know anything at all wrong, or possibly wrong--to explain it. If you

make a theory, for example, and advertise it, or put it out, then you must also put down all the facts that disagree with it, as well as those that agree with it. There is also a more subtle problem. When you have put a lot of ideas together to make an elaborate theory, you want to make sure, when explaining what it fits, that those things it fits are not just the things that gave you the idea for the theory; but that the finished theory makes something else come out right, in addition.

In summary, the idea is to try to give all of the information to help others to judge the value of your contribution; not just the information that leads to judgment in one particular direction or another.

All of the above can be said to constitute what falls under the purview of the field known as "[sociology of scientific knowledge](#)" or "sociology of science".²

A modern field related to this is "STS", or "[science and technology studies](#)".³

Moving on, let's cover some of the more philosophical ingredients for science as we know it today.

Empiricism

Empiricism is a philosophy that can be understood in one of usually two contexts. As just a philosophy emphasizing empiricism which meshes with any worldview (an existing epistemology of any rational flavor) which can sort of be considered methodological empiricism or as an epistemology unto itself (which often finds itself at odds with traditional rationalism). For this section, and whenever I reference empiricism in the context of Islam, the former is what I am referencing by default. This is important to note because "Empiricism" by itself usually carries connotations of a whole epistemology. Islamic epistemology is not Empiricism, but it strongly lends itself to it. During the parts where I discuss philosophers from history, some are obviously Empiricists in this second fashion.

Perhaps nothing better defines science than the idea that evidence must be empirical in nature, that is, empirically tested. Empirical proof is measurable, observable proof. It arises from our experience and is an example of *a posteriori* knowledge.

²http://en.wikipedia.org/wiki/Sociology_of_scientific_knowledge

³http://en.wikipedia.org/wiki/Science_and_technology_studies

The first and most famous proponent of empiricism in our tradition of history was Aristotle. Though he could hardly have been called a proponent per se, he basically just challenged his predecessor, Plato, by establishing the importance of sense perception and *a posteriori* knowledge.

Without empiricism there is no experimentation and there is no science.

How this works with regard to reasoning (especially in the context of scientific research) is, traditionally speaking, induction. There are two main types of reasoning according to classical philosophy. Induction and deduction. Deductive arguments show that a conclusion must follow or necessarily follows from a set of premises or hypotheses. In very broad and general terms, deduction can be said to give *a priori* knowledge. It's a method of reasoning from universals to particulars. Induction, on the other hand, is the reverse. Inductive reasoning is the method of reasoning from particulars to universals. By analyzing certain specific instances (empiricism, *a posteriori* knowledge), conclusions are drawn to universal statements.

With regards to induction versus deduction, it's obvious that deduction gives more definitive statements whereas induction results in "non-definitive" knowledge or statements in which the emphasis is no longer on certainty but rather reliability as determined by extensive testing and corroboration.

Deductive reasoning can be contrasted with inductive reasoning. In cases of inductive reasoning, even though the premises are true and the argument is "valid", it is possible for the conclusion to be false (determined to be false with a counterexample or other means).⁴

For more on this, read up on the "[problem of induction](#)".⁵ The purpose of this is not to explain these concepts where better explanations are already freely available via an internet search, just to mention which concepts one should be familiar with for this discussion.

Skepticism

This seems obvious enough but skepticism as it relates to science ("scientific skepticism") is a little different from general philosophical skepticism (though undoubtedly related as its derived from it). The Wiki definition:

Scientific skepticism or rational skepticism (also spelled scepticism),

⁴http://en.wikipedia.org/wiki/Deductive_reasoning

⁵http://en.wikipedia.org/wiki/Problem_of_induction

sometimes referred to as skeptical inquiry, is a practical, epistemological position in which one questions the veracity of claims lacking empirical evidence or reproducibility.

[...]

Scientific skepticism is different from philosophical skepticism, which questions our ability to claim any knowledge about the nature of the world and how we perceive it. Scientific skepticism primarily uses deductive arguments to evaluate claims which lack a suitable evidential basis.

[...]

Scientific skeptics believe that empirical investigation of reality leads to the truth, and that the scientific method is best suited to this purpose. Considering the rigor of the scientific method, science itself may simply be thought of as an organized form of skepticism. This does not mean that the scientific skeptic is necessarily a scientist who conducts live experiments (though this may be the case), but that the skeptic generally accepts claims that are in his/her view likely to be true based on testable hypotheses and critical thinking.

The general sense of the role skepticism plays could be ascertained from Feynman's speech quoted earlier.

Peer Review

The process of peer review has become an integral part of the modern scientific tradition. The term is sort of self-explanatory, but here's a definition of it from Wikipedia:

Peer review is a generic term for a process of self-regulation by a profession or a process of evaluation involving qualified individuals within the relevant field. Peer review methods are employed to maintain standards, improve performance and provide credibility. In academia the term is often used to denote a prepublication review of academic papers; reviewing an academic paper is often called refereeing.

[...]

The process and content of peer review may vary substantially depending on the profession and the purpose of the review. The key elements Peer and Review define and describe the term.

Peer

1. Someone "of equal standing with another ... especially belonging to the same societal group...or [having the same] status" ⁶

Review

1. A critical inspection or examination
2. A second or repeated viewing of past events, circumstances or facts.⁷

There are various manifestations of this depending on the field. I recommend reading the whole Wikipedia page on [Peer Review](#)⁸ for starters if you're unfamiliar with the idea.

History of Islamic philosophy

No discussion of the history of Islamic philosophy can begin without a discussion of Islamic history, especially as it relates to the history of Islamic theology.

After a brief overview of the history of the development of theology and philosophy in Islam, I'll focus on the actual philosophies themselves.

Shaykh Hamza Yusuf does a great job of this in his translation of *The Creed of Imam Tahawi*. I consider this to be a must read for anyone interested in Islamic theology. Here's a brief excerpt:

With the murder of Uthman, the third caliph, the Muslims split into different camps. The two primary factions were that of Mu'awiyah, the governor of Syria and Palestine, and that of Ali, who was residing in Medina (as Caliph) but who soon relocated to Iraq. Mu'awiyah wanted to bring to justice the murderers of Uthman, while Ali felt that exacting retribution at that point would lead to greater disunity within the Muslim community. Over this issue, the two factions went to war. Who was right, who was wrong, and what were the theological implications of Muslims fighting each other--these became hotly disputed issues among scholars of the day, and the repercussions of those debates still reverberate among Muslims today.

The first secession of the Khawarij occurred during Ali's preparation to march against Mu'awiyah's army. During Ali's rule, there were at least five

⁶Merriam-Webster Dictionary

⁷thefreedictionary.com

⁸http://en.wikipedia.org/wiki/Peer_review

similar uprisings. Nomadic tribesmen unaccustomed to central authority, the Khawarij were rigidly puritanical and had little tolerance for the "refinements" of civil life. They survived by raiding towns and hamlets in Iraq and, because of their exclusivist beliefs, killed other Muslims with self-righteous impunity. Periodically, the Umayyads would dispatch armies to suppress their frequent rebellions and disperse them, but the powerful bonds of religion--their brand of religion--held them together in a way not dissimilar to tribal bonds.

While they were renowned for their orators, demagogues, and poets, the Khawarij lacked trained theologians, scholars, exegetes, and jurists. During the uprising of Ibn Zubayr (d. 656), who attempted to restore just rule in the tradition of the righteous caliphs, the leader of one of the two major groups of Khawarij, Nafi b. al-Azraq (d. 685), formulated a simple creed. It was based on the Qur'anic verse 12:67, "*No decision but God's*", which was interpreted thus: if one did not abide by the decision of God, then one was not a Muslim, since "Muslim" literally means "one in submission [to the decision of God]." Moreover, al-Azraq's sect decreed that those who agreed with their interpretation join their camp, and others be killed. Historian William Montgomery Watt writes, "This puritanical theology became a justification for sheer terrorism, and the Azraqis became noted and feared for their widespread massacres." The Khawarij failed to understand that divine revelation is invariably filtered through the human mind and is thus susceptible to distortion and refraction, and that this fact prevents the arrogation of God's understanding or ruling to any human being other than a prophet. Ibn Qayyim al-Jawziyyah (d.1350) discusses this in his opus, *I'lam al-muwaqqi'in*, in a chapter entitled, "On the inappropriateness of calling a fatwa the 'ruling of God.'"

The second major group of the Khawarij was from Najd in eastern-central Arabia, in a region called the Yamamah. They were known as al-Najadat or al-Najdiyyah. Unlike the Azraqis, they controlled a large area of land and, because of this, judged less stringently those who did not agree with them, simply considering such people hypocrites. They also permitted concealment (*taqiyyah*), which allowed them to hide their views from other Muslims.

In the city of Basra, a small group of Khawarij, who did not accept the radical views of either the Azraqis or the Najdis, founded *kalam*⁹ as a new science. In the midst of all the theological debates and discussions, the prophetic tradition of Islam as understood by the Prophet and his followers continued to be taught. Al-Hasan al-Basri (d. 728), a companion of Ali, held a position

⁹*Kalam* means simply seeking theological principles through philosophical dialectic. It became an entire tradition unto itself, with the *mutakallimun* being distinct from the philosophers (*al-falaasifah*) by definition though some were obviously both. Many of these were from the Mu'tazilah.

concerning free will and predetermination that is only understood within the conceptual space of antinomies, i.e., propositions which, in formal logic, are mutually exclusive without being irrational. He stated that while a man is free, his fate is also determined. This attempt at reconciliation resulted in the adoption of the doctrine of acquisition (*kasb*) that Imam Tahawi (d. 933), Abu al-Hasan al-Ash'ari (d. 936), and Abu Mansur al-Maturidi (d. 944) later codified in their creeds. The problem of free will and determinism led to the development of a highly sophisticated cosmology that included a novel atomic theory that explained the nature of time, change, spirit, causality, and matter.

It should be noted that “Najdi” or “Najdiyyah” is a term sometimes used today to refer to Wahhabis due to the origin of that movement from the same region of Najd. Interestingly enough, some traditional Muslims draw comparisons between them and the original Khawarij. They are also sometimes, very controversially, considered the *Mujassimah* or *Hashawiyyah* (anthropomorphists)¹⁰ of today. Even more interestingly, the Salafi movement later got caught up with them and became influenced by them, though it (Salafism) originally started as a neo-Mu'tazilah movement from Egypt (this was due to the fact that basic philosophy behind most non-Sunni sects is a divergence from orthodox academic/legal tradition, so they had this in common, connected on these common grounds and in turn influenced each other greatly). So now Wahhabism is considered a sub-branch of Salafism. In this sense, there's been a parallel of the ancient relationship described here between the Mu'tazilah and the Khawarij in today's relationship between some who describe themselves as Salafi and Wahhabi. Of course, today Salafism has lost the neo-Mu'tazilah flavor of its founder, Muhammad Abduh, due to the dominance of the “Wahhabi” influence (exacerbated by the Ikhwan, the Muslim Brotherhood, taking refuge in Saudi-Arabia while escaping persecution in Egypt and Syria) so the parallel ends there.

That was a rather brief overview of the history leading up to Hasan al-Basri (رحمة الله عليه). If one thinker or theologian can be said to be the most influential in the development of Islamic philosophy, it was him.

Now I'm going to step back and go back over the history in further detail, this time relying heavily on the work [A Flash through the Formation of the Sects](#)¹¹ by Imam Zahid al-Kawthari (d. 1951, رحمة الله عليه), the deputy Shaykh al-Islam of the Ottoman Empire during its last period.¹² Any uncited quotes in the following section are from this work.

¹⁰“The *Hashaweeyah* or *Crypto-Anthropomorphists* is the name applied to those who resemble the *Mujassimah*, or those who say that *Allah is a body unlike bodies*, in that they say ‘*Allah has hands, eyes, etc. but not like eyes, hands, etc.*’ The difference between the two groups is simply that the first group doesn't say that Allah *is* or *has* a body, although the line of thought between the two is the same.” (*A Flash through the Formation of the Sects*)

¹¹https://docs.google.com/View?docid=dd5np2v8_16dhq82c&revision=published

¹²http://www.masud.co.uk/ISLAM/misc/al_kawthari.htm

After the arbitration which concluded the Battle of Siffin in 657 between the forces of the governor of Iraq and Syria, Mu'awiyah and the fourth Caliph, Ali ibn Abi Talib (رضي الله عنهم), the **Khawarij** emerged and deviated from the group of Ali's (ra) supporters.

The battle at *Siffeen* is one of the great encounters that occurred between the armies of 'Ali ibn Abee Taalib and Mu'aawiyah ibn Abee Sufyaan. During this battle they agreed to make an elect number of men from each side judges in the dispute between the two warring factions. However, a faction of 'Ali's army condemned this motion and considered it to be *kufir*, since Allah said in the Qur'an ((*Judgment belongs only to Allah*)) {*Sooratul-An'aam: 6*}. Thereupon, they dispersed from around him and abandoned him. The appointment of judges in this event is known as the matter of *At-Tahkeem*.

Al-Khawaarij is taken from the verb '*kharaja*', which means '*to depart from or exit.*' This title was given to those who departed from the obedience of Imam 'Ali during the encounter at *Siffeen*. They later evolved into an extreme sect that declared disbelief upon anyone who differed with them and many times would even kill them, while they would show gentleness towards those who have yet to accept Islam. The most outstanding point of their creed was the declaration that anyone who committed a major sin is considered a nonbeliever and would spend eternity in the Hell-fire.

After Ali (ra) was assassinated, a succession dispute arose between Mu'awiyah and Hasan (رضي الله معهم), Ali's (ra) son. Al-Kawthari traces the roots of the the sect that would come to be known as the Mu'tazilah to a group of the Muslims who withdrew from the opposing factions at this time (having been previously affiliated with Ali (ra)) to "cling to their *masajid* and busy themselves with knowledge and devotion."

Mu'tazilah comes from the word '*itizaa*', which means withdrawal.

It is said that the first to withdraw (that is, to adopt the *Mu'tazilee* traits) was Aboo Haashim 'Abdullah and Al-Hasan, the sons of Muhammad ibn Al-Hanafeeyah.[xiii] Then the second (of the two of them) started rebutting the *Khawaarij* regarding the matter of '*Eemaan*' (Faith). He would say, "*Eemaan is word and creed without action.*" So he and his group were named *Murji-ah* (i.e. *Those who Defer*), since they delay/defer action from faith (*eemaan*). And from them a group appeared that used to say, "*A sin has no harm with faith (eeman) {i.e. as long as you have faith}.*" And they are the *Deferrers of heresy (Murji-atul-bid'ah)*.

[xiii] Muhammad ibn Hanafeeyah was the son of 'Ali ibn Abee Taalib from his wife Hanafeeyah who he married upon the death of *Faatimah* – may Allah be pleased with them all.

Imam al-Kawthari describes the origin of both the Khawarij and Mu'tazilah:

And it is evident that scholarship had no place in the formation of the *Khawaarij* and the *Mu'tazilah*. Rather, political apathy gave birth to them, and then the disputants of the religion amongst the *Zanaadiqah*¹³ infiltrated them. Then both of them evolved over scandalous phases while their original course was toward opposing the standing government.

The Mu'tazilah did emerge from elements of the orthodoxy in this manner before they later deviated into their own sect. The **Murji'ah** were advocates of deferred judgment regarding other people's belief, in stark contrast to the Khawarij:¹⁴

...a theological school that was opposed to the Kharijites on questions related to early controversies regarding sin and definitions of what is a true Muslim.

As opposed to the Kharijites, Murjites advocated the idea of deferred judgement of peoples' belief. Murjite doctrine held that only God has the authority to judge who is a true Muslim and who is not, and that Muslims should consider all other Muslims as part of the community. This theology promoted tolerance of Ummayyads and converts to Islam who appeared half-hearted in their obedience.

In another contrast to the Kharijites, who believed that committing a grave sin would render a person non-Muslim, Murjites considered genuine belief in and submission to God to be more important than acts of piety and good works. They believed Muslims committing grave sins would remain Muslim and be eligible for paradise if they remained faithful.

The Murjite opinion on the issue of whether one committing a grave sin remains a believer was adapted with modifications by later theological schools – Maturidi, Ash'ari, and Mu'tazili.

The Murjites departed from the viewpoint of the Sunnis when they declared that no Muslim would enter the hellfire, no matter what his sins. This contradicts the traditional Sunni belief which states that some Muslims will enter the fire of hell temporarily. Therefore the Murjites are classified as "Ahlul Bid'ah" or "People of Innovation" by traditional Sunni Muslims.

Imam al-Kawthari describes them thusly,

The *Murjiah* were a result of a form of scholastic discussion. Their course

¹³ *Zanadiqah* or Heretics

¹⁴ <http://en.wikipedia.org/wiki/Murji'ah>

was toward counteracting the *Khawaarij* in creed, and then views that were far from the religion and scholarship branched out from them that produced laxness in (religious) practice.

The city of Basra in Iraq at this time had become the center for philosophical/theological debate, and Hasan al-Basri (literally, "of Basra") was at the center of it.

It was in this context that Ma'bad al-Juhani, in his attempt to refute the determinist/fatalist doctrine of those he observed justifying sin by the Divine Decree (*al-Qadar*), negated predestination altogether. This negation of al-Qadar earned his group the name **Qadariyyah**. This group would later evolve into the Dualists of Islam.

And once that reached *Ibn 'Umar* he declared his innocence from him. Then *Ma'bad's* group was given the name '*Qadareeyah*.' And his school lasted amongst the unfortunate transmitters of *Basrah* for centuries. Rather, it evolved amongst a faction of them to the extent that they assigned to the Creator what the *Thanaweeyah* [xvi] ascribe to light and to the creation what they ascribe to darkness.[xvii]

[xvi] The *Thanaweeyah* can be translated as '*The Dualists*' or '*Those who ascribe two creators to the universe*', one who creates good and one who creates evil.

[xvii] This means that this faction of the *Qadareeyah* ascribed the creation of good to Allah and the creation of evil to the creation.

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The *Qadareeyah* formed from a scientific discussion. Its course was toward the opposition to laziness and reliance, and considering what it evolved to while being influenced by the views of the Dualists.

And as Hamza Yusuf describes them,

The Dualists (al-qadariyyah) are followers of Ma'bad al-Juhani (d. 80/699). Known for their rejection of divine preordainment of good and evil, Dualists believe that God has no volition concerning human action, once free will has been granted; that is, they believe that God creates human beings and then humans create their own actions. Dualists also believe that while good is from God, evil is not. The Prophet (sallallahu alayhi wasallam) predicted their advent and called them the "Zoroastrians of Islam" due to their rejection that evil was also from God.

In response to the Qadariyyah, a man from Iraq who had moved to Khorasan (Iran and

Central Asia) known as Jahm ibn Safwan made his refutation. In so doing, he fell into fatalism (*al-Jabr*). Thus his followers became known as the **Jabriyyah** (the Fatalists or Determinists).

The Determinists (al-jabriyyah) claim that human beings have no choice in their actions and thus cannot be held responsible for them. According to Sadi al-Ghiryani, for the Determinists, "the state of the human being is like that of a feather in the wind; they believe that a man is on parity with an inanimate creation, and that he has neither volition nor choice..."¹⁵

As al-Kawthari says,

And the *Jabreeyah*, the callers to immobility and the herald of ruin, resulted from an unscientific discussion. Their roots (*'ulooq*) were from the neighborhood of the *Samaneeyah*, the *Baraahimah*

Al-Barahima were simply the Brahmins of Hinduism. Al-Sumaniya (*Samaneeyah*) were those who spread Indian skepticism in Persia.¹⁶ *Encyclopedia Britannica* makes a brief mention of them in the article on Humanism:

Other Indian movements of a broadly humanist orientation in India include the Ajivikas and the Sumaniya, about whom little is now known. The Ajivikas flourished between the 3rd and 6th centuries BCE, and their influence can be traced for more than 1,500 years. Like some early Jains and Buddhists, the Ajivikas went about naked, to indicate their contempt for worldly goods. In the main, they upheld a principle of nonaction, denying that merit accrued from virtuous activity or that demerit from wicked activity. Coupled with this was a thoroughgoing determinism and skepticism regarding karma and any sort of afterlife.

While the Barahima (Brahmins) likely referred to those from a pantheistic tradition of Hinduism, the Sumaniya could have been from an atheistic tradition of Hinduism. The Ajivikas are described by Wikipedia as atheistic and fatalistic. The fatalist doctrines of the Jabriyyah were influenced by these.

Eventually, the followers of Jahm (who himself was of the Jabriyyah) (and some of, it's said, the Murji'ah), not surprisingly, turned to a form of pantheism and became known as the **Jahmiyyah**.

Hamza Yusuf says about them,

¹⁵*The Creed of Imam Tahawi* - Hamza Yusuf

¹⁶E. J. Brill's first Encyclopaedia of Islam 1913-1936 By M. Th. Houtsma (p.48)

The Pantheists (al-jahmiyaah) are followers of Jahm b. Safwan (d. 128/745); known for their negation of divine attributes, Pantheists believe that "God is everything." They also claim that Hell is not eternal and that human beings are forced to act, a doctrine they share with the Determinists (Jabriyyah).

The specific theological doctrines of these sects have not yet been elaborated upon because that will be covered under the Mu'tazilah, who took ideas from all of them. Those who were strongly influenced by the Jahmiyyah included those reputed to be the atheists (in line with the heritage of the influence from the Indian skeptics) and "freethinkers" of the era, such as Abu Bakr Muhammad ibn Zakariya al-Razi (Rhazes), Ibn al-Rawandi, and Al-Ma'arri. Though their definite attribution to this sect or the other is beyond the purpose of this short document, these are how they are popularly attributed. I am only pointing out here that they displayed the obvious signs of influence from Indian philosophy/theology.

Returning to Hasan al-Basri, we come to the emergence of the anthropomorphists, the **Hashawiyyah** and their divisions, the **Mujassimah**, and the **Mushabbihah**.

Hasan Al-Basaree was amongst the most brilliant of the Successors (*Taabi'een*)¹⁷, and of those who persisted for years disseminating knowledge in *Basrah* while the noblest people of knowledge would attend his assembly. One day some poorly trained narrators attended his assembly. When they made some problematic statements he said, "*Move these over to the hashaa of the assembly.*" That is, "*the side of it.*" So they were named the '*Hashaweeyah.*' And from them came the different divisions of the *Mujassimah* [xviii] and the *Mushabbihah*. [xix]

[xviii] The name 'Mujassimah' means *those who consider Allah to be a body*.

[xix] The name 'Mushabbihah' means *those who give Allah a likeness*.

Al-Kawthari goes on to describe them:

The *Hashaweeyah*, ignorance and stagnation made them fall into adopting pre-Islamic views that they inherited from sects they belonged to prior to Islam. And the distortions of the Dualists, the People of the Book, and the Sabians were circulated among them.

They possess asceticism by which they dupe the masses, and ignorant remarks that no sane person could imagine. They are stern in disposition, harsh and rude. They await opportunities to create disturbances, while no view of theirs is manifest unless it is a time of weakness for Islam. And

¹⁷The *Tabi'een* were the Contemporaries of the Companions (*Sahaba*) of the Prophet (pbuh)

the matter of unbelief gets out of hand whenever their view is manifested, likewise, in all phases of history. Their opposition is directed against logic, the theoretical sciences, and every existing sect.

It was at this time that Wasil ibn 'Ata, who had learned *'itizaa'* from the aforementioned Abu Hashim (*Aboo Haashim*) and who had been attending the assemblies of Hasan al-Basri made his claim that a flagrant sinner (*fasiq*) cannot be called a believer or a disbeliever. While it seemed to try and reconcile the views of the orthodoxy and the Khawarij, in actuality it conformed to the essence of the Khawarij view since the whole disputation was in regards to the status of believers and on this matter he adopted the stance of the Khawarij (in that he believed the *fasiq* would spend eternity in Hell, as a disbeliever would). Hasan al-Basri had Wasil removed from the assembly. Wasil then began to spread what became the **Mu'tazilah** doctrine (the Five Principles¹⁸).

The major controversial doctrine of the Mu'tazilah was that of the "createdness" of the Qur'an. The orthodoxy clung to the belief that the Qur'an was the uncreated Word of Allah, but our uttering, recitation, and writing of it are created.

The first to espouse this belief was Al-Ja'd bin Dirham who taught it to Jahm. They also negated the eternal nature (everlastingness or *nafyul-khulood*) of Hell.

It should also be pointed out that the vast majority of the philosophers (*al-falasifah*) of the Mu'tazilah had adopted the metaphysics of Plato combined with Aristotle (Neoplatonism) and the epistemology of Aristotle (with some obvious mixing, they reconciled the two philosophers' views). Aristotle was favored for epistemology for his advocating the role of empiricism and *a posteriori* knowledge, in conformity with Islamic theology. The influence of the Greeks shall be discussed later, but this much should be known. They established their doctrines of the negation of Allah's Attributes through a version of Plato's idea of Forms. For more, see Wikipedia, Britannica, or the Stanford Encyclopedia of Philosophy on Plato and Neoplatonism. They carried on their debates using Greek rhetoric and logic. So the heretics (*Zanadiqah*) varied in theology from the pantheism of the Jahmiyyah (whether outright in the style of Brahmins or manifested through Plato's doctrines) to the Aristotelian deism of the Mu'tazilah to atheism and whatever came inbetween. What fueled the theological debate was the political, military, and scientific successes of the Muslims, the latter including Muslim scientists of all theological backgrounds, that were occurring at this time and which brought them into contact with varying philosophies and theologies from around the world. The impact of scientific advancements was why attention settled onto these few worldviews (rather than, say, Christian theology), but this is a subject that will be discussed later. It is for this reason the Mu'tazilah are often called the "Rationalists", in that they followed Greek rationalism.

Hamza Yusuf describes them:

¹⁸For more information: <http://en.wikipedia.org/wiki/Mu'tazili#Tenets>

The Rationalists (al-muztazilah) are a sect that formed when Wasil b. Ata left the study circle of his teacher, al-Hasan al-Basri, and formed his own group. Rationalists are primarily a theological school (though they also had juristic points as well as a political philosophy). Though not a well-organized group of scholars, the Rationalists did introduce systematic theology to the Muslim community, which forced the Sunni scholars to produce refutations that invariably clarified their own positions within a Sunni framework of theology. The Rationalists presented the greatest doctrinal challenge to the early Muslim community; ironically, Rationalist thought migrated to Europe in the twelfth and thirteenth centuries and heavily influenced Catholic thought. Muslims abandoned Rationalism for a middle position between revealed truths that present themselves as supra-rational in many instances and natural theology that demands reasoned thought as a basis for belief and its defense.

Some of the Rationalists' beliefs which differ from the Sunnis' are as follows: the Rationalists interpret the attributes of God figuratively; they say the Qur'an is created; they deny the Beatific Vision; they reject God's volition concerning acts of "evil"; they believe God must punish the sinners and reward the righteous; they declare that a Muslim who has committed a grave sin and who has not yet repented is neither a believer nor a disbeliever but is in between - a reprobate or a malefactor (while the Sunnis say that such a person is a believer but in the Providence of God [mashi at Allah]: if God chooses, He pardons him, and if not, He punishes him); and they assert that it is the duty of every Muslim to ensure the good and prevent the unacceptable (without the conditions that Sunnis stipulate). A revival of Rationalist thought occurred in the late nineteenth century that still impacts modern Muslim discourse. It was started largely in Egypt by a group of Azhari scholars¹⁹ confronting the Enlightenment and Europe's encroaching power and influence on Muslim lands.

At first, it was Jahm and his followers and then the Mu'tazilah who were refuting the views of the anthropomorphists that the Creator and the creation shared attributes not just in name (i.e, Knowledge, Will, etc) but in meaning (resulting in anthropomorphism). In so doing, Jahm negated the Attributes of Allah altogether. This is contrast to the orthodox view that the attributes are only shared in name, but not in meaning. The example used by al-Kawthari is that of knowledge. Both Creator and creation are described with it, but the Creator's is ever-present (*hudooree*) and the creation's knowledge is acquired (*husoollee*).

Despite his movement becoming known for its pantheism, Jahm was himself not a

¹⁹He refers here to the "neo-Mu'tazilah" I mentioned earlier, led by Muhammad Abduh, founder of Salafism.

pantheist. Imam al-Kawthari mentions that much of what's been ascribed to Jahm was done insultingly and most of these came about as other scholars analyzed his doctrines and concluded they naturally suggested this or that view. This then spread until people actually picked up pantheism or other views from him that he himself never overtly suggested.

And many times views are attributed to sects that aren't found in their books to either give birth to them (*tauleedan*), resulting from what their view necessitates (*ilzaaman*), or due to being transmitted from the books of those who are unreliable amongst the rivals

During this time, the *fuqaha* (jurists, specialists in *fiqh* or Islamic law) and the orthodoxy (followers of the *Sunnah*), stayed out of these intense debates.

Imam al-Kawthari describes the Mu'tazilah as doing a service to the *Ummah* (community of believers) by refuting the various philosophical/theological attacks from atheists, Persian Dualists, etc.

So once a bit of laxity started to befall the (military) conquests, people found more leisure for preoccupation with those (different) views scattered about, and the passion to become absorbed in them overwhelmed their thoughts.

So the likes of *Ibn Al-Muqaffa'*, *Hammaad 'Ajr*, *Yahyaa ibn Ziyaad*, *Mutee' ibn Iyaas*, and *'Abdul-Kareem ibn Abeel-'Aujaa* started a continued striving to spread atheism amongst the Muslims, and to translate the books of the Atheists and the Persian Dualists until their matter got out of control.

Then *Al-Mahdee* [an Abbasid Caliph] ordered the scholars of polemics from the Theologians (*al-mutakallimoon*) to compose the books related to '*The rebuttal of the Atheists.*' So they established the proofs, removed the doubts, clarified the truth, and did a service to the religion.

He goes on to describe how the unfortunate consequence of their engagements and debates was becoming afflicted with the heresies of those they were debating (not necessarily in the doctrines themselves, but in their mentality or mode of thought).

The *Mu'tazilah* are the opposite of the *Hashaweeyah* in a straight line. Scientific study produced them. The gluttony of their minds steered them to attempt to reach the farthest limit of every thing. And their original hostility was directed against stagnation, and their plan was to repel the views entering Islam from the outside with cogent proofs and hushing rational evidences.

They have honorable positions with reference to the Islamic defense against

the existentialist materialists (*Dahreeyeen*), the deniers of prophecy, the Dualists, the Christians, the Jews, the *Sabians*, and the different factions of Agnostics (*Al-Malaahidah*).

And you see *Adh-Dhahabee* mentioning a biographical sketch about *Al-Jaahiz* in *Siyar An-Nubalaa* when he mentions his book about Prophecy, just as we haven't seen any book that comes close to '*Tathbeetu Dalaail An-Nuboowah*' of *Al-Qaadee 'Abdul-Jabbaar* in argumentative strength and good wording with reference to the repelling the doubts of those who spread doubt.

So the complete abandonment of their books isn't good to do. For how many are the benefits that still exist in their worn out garments that haven't been stricken with calamity despite time's returning charge over them! And how much did *Al-Ustaadh Al-Imam* find in them what by which he could repel the disputants of the time, while he did not shrink back from taking from them without diminishing their right; except that due to the greatness of their preoccupation with debating the disputants a number of views were transmitted to their minds by which they went far from correctness and became immersed in heresies of which the disciples (of the Sunnah) refuted!

Al-Khattaabee, the author of '*Ma'aalimus-Sunnah*,' said, "*The Mu'tazilah were in the initial phase upon the opposite of these fancies. But some of them innovated them during the latter phase.*"

Several classes of non-believers or heretics are mentioned. The *Malahidah* (plural of *Mulhid*), translated above as Agnostics, were general atheists (or "agnostic atheists"). The *Dahriyyah* (*Dahreeyeen*) were a specific type of atheist who followed a metaphysical doctrine of materialism and therefore believed in the eternity of time and ascribed creation to time. In other words, they believed creation happened by itself over time (not unlike the modern ideas of evolution when used by atheists to refute Creationism (i.e, evolution as it is used in atheistic philosophy, not the scientific theory) or the idea prevalent among some atheists today that the universe spontaneously created itself). The term used, "existentialism", signifies the link between this type of atheism and its pantheist roots (I will discuss these philosophies later). The *Dahriyyah* were Determinists like the *Jabriyyah* (and metaphysical Materialism logically lends itself to refuting the idea of Free Will) which, as was mentioned earlier, was still Islamic monotheism but evolved into the Pantheistic Determinism of the *Jahmiyyah*. Though the *Dahriyyah* were atheists in that they either renounced Islam and all religions altogether or followed a sect deemed heretical (as some pantheists did who were then accused of atheism), but living in an Islamic society, they mostly upheld the basics of the Islamic way of life and lived/worked within the framework of the Islamic state. It's not unlike how in the United States today there are atheists and Christians and other groups of wildly varying beliefs living under one culture and working for one state. Philosophically speaking, they were at the time lumped in with pantheistic heretics. The *Dahriyyah* also

existed among the people of pre-Islamic Arabia, as their view is described in the poetry of the era in which the Arabs attributed creation to Time or Fate.²⁰

The Mu'tazilah, after engaging in extensive debates and soundly defeating the philosophies of these groups, eventually became heretical themselves, particularly when it came to the doctrine of the createdness of the Qur'an. The orthodoxy observed that this was due to the Mu'tazilah's heavy reliance on Reason over Revelation, keeping in line with their Greek rationalist roots. This meant when they could not reason past a theological problem, they wound up essentially rewriting theology.

The Mu'tazilah came into conflict with the orthodoxy when Al-Mamun, the son of the Abbasid Caliph Harun al-Rashid who usurped power from his brother, ascended to the Caliphate. He was a Mu'tazilite and instituted the *mihna*, which was an Inquisition to spread Mu'tazilite views by coercion (via threat of imprisonment and torture). People were forced to verbally attest to the createdness of the Qur'an and the negation of Allah's Attributes (justified by painting the orthodox view as anthropomorphist, since this view arose, as I mention earlier, out of a refutation of the Hashawiyyah... so all affirmation of Allah's Attributes was lumped in with the Hashawiyyah).

The Mu'tazilah controlled the Caliphate during the next two rulers as well. It was during this time that the famous Sunni scholar, Ahmad ibn Hanbal (رحمة الله عليه) (one of the four Sunni Imams of *fiqh*) was imprisoned for 15 years for refusing to bow to the inquisition of the Mu'tazilites.

He resisted on the basis that he found nothing of the sort mentioned in any narration from the *Salaf* (the pious first generations of Muslims).

It was at this point in time that the followers of Imam Ahmad became tangled up with the Hashawiyyah.

The latter had become resurgent on the wave of the popular backlash in the wake of the Inquisition. Even the common man could dispute with the philosophers on this issue for the *ijaz al-Qur'an* backs up the doctrine of the Qur'an being the uncreated Speech of Allah (with only the recitation being created). The *ijaz al-Qur'an* refers to the unique nature of the Qur'an's style of Arabic, its lack of resemblance to any other literary work or composition in the Arabic language, and its inimitability (the inability of anyone to compose anything in its style). This is viewed as a miracle by many Muslims, easily ascertained by simply listening or reciting.

So, the Hashawiyyah, being the natural opponents of the Mu'tazilah, rallied behind orthodox scholars such as Imam Ahmad and their imprint has been felt on his school of followers ever since. Imam Ahmad's famous stance became a theological school unto itself, named the **Athari** school of orthodox theology, adhered to by a group of

²⁰Abdul Majid Daryabadi's Tafsir, The section in question is quoted later on in this work

the followers of the school of legal thought that developed around his teachings (the Hanbali *madhab* or school of thought). The philosophy behind their theology was to consign the meaning of the verses of the Qur'an regarding the nature of Allah that were hotly disputed to Allah, to avoid indulging in speculation over them, and to stick to the narrations (*athar*) of the Salaf. Precisely when it became identified as a distinct school of orthodox theology is unclear as this was the general "first principle" of sorts of all orthodox theology anyway.

Eventually a Caliph came to power who stopped the Inquisition and freed Imam Ahmad and even tried to praise him for resisting. Imam Ahmad was so bitter he disavowed any and all relationship with the state. He disowned his sons for accepting gifts from the Caliph who wanted to honor their father. Similarly, Imam Abu Hanifah (رحمة الله عليه) was also tortured for refusing to be the chief jurist of the Abbasid Caliphate in his time (one of his students took the job some time after him). Abu Hanifah, founder of the largest legal school of thought in Sunni Islam, died in prison, likely poisoned. It's related that when Imam Ahmad found out the fate of Imam Abu Hanifah, he himself wept. Abu Hanifah's creedal text, *Al-Fiqh Al-Akbar* is one of the most important in Islamic theology's history. It's important to take note that the orthodox scholars didn't spread their views through political patronage. It was on the strength of their arguments that the orthodoxy eventually came to dominate the philosophical and theological discourse.

After this the majority of the orthodoxy, the jurists (*fuqaha*), the scholars of *hadith* (*muhadditheen*), as well as all the Muslim scientists (of varying theological allegiances) continued their work mostly unperturbed.

Meanwhile, debates in theology continued to rage unabated. The Hashawiyah were rejuvenated and the Mu'tazilah sought to turn all the major thinkers to their side.

Imam al-Kawthari is scathing in his denunciation of the Hashawiyah:

The *Hashaweeyah* were operating in accordance with their recklessness and blindness, while seeking the following of hooligans and riffraff, and concocting about Allah what neither the law nor the mind allows, such as the ascription of motion to Him, translocation, limitation, direction, sitting, sitting (others beside Him on His throne), lying down (to rest), establishment, and the like of what they received with (full) acceptance from the swindlers (*dajaa'ilah*) of those who dupe amongst the Dualists and the People of the Book, and also from what they inherited from nations that have passed away.

Then they'd publish books that they filled with attacks on others, while piercing the veil of awesomeness in declaring unbelief, hiding behind the *burqah* of the *Sunnah*, and boasting of the *Salaf*. They exploit the obscure statements transmitted from the *Salaf* that possess no proof in them (in their favor).

Yes! They have a *Salaf*, but from other than this *Ummah*. And they are upon a *Sunnah*, but upon the one who initiated it are the burdens (of all) until the Day of Resurrection, while this isn't the place to cover their infamies in detail.

The *Mu'tazilah* were winning over the minds of the thinkers amongst the scholars and striving to retrieve their domination over the *Ummah*, all the while the Atheists and the Karmathians sunk deep into corruption and occupied the lands whereas there didn't remain at the bays for defending the religion anyone on post with any cogent arguments that could efface their sleight of hand due to the preoccupation of themselves with newly faced circumstances.

The [Karmathians](#)²¹ were a sect of Isma'ilis similar to the *Hashashin* (Assassins) who harassed the Abbasids to no end. Their story is not going to be included here but is very interesting and one I recommend reading up on when given the chance.

It was then that the famous Sunni Imam of 'aqeedah, of the orthodox theology, Imam Abu Hasan al-Ash'ari (رحمة الله عليه) emerged on the theological scene.

Imam Ash'ari started his career as a Mu'tazilite student of Abu Ali Muhammad al-Jubba'i, considered the greatest Mu'tazilite scholar of the time. At the age of 40, he left the Mu'tazilah in a famous incident:

The story as told by Ibn Hallikan, (No. 618, ed. Wustenfled), is that al-Ash'ari proposed the case of the three brothers, one of whom was a true believer, virtuous and pious; the second an infidel, a debauchee, and a reprobate; and the third an infant. They all died. What was the state of each one of them? Al-Jubba'i answered: 'The virtuous brother occupies a high place in Heaven; the infidel is in the depths of Hell; and the child is among those who have obtained safety.' [Not in Hell or Heaven] 'Suppose,' asked al-Ash'ari, 'that the child should wish to ascend to the place occupied by his virtuous brother, would he be allowed to do so?' 'No,' replied al-Jubba'i, 'it would be said to him "Thy brother attained to this place through his numerous works of obedience (to God), but thou hast no such works to show."' 'But suppose,' said al-Ash'ari, 'that this child said, "That is not my fault; Thou didst not let me live long enough, neither didst Thou give me the means of proving my obedience."' 'In that case,' replied al-Jubba'i, 'God would say, "I knew that, if I had allowed thee to live, thou wouldst have been disobedient and deserved the grievous punishment (of hell); I thus considered what was for thy advantage."' 'But suppose the infidel brother were then to say, "O God of the universe! since Thou knewest what his state would be, Thou must have known what mine would be; then why didst Thou consider what was for

²¹For more information: <http://en.wikipedia.org/wiki/Qarmatians>

his advantage and not for mine?” Then al-Jubba’i was put to silence (Spitta, p.42).²²

He became a proponent of the orthodox theology expressed in rational terms, in the language of the philosophy and rhetoric of the Mu’tazilah. Thus arose the **Ash’ari** school of theology.

Imam al-Kawthari describes him as such:

Then in the like of these difficult circumstances Imam *Abool-Hasan Al-Ash’aree* – may Allah be pleased with him - launched an attack on the various forms of scourge that had befallen the Muslims, and he stood up to aid the *Sunnah* and to suppress innovation (*Bid’ah*).

So he strove first to reconcile between the two (opposing) factions by returning them - away from their extremism - back to the just median by saying to the first of them, “*You are upon truth if you mean by ‘the createdness of the Quran’ the expression (lafz), the recitation (tilaawah), and the script (rasm).*”

And to the others he said, “*You are correct if what you mean, by ‘uncreated’ (qadeem), the attribute that is ever-present with the essence of The Originator (Al-Baaree) that doesn’t become separated from Him as ‘Abdullah ibn Al-Mubaarak says” – meaning, The Speech of the Self (Al-Kalaam An-Nafsee). “*And you have no basis for denying the createdness of the utterance of the speaker (lafzul-Laafiz) and the recitation of the one who recites (tilaawatut-taalee), just as the first group doesn’t have the right to negate the attribute ever-present with Him – exalted is He – without utterance or sound.*”*

And he also said to the first group, “*To negate juxtaposition (al-muhaadhaah) and form (as-soorah) is proper, although you must acknowledge the (Divine) manifestation without (asking) how.*”

And he said to the latter group, “*Beware to ascribe form and juxtaposition (to Allah) and anything that indicates createdness, while you are correct if you limit yourselves to confirming the seeing (of Allah) for believers in the Hereafter without (asking) how.*”

And thus he continued until Allah gave him success in bringing together the word of the Muslims, uniting their ranks, suppressing the obstinate ones, and breaking their extremism. And questions from the different regions of the world were brought to him, and he responded to them.

²²Encyclopedia of Religion and Ethics, Part 3 - James Hastings, p. 111

As a result, his mention covered the horizons and filled the world because of his writings and the writings of his disciples about the *Sunnah* and the refutation of the various groups of heretics, atheists, and the People of the Book.

His disciples scattered about in the lands of *'Iraq, Khuraasaan, Shaam*, and the lands of the *Maghrib*, and he went his way. And shortly after his demise the *Mu'tazilah* retrieved some of their strength during the era of *Banoo Bawaih*. However, *Imam Naasirus-Sunnah Aboo Bakr ibnul-Baaqillaanee* stood up in their face and subdued them with his proofs. As a result, the people of the Earth to the most distant lands of Africa professed adherence to the *Sunnah* according to the *Ash'aree* methodology.

And *Ibnul-Baaqillaanee* dispatched - with a group of his disciples that he dispatched to the different lands – *Aboo 'Abdillah Al-Husain ibn 'Abdillah ibn Haatim Al-Azdee* to *Shaam*, then to *Qairawaan* and the lands of the *Maghrib*. Then the people of knowledge of the Imams of the *Maghaaribah* complied with him, and the school (*madhhab*) spread to *Siqqilleeyah* and *Andalus*. And *Ibn Abee Zaid, Aboo 'Imraan Al-Faasee, Abool-Hasan Al-Qaabisee, Abool-Waleed ibnul-Baajee, Aboo Bakr ibnul-'Arabee*, and their students had a helping hand in that.

The narrator of *Al-Jaami' As-Saheeh*, *Al-Haafiz Aboo Dharr Al-Harawee*, spread the *madhhab* in the *Hijaz*. And those scholars from the different horizons who traveled to him learned it from him.

And before that, in *Shaam*, it spread by means of the disciple of *Al-Ash'aree, Abool-Hasan 'Abdul-'Azeez At-Tabaree*, the narrator of *The Tafseer of Ibn Jareer* on the authority of its composer.

And the people of *Shaam* would bring the most distinguished Imams from the *Ash'aree* school time after time, like *Imam Qutub Ad-Deen An-Neesaabooree. Noor Ad-Deen Ash-Shaheed* brought him upon the request of the scholars.

[...]

So it appears from all of that that the spread of the *Ash'aree* School was a result of the authority of knowledge, not by the might of the *Sultans*. And what occurred in Baghdad and elsewhere regarding a little harshness against the *Hashaweeyah* from time to time, it was merely due to their breach of security and their creation of disturbances.

The whole while the *Fuqahaa* of the *Madhaahib* were protracting '*Al-Ash'aree*' to their respective schools, and stating his biography in their biographical compendiums (*Tabaqaat*). And the *Hanbalees* were most worthy

of that; since *Al-Ash'aree* clearly states during his debates with them that he was on the *madhhab* of *Ahmad*. However, they didn't state his biography in their *Tabaqaat*, and they don't consider him to be one of them. Rather, the *Hashaweeyah* amongst them loathe him more than they hate the *Mu'tazilah*.

So all of the *Maalikees*, three quarters of the *Shaafi'ees*, one third of the *Hanafees*, and a portion of the *Hanbalees* have been upon this approach towards speculative theology (*tareeqah minal-kalaam*), since the time of *Al-Baaqillaanee*, while two thirds of the *Hanafees* were upon the *Maatureed*²³ approach in the homes of what is beyond the river, the lands of Turkey, Afghanistan, India, China, and all that follows it...

[...]

And one of the distinguishing characteristics of the *madhhab* of the scholar of *Medinah*²⁴ is that it *negates the filth of heresies from the adherents of his madhhab*. So you do not find amongst the *Maalikees* the heresies of *'itizaal* and *tashbeeh*. And part of what produced that – according to what I reckon – is *Maalik's* prohibition against relating the reports of attributes...

[...]

And some of the *Hanbalees* are upon the path of the Salaf regarding *tafweed* (i.e. consigning the knowledge of the *mutashaabihaat* to Allah), and abandoning indulging (in them), while others of them yielded to the *Mu'tazilah*. But most of them over the succession of centuries have been *Hashaweeyah* upon the *Saalimee* and *Karraamee* approaches until *Az-Zaahir* placed the office of supreme justice (*qadaa al-qudaat*) in *Yabris* to the four schools for the first time.

Then they made contact with the scholars of *Ahlu-Sunnah* conversing with them about knowledge. As a result, their heretical ills began to go away, and almost not a single *Hashawee* would have remained if it had not been for the colony of *Harraan* after the misfortune of Baghdad lied down their saddles in *Shaam*.

He compares them to the *Mu'tazilah* and the *Hashawiyyah*:

And the *Ash'arees* are those who are balanced justly between the *Mu'tazilah* and the *Hashaweeyah*. They didn't go far away from transmitted knowledge as the *Mu'tazilah* did, or from logic as was the custom of the *Hashaweeyah*.

²³The other of the two main schools of orthodox theology

²⁴Referring to the *madhab* or legal school of thought of the Maliki

They inherited the best of those who preceded them, abandoned the falsehood of every sect, preserved what the Prophet – may Allah bless and grant him peace, and his companions were upon, and filled the world with knowledge.

He does go on to offer a criticism, if you could call it that, of al-Ash'ari's arguments (not his positions):

Despite that, his views aren't free from some of what can be taken into account – like a type of remoteness from logic at one time and from transmitted information another time - by the one who looks at his words regarding a number of theoretical issues, such as his view concerning (the mind's determination of what is) good and bad (*at-tahseen wat-taqbeeh*), the designation of purposeful reason (to Allah's actions) {*at-ta'leel*}, what (authoritativeness) transmitted knowledge produces (strength-wise), and the like of that. That's because whoever has disputed at length with the *Mu'tazilah* and the *Hashaweeyah* like he did, inevitably something of this sort will occur in his comments.

However, the like of that didn't happen to his contemporary, The Imam of Guidance, *Aboo Mansoor Al-Maatureedee*, the Sheikh of the *Sunnah* from what is beyond the river (*maa waraa an-nahr*), due to the *Sunnah's* complete victory there over the (different) kinds of heretics whereas their mischievous ways didn't appear in his presence. As a result, he was able to pursue complete balance in his views. So he gave transmitted information its right and logic its (proper) ruling.

[...]

So *Al-Ash'aree* and *Al-Maatureedee* are the Imams of *Ahlus-Sunnah wal-Jamaa'ah* in eastern regions of the earth and its western regions.

They have countless books. And the difference of opinions found between these two Imams is under the category of '*differences in expression.*'

We have here an introduction of the other major Imam of theological orthodoxy, Imam Abu Mansur al-Maturidi (رحمة الله عليه).

The **Maturidi** school of theology became predominant in Asia (Central Asia, South Asia) and Europe (Eastern Europe, Asia Minor). It was popular amongst those who followed the Hanafi *madhab* of *fiqh* (law), based on the work of Imam Abu Hanifah. Abu Hanifah had authored a text on creed (one of the first of its kind, if not the first) referred to earlier, *Al-Fiqh Al-Akbar*, and the Maturidi creed is ideologically descended from this (technically, they all were, but Maturidi remained closest to its spirit). So what al-

Kawthari is referring to by "what is beyond the river" is Central Asia (the Imam was born in Samarkand in what is today Uzbekistan).

The Wikipedia page on al-Maturidi has some quotes from Western scholars which are accurate, so I'll quote some of it (which is correct) here:

When al-Maturidi was growing up there was an emerging reaction²⁵ against some schools within Islam, notably Mu'tazilis, Qarmati, and Shi'a. The Sunni scholars who were following Abu Hanifa. Al-Maturidi with other two preeminent scholars wrote especially on the creed of Islam and elaborated Abu Hanifa's doctrine, the other two being Abu al-Hasan al-Ash'ari in Iraq, and Ahmad ibn Muhammad al-Tahawi in Egypt.²⁶

While Al-Ash'ari and Al-Tahawi were Sunni together with Al-Maturidi, they constructed their own theologies diverging slightly from Abu Hanifa's school.

[...]

Al Maturidi, followed in Abu Hanifa's footsteps, and presented the "notion that God was the creator of man's acts, although man possessed his own capacity and will to act".²⁷

[...]

Later, with the impact of Persianate states such as Great Seljuq Empire²⁸ and Ottoman Empire,²⁹ Hanafi-Maturidi school spread to greater areas where the Hanafi school of law is prevalent, such as Afghanistan, Central Asia, South Asia, Balkan, Russia, China, Caucasus and Turkey.

Maturidi had immense knowledge of dualist beliefs (Thanawiyya) and of other old Persian religions. His "Kitāb al-Tawhid" in this way has become a primary source for modern researchers with its rich materials about Iranian Manicheanism (Māniyya), a group of Brahmans (Barāhima), and some controversial personalities such as Ibn al-Rawandi, Muhammad al Warraq,

²⁵Williams, J. A. (1994). *The word of Islam*. London: Thames and Hudson. p. 145.

²⁶Ali, A. (1963). Maturidism. In Sharif, p. 260. Wiesbaden: Otto Harrassowitz.

²⁷Shah, M. (2006). Later Developments. In Meri, J. W. (Ed.), *Medieval Islamic civilization: an encyclopedia*, (Vol. 1), (p. 640). New York:Routledge.

²⁸Hughes, A. (2004). Ash'arites, Ash'aria. In Martin, R. C. et al. (Eds.), *Encyclopedia of Islam and the Muslim World*, (Vol. 1), (pp. 83-84). New York: Macmillan Reference USA

²⁹DeWeese, D. (2004). Central Asian Culture and Islam. In Martin, R. C. et al. (Eds.), *Encyclopedia of Islam and the Muslim World*, (Vol. 1), (p. 139). New York: Macmillan Reference USA

and Muhammad b. Shabib.^{30 31}

Regarding the differences between the Ash'ari and Maturidi schools, they are few. Most Sunnis view these as simply two different ways of describing the same thing.

The difference relevant for this discussion, as alluded to in the quote of al-Kawthari above, is the slightly greater emphasis on Reason that exists in the Maturidi view in contrast to the Ash'ari view which was codified as a response to the Mu'tazilah who placed complete primacy on Reason over Revelation.

In the Maturidi view, man can arrive at knowledge of God's existence and basic morality through use of their own Reason/intellect. The implication of this is that a disbeliever who is not reached by the Divine Message is still responsible for believing in God.

He [al-Maturidi] said: "No one is excused by ignorance of his Creator, due to what he sees in the creation of the heavens and earth", and: "Had Allah not sent a Messenger [still] it would have been obligatory for the creation to know Him through their intellects."³²

In contrast, al-Ash'ari maintained that no one is [held] responsible for what does not reach them via Revelation, even if they are capable of using their reason to distinguish some things.

So, due to their long history of debate with the Mu'tazilah and other such sects, the Ash'aris can be seen as empiricists or favoring empiricism over rationalism. This can be seen in the work of Ash'arite scientists, some of whom we will analyze shortly. The Maturidis give slightly more importance to rationalism. This is partly reflected in that school's dominance among the jurists and leaders (Ottoman, Mughal, and some say one of either the Ayyubid or Seljuq dynasties).

It should be noted that the two Imams basically codified the orthodox theology and defended it from heresies. This didn't stop the philosophical assaults of competing ideologies. That task fell to the representative of the Ash'arite school, Imam Abu Hamid al-Ghazali (رحمة الله عليه). He went on the offensive and utilizing a mastery of philosophy

³⁰G. Vajda, "Le Témoignage d'al-Maturidi sur la doctrine des manichéens, des daysanites et des marcionites", *Arabica*, 13 (1966), pp. 1-38; Guy Mannon, "Matoridi et le manichéisme", *Melanges de l'Institut Dominicain d'Etudes Orientales de Caire*, 13 (1977), pp. 39-66; Sarah Stroumsa, "The Barahima in Early Kalam", *Jarusalem Studies In Arable and Islam*, 6 (1985), pp. 229-241; Josef van Ess, "al-Farabi and Ibn al-Rewandi", *Hamdard Islamicus*, 3/4 (Winter 1980), pp. 3-15; J. Meric Pessagno, "The Reconstruction of the Thought of Muhammad Ibn Shabib", *Journal of American Oriental Society*, 104/3 (1984), pp. 445-453.

³¹The Authenticity of the Manuscript of Maturidi's *Kitāb al-Tawhid*, by M. Sait Özervarli, 1997

³² *The Disagreements between the Ash'aris and Maturidis* - Imam Shams al-Din Ahmad b. Sulayman ibn Kamal Pasha (d. 940 AH) - www.marifah.net

and logic, brought to bear the full ontological and epistemological weight of Islamic theology (manifested as the uniquely Islamic view of monotheism or *tawheed*, and the natural skepticism inherent in the worldview and epistemology described in Islam) on the heretics.

Al-Ghazali's complete and thorough dismantling of Neoplatonist and Aristotelian metaphysics, long a staple of Islamic philosophers (especially of the Mu'tazilite tradition), using the very rhetoric and logic of rationalism has become one of the seminal events in the history of all of philosophy. His *Tahafut al-Falasifah (Incoherence of the Philosophers)* established the supremacy of the orthodox theology at home and reverberated in the centers of philosophical discourse in the far corners of the world and influenced philosophical skeptics for many generations to come. By going to the extent of pointing out the logical errors of the philosophers, he demolished the doctrine of the Mu'tazilah that placed primacy on Reason over Revelation. Reason was great; after all, al-Ghazali was an expert in it. But being subject to such human error (as he meticulously laid out), it could not be prioritized over Revelation to the extent that theology became vulnerable to the whims of the philosophers. *Kalam*, which was based on speculation in theology, was completely shut down. Speculation was fine in any other field (even the legal sciences as we'll soon get to), so long as it was eventually held to methodological scrutiny, but there was no room for speculation in theology.

The aforementioned philosophical ingredients for science such as empiricism and scientific skepticism, were not at all involved here (rather, al-Ghazali was the one employing philosophical and logical skepticism). These were adhered to by Muslim scientists of all theological backgrounds, whether orthodox, Mu'tazilite, or whatever else. What was at issue was the usage of philosophical discourse for speculation in theology. Metaphysics, not physics. It (*kalam*) arose as a means of defending the orthodox Islamic theology from foreign philosophical attacks, but as al-Ghazali pointed out, the philosophers themselves became intoxicated with their own brilliance and turned that speculation inward on their own tradition. Instead of showing allegiance to the theology of the Prophet (saw) and the Salaf, they were blindly imitating the Greeks or other peoples. As al-Ghazali showed, it had been a necessary "evil"; one that was no longer necessary. The "Philosophers" had adopted all manner of what al-Ghazali argued were logically nonsensical and inconsistent positions.

One could consider this the start of the modern tradition of philosophy. Few people today, anywhere in the world, follow Plato or Aristotle literally as far as metaphysics goes. We think of them as brilliant philosophers, but we know far more now than they did then (and their contributions to philosophy, especially epistemology, still exist today), so it would just be foolish to start following them in literal fashion. Al-Ghazali marked that transition. It's likely for this reason that the Stanford Encyclopedia of Philosophy considers al-Ghazali to have initiated a Golden Age of philosophy in Islam³³, *after* the far

³³Street, Tony, "[Arabic and Islamic Philosophy of Language and Logic](#)", *The Stanford Encyclopedia of Philosophy (Fall 2008 Edition)*, Edward N. Zalta (ed.)

more popular (in the West) Peripatetic³⁴ philosophers were refuted. It was because of al-Ghazali that logic became a standard part of the curriculum of educational institutions in the Islamic world.

The negative association between al-Ghazali and science/mathematics is likely due to the fact that many of the philosophers of the Islamic Peripatetic school that he had attacked were avid scientists. The contributions of philosophers like Ibn Sina (Avicenna) and al-Farabi cannot be overstated and their influence was so much that al-Ghazali and the orthodoxy themselves owed much to Ibn Sina. Ibn Sina is still viewed positively in the Islamic world today by the orthodoxy (Sunni theologians). The limited understanding of the affairs of the Islamic world likely led Western Orientalists to conclude that this major event is what shut down "Islamic science" when nothing could be further from the truth. Many scientists arose from the orthodox (Ash'ari and Maturidi) tradition. Among them were Ibn al-Haytham (Alhazen)³⁵, widely recognized as the father of optics and the first to implement the modern scientific method³⁶ and al-Biruni³⁵, who measured the circumference of the earth and discussed its rotation on its axis³⁷ and of course, Ibn Khaldun. Al-Biruni even debated and criticized Ibn Sina over the latter's reliance on Greek physics and natural philosophy³⁸.

And as al-Ghazali himself said in his *Tahafut al-Falasifah*:

In the second place there are those things in which the philosophers believe, and which do not come into conflict with any religious principle. And, therefore, disagreement with the philosophers with respect to those things is not a necessary condition for the faith in the prophets and the apostles (may God bless them all). An example is their theory that the lunar eclipse occurs when the light of the Moon disappears as a consequence of the interposition of the Earth between the Moon and the Sun. For the Moon derives its light from the Sun, and the Earth is a round body surrounded by Heaven on all the sides. Therefore, when the Moon falls under the shadow of the Earth, the light of the Sun is cut off from it. Another example is their theory that the solar eclipse means the interposition of the body of the Moon between the Sun and the observer¹ which occurs when the Sun and the Moon are stationed at the intersection of their nodes at the same degree.

We are not interested in refuting such theories either; for the refutation will

³⁴Aristotelian

³⁵Sardar (1998), Routledge Enc. of Philosophy, <http://www.muslimphilosophy.com/ip/rep/H016.htm>

³⁶Bradley Steffens (2006). *Ibn al-Haytham: First Scientist*, Morgan Reynolds Publishing

³⁷James S. Aber <http://academic.emporia.edu/aberjame/histgeol/biruni/biruni.htm>

³⁸Rafik Berjak and Muzaffar Iqbal, "Ibn Sina--Al-Biruni correspondence", *Islam & Science*, June 2003.

serve no purpose. He who thinks that it is his religious duty to disbelieve such things is really unjust to religion, and weakens its cause. For these things have been established by astronomical and mathematical evidence which leaves no room for doubt. If you tell a man, who has studied these things—so that he has sifted all the data relating to them, and is, therefore, in a position to forecast when a lunar or a solar eclipse will take place: whether it will be total or partial; and how long it will last—that these things are contrary to religion, your assertion will shake his faith in religion, not in these things. Greater harm is done to religion by an immethodical helper than by an enemy whose actions, however hostile, are yet regular. For, as the proverb goes, a wise enemy is better than an ignorant friend.

[...]

The atheists would have the greatest satisfaction if the supporter of religion made a positive assertion that things of this kind are contrary to religion. For then it would be easier for them to refute religion which stood or fell with its opposition to these things. (It is, therefore, necessary for the supporter of religion not to commit himself on these questions,) because the fundamental question at issue between him and the philosophers is only whether the world is eternal or began in time. If its beginning in time is proved, it is all the same whether it is a round body, or a simple thing, or an octagonal or hexagonal figure; and whether the heavens and all that is below them form—as the philosophers say—thirteen layers, or more, or less. Investigation into these facts is no more relevant to metaphysical inquiries than an investigation into the number of the layers of an onion, or the number of the seeds of a pomegranate, would be. What we are interested in is that the world is the product of God's creative action, whatever the manner of that action may be.

In the third place, there are philosophical theories which come into violent conflict with the fundamental principles of religion, e.g., the religious doctrines of the world's beginning in time: of the attributes of the Creator; and of the resurrection of bodies. All these things have been denied by the philosophers. Therefore, we propose to leave the rest of the sections (enumerated above) aside, in order to concentrate on this one, and on questions allied to it, in our criticism of philosophical theories.

And that's that.

The discussion will now turn to the actual philosophies of the Islamic world which were relevant to scientific pursuits.

What Muslims gained from the Qur'an

It would be prudent to discuss the historicity of philosophical influence on Islamic science from the frame of reference of the very Muslims engaging in those scientific pursuits. The most obvious choice and the biggest influence on the worldview of any Muslim is the holy book of Islam, the Qur'an. This section will discuss the philosophies native to Islamic theology and the history of Islamic philosophical development up until the influx of Greek works.

As discussed in the opening, one of the biggest motivators of scientific pursuit is to fulfill a specific need. The nascent civilization of Islam had a few very important needs immediately upon the passing away of its Prophet (saw).

The first was the preservation of the Qur'an. This began under the Caliphate of Muhammad's (saw) immediate political successor, Abu Bakr (رضي الله عنه) at the behest of 'Umar (رضي الله عنه), who would become the second Caliph. During the Caliphate of 'Uthman (رضي الله عنه), he would have the compilation by the scribes appointed by Muhammad (saw) and tasked with writing the Qur'an become the official version and destroyed all the other copies (the Qur'an was revealed in several dialects of Arabic corresponding to the various Arab tribes... the dialects differed slightly only in recitation). Copies were made of this and sent to the various cities of his governors.

This was an extremely serious endeavor for the Muslim community, the implications of which were clear for the *Khulafa ar-Rashideen* (the Rashidun Caliphate, or the Rightly Guided Caliphs... Abu Bakr and 'Umar, who were the Prophet's (saw) fathers in law, and 'Uthman and Ali who were his sons in law). The need for an official written copy arose as the borders of the Islamic state expanded. There were thousands of narrators of the Qur'an upon the Prophet's (saw) death who had the entire book committed to memory. Transcribing such a widely known book seems like it would have been an easy enough endeavor but a specific methodology was used in compiling it and consistently applied throughout the process.

The entire process has been documented extensively and my two favorite introductions to this are the following:

The History of the Qur'anic Text from Revelation to Compilation: A Comparative Study with the Old and New Testaments By Muhammad Mustafa Al-A'zami. Leicester: UK Islamic Academy.

<http://attahawi.com/2010/05/11/the-history-of-the-quranic-text-from-revelation-to-compilation-by-mawlana-muhammad-mustafa-al-azami/>

And,

How the Qur'an was compiled - A lecture by Shaykh Hamza Yusuf

<http://www.youtube.com/watch?v=x3eE2nWLZvc>

I would consider watching at least the Hamza Yusuf lecture mandatory for an understanding of this subject.

In short, the process followed the Qur'an's own guidelines for witnesses. Abu Bakr (ra) tasked Zayd bin Thabit (ra), the Prophet's (saw) chief scribe, to collect all existing written verses, with two witnesses for each verse (witnesses to the act of it being written to dictation by the Prophet (saw)). The Qur'an was compiled from *written* verses taken as evidence on the testimony of two witnesses (as to it being written in the presence of the Prophet (saw)). It was not compiled from memorized narrations. They only served to reaffirm the evidence (they could discount evidence, but not be evidence themselves). It was, however, not the written form of the Qur'an which initially spread with the Muslims. Obviously the one they had memorized did. The seamless transition to the written form occurred during 'Uthman's (ra) Caliphate when he had official copies made (of Abu Bakr's (ra) commissioned copy which was stored with Hafsa (ra), one of the prophet's (saw) widows) and spread to the various capitals of the provinces. Zayd (ra) went to the extent of holding out for a written copy of the last verse to be added to the manuscript, despite everyone knowing the verse already. It was not added until the evidence was obtained. For most all the verses until the last, multiple pieces of evidence (multiple transcriptions) were available. For the last one, only one written copy (along with the two witnesses) were found. Despite the fact everyone agreed with the verse and that there was unanimous consensus by all who knew that chapter by heart, there was still the additional rationalization that the verse contained nothing of political/theological significance. The trepidation with which Zayd (ra) undertook his task, the faith and honesty, is apparent.

Then there was the matter of 'Uthman's (ra) official duplication. Problems arose when the Arabs of various tribes (who had learned the Qur'an in their respective dialects) were together fighting battles in the far reaches of Central Asia and settling all over the fast expanding state. The new Muslims were confused about the dialects and pronunciations as Arabic wasn't their mother tongue. It was decided (before 'Uthman, in fact) that the Qurayshi dialect, that of the Prophet's (saw) own tribe, would be the preferred and final dialect for the Qur'an and was most appropriate for new and future Muslims.

First, the previous task was methodologically repeated. 'Uthman (ra) commissioned a new compilation of a manuscript, again from primary sources and once again tasked Zayd bin Thabit (ra) with overseeing the process. 'Uthman himself personally took part in the process at times. In addition, he compared these with the parchments gathered personally from Aisha (ra), another of the prophet's (saw) widows. When this copy was

completed, he asked for the original copy commissioned by Abu Bakr (ra) and kept with Hafsa (ra), compared the two, found no discrepancies, then had a public reading of it with the Companions, and only then authorized the duplication. The final step after the dispatch of the duplicates was the collection of all other parchments, sources, etc and all the other copies were destroyed, leaving only the verified, intact, whole manuscript and its duplicates.

As Ali (ra) said,

“By Allah, he did what he did with these fragments in the presence of us all [i.e. and none of us objected].”

Furthermore, the recitation was preserved. Each copy was sent with an official *qari* (reciter):

"Each of these scholars recited to the people of his respective city in the manner he had learned it through authenticated, multiple channels going back to the Prophet, insofar as these channels lay in complete agreement with each other and fit the Mushaf's consonantal skeleton. Any mode of recitation arriving through a single channel (or containing verses that had been abrogated during the Prophet's lifetime) was discarded. Dispatching reciters with the Mushafs meant limiting the possibilities that were compatible with the consonantal script to only those that enjoyed authenticated and multiple backing... Sending a scholar with every Mushaf was, therefore, elucidating that proper recitation was dependent on the learning through direct contact with teachers whose transmission channels reached to the Prophet, not simply a product of script or spelling conventions."³⁹

This methodology, based off the Qur'an's own verses, was clearly scientific in nature. 'Uthman's (ra) commission of another independent manuscript from primary sources can be viewed in the context of the definition of peer review mentioned at the very beginning. Regarding the definition of peer: "Someone 'of equal standing with another ... especially belonging to the same societal group...or [having the same] status'". 'Uthman was the third of the rightly guided caliphs and was as close to Abu Bakr and 'Umar as anyone aside from Ali (ra). Then review: "A second or repeated viewing of past events, circumstances or facts." The process of compilation was repeated and results compared.

The methodology treated history and communication with a scientific eye and held them to scrutiny. It was historiography. The goal was to find the truth and preserve the truth. These were the baby steps of a fledgling scientific tradition. What was at stake? Not just life and death, but the eternal afterlife as well. The belief and religious fervor of the early

³⁹Abdul-Fattah al-Qadi as quoted in *The History of the Qur'anic Text from Revelation to Compilation*, p.95

Muslims held them to account.

As a result, the Qur'an we have today is the same original Qur'an. This is a monumental achievement when considering this was the 7th century. No book has been so authentically and meticulously preserved and transmitted over such a long period of time (1300 years and counting). This marked a transition to a modern tradition of history. The Arabs would become renowned for their historians and the Qur'an (and its compilation) would become their gold standard for historical authenticity. A standard which began to be immediately applied in other areas.

First were the legal sciences, as the need for this arose as soon as the Islamic Caliphate expanded into the former lands of the the Byzantines and into Persia. Simply put, new Muslims had legal questions and jurists (*fuqaha*) were needed to answer them. The *Sahaba* (Companions) of the Prophet (saw) were up to the task, based on the precedent set during Muhammad's (saw) career where he essentially signed off on the *ijtihad* (independent reasoning) ability of his companions. These judgments were pronounced on the basis of the Qur'an, the understanding of it as taught by Muhammad (saw), the latter of which constituted his sayings (*hadith*) and *Sunnah*, which were narrated orally as well. Muhammad (saw) had left specific instructions to his Qur'anic scribes to not record anything other than the Qur'an. So as long as the Qur'an was being compiled (during the first 3 Caliphs), the recording of the *hadith* was limited (though it began during the Prophet's (saw) own lifetime by some companions). The Companions in turn taught the next generation, the *tabi'een*⁴⁰ or the Contemporaries of the Companions. Abu Hanifah, the first of the four major orthodox Imams of *fiqh* was a *tabi'i*. It was through the transmission of legal rulings that the initial narrative records of hadith were kept and transmitted. Thus the *fuqaha* (jurists) preceded the *muhadditheen* (scholars of hadith).

A common criticism of the ignorant is that the corpus of hadith were not compiled until the advent of the major *muhadditheen* like Imam al-Bukhari in the 2nd and 3rd centuries (AH). Yet they ignore the fact that of the world's Sunni Muslims, the largest religious denomination in the world⁴¹, 45% are of the Hanafi *madhab*⁴². And Imam Abu Hanifah based all of his rulings on hadith, even narrating some himself directly from companions (in which the *isnad* or chain of transmission included a single narrator between himself and the Prophet (saw)).

Regarding the relationship between *fiqh* and *hadith*, Mufti Mahdi Hasan wrote this:⁴³

It is transmitted from Abu Muhammad al-Harithi in his own words,

⁴⁰Literally, "successors" or "followers"

⁴¹<http://www.timesonline.co.uk/tol/news/world/article3653800.ece>

⁴²http://thebook.org/books_pdf/500Muslims_2009.pdf

⁴³ *The Kitab al-Athar of Imam Abu Hanifah* - Turath Publishing

saying, "Ibrahim ibn 'Ali at-Tirmidhi informed us, 'Muhammad ibn Sa'd informed us saying, "I heard from someone who attended Yazid ibn Harun, and with him were Yahya ibn Ma'in, 'Ali ibn al-Madini, Ahmad ibn Hanbal, Zuhayr ibn Harb and a large body of others, when someone came seeking a judgment in *fiqh* and asked him about a case. He said, 'Yazid said to him, "Go to the people of knowledge." So 'Ali ibn al-Madini said to him, "Are the people of knowledge and hadith not with you?" He said, "The people of knowledge are the companions of Abu Hanifah and you are pharmacists⁴."'" Sadr al-A'immah mentioned in *Manaqib al-Imam al-A'zam*, "Yazid (ra) told the truth because the people of *fiqh* are more knowledgeable about the meanings of the hadith, as at-Tirmidhi declared openly in his *Jami'* in the chapter on what has been narrated about washing the dead."

⁴ The *fuqaha* are like the doctors and the people who have knowledge of the hadith are like the pharmacists who mix the remedy.

Hafiz Ibn al-Jawzi said in *Daf' shibh at-tashbih*, "Know that there are fine and subtle points in the hadith which only '*ulama*' who are learned in *fiqh* recognise, sometimes from their transmission, sometimes from unveiling of their meanings." The like of this is narrated as the saying of al-A'mash addressed to Abu Hanifah, "You are the physicians and we are the pharmacists." Hafiz Ibn 'Abd al-Barr narrated in *Jami' bayan al-'ilm* with its chain of transmission that 'Ubaydullah ibn 'Umar said, "I was in a gathering of al-A'mash's and a man came and asked him about an issue but he did not answer him about it. Then he looked around and there was Abu Hanifah. He said, 'Nu'man, you speak about it,' and he said what he said about it. He asked, 'From where [did you get this judgment]?' He said, 'From a hadith which you narrated to us.'" He said, "So al-A'mash said, 'We are the pharmacists and you are the doctors.'"

Thus the hadith are preserved a full two generations before the canonical compilations known as the *Sahih Sitta* via the legal rulings of the *fuqaha*. In fact, Abu Hanifah's book of hadith, *Kitab al-Athar*, was the first book composed in Islam after the generation of the Companions.

Before we turn to the transition from the age of *fuqaha* to the age of *muhadditheen*, we should note how exactly *fiqh* was done. The four *madhabs* or legal schools of thought correspond to the four Imams and the specific methodology of the four Imams. For instance, Imam Malik (رحمة الله عليه) based his methodology on the culture of the people of Madinah, reasoning that they would follow the Prophet's (saw) *Sunnah* the best. Abu Hanifah on the other hand was based in Iraq and was known for making heavy use of *qiyas* or analogical reasoning.

From the popularly narrated account of their meeting:⁴⁴

In their meeting Imam Malik disapproved of Imam Abu Hanifa's view. Abu-Hanifa replied that the circumstances in Iraq are different from Madinah. Iraq is the capital of the Caliphate and everyday there are new things being introduced and they should be prepared, while in Madinah problems are fixed and limited.

Imam Malik brought up the heavy derivation of a varied amount of opinions from each single hadith that characterized the *qiyas*-heavy methodology of Abu Hanifah.

Imam Abu-Hanifa replied that in Iraq, Greek, Roman and Persian philosophies and sciences are invading them, so he needs to keep people fixed on the path of the Prophet (SAWS). That is why he was searching in ahadith to counter the new ideas. On the other hand in Madinah, there are none but the companions and their followers, so there is no need for expansion in elaborating ahadith.

The Sunni approach to *fiqh* became settled on these four *usul-i-fiqh* (principles of jurisprudence), in prioritized order:

1. Qur'an
2. Sunnah
3. *Ijma'* (consensus⁴⁵)
4. *Qiyas* (analogical reasoning)

The *ijma'* became a source or proof in law, based on the Qur'anic verses such as 4:115, 3:103 and the endorsement of the Prophet (saw) carried across multiple *sahih* (sound) mass transmitted hadith in which he says to the effect of, "My community will not agree on error."

After this, though the essence of the *fiqh* or law of the religion became preserved in the legal rulings of the *madhabs* (the legal sciences as *fiqh* became known), the need developed for the compilation of the actual hadith themselves in written form in response to the efforts of heretical sects to introduce falsely concocted hadith into the orally narrated circulation (as well as the passing away of many of the Companions and Successors). The *muhadditheen* embarked on a more purely historiographic mission in line with the original compilation of the Qur'an. Their efforts are well known and written about in many places.

⁴⁴These specific quotes were taken from amrkhaleed.net, a translation of which was on islamiology.wordpress.com

⁴⁵Consensus of the Companions, their Successors, and those who inherited their knowledge and tradition (the '*Ulema* or scholars)

A great introduction to what became known as the science of hadith is this lecture of Dr. Jonathan Brown, “*An Introduction to Hadith*”:

<http://vimeo.com/7216747>

The one aspect of the hadith sciences which is relevant to this topic is the classification of *mutawatir*. A *mutawatir* transmission has been narrated from so many people that it is inconceivable that they could have conspired to concoct a lie. An example of such a transmission is the existence of a land called China or the man named Caesar. The Qur’an is the ultimate example of this in book form as the very first narrators (who had committed it to memory) numbered in the thousands and it only grew from there.

What drove the Muslims to fulfill the needs that emerged with an expanding civilization in the manner that they did? By the 8th and 9th centuries, around the same time as the *muhadditheen* were doing their thing, Muslims had begun exploring the physical sciences (natural sciences, as derived from “natural philosophy”).

Let’s discuss the direct and overt contributions of the Qur’an (via a literal reading of its verses) to the Islamic epistemology.

Empiricism

We need look no further than verses 35-36 of chapter 17, *Surah al-Isra*:

“Give full measure when ye measure, and weigh with a balance that is straight: that is the most fitting and the most advantageous in the final determination.

And pursue not that of **which thou hast no knowledge**; for every act of **hearing**, or of **seeing** or of **(feeling in) the heart** will be enquired into (on the Day of Reckoning).”

Simply put, the Qur’an tells Muslims they can get knowledge from their senses (an obvious endorsement of empiricism and which lends itself to realism⁴⁶), that they will be held to account for their use thereof, and that they are to pursue an accurate system of weights and measure (used initially in trade, which prospered with the Arabs who were natural merchants, but which extended naturally into their forays into science), which also endorsed accurate instrumentation. Bearing false witness, false testimony, etc carry extremely negative connotations in the Qur’an and the religion. The order of the senses mentioned is considered important in the exegetical commentaries. According

⁴⁶ Though the Greeks too generally adhered to realism, the various other peoples that Muslims came into contact with such as Indians, Persians, even some Chinese, didn’t always.

to the *Ma'ariful Qur'an* in particular, hearing is mentioned first as one of man's primary sources of information is through other people via communication. Feeling in the heart is mentioned as referring obviously to man's thought which is based on the first two, implying even rational thought will be held to account, particularly where it leads to the formation of beliefs (whether seemingly petty, such as beliefs about another person when hearing gossip, or extending all the way to the deepest theological concepts).

The initial implications were in the aforementioned religious sciences⁴⁷, legal sciences, and the pursuit of fair trade and business (where honesty was valued over profit). If you'll recall in the beginning of this the necessary prerequisites for a scientific tradition were discussed. These are all important factors.

Imam al-Ghazali writes in his *Al-Qistas Al-Mustaqim (The Just Balance)*:

The astrolabe is a balance for measuring the movement of stars, the rule is a balance for measuring linear distances, while the plumb line is a balance for verifying the perpendicularity and curvature of a building. All these "balances," even though their forms may differ, share one thing, the property of showing where there is excess or deficiency.

[...]

"...the principles of experiment and those of the senses, which are the bases for the weighing of gold..."

Then there is, of course, the exhortation to actually observe nature which is repeated many times throughout the Qur'an as a way to gain knowledge of God:

"Behold! in the creation of the heavens and the earth; in the alternation 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 an earth that is dead; in the beasts 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;- (Here) indeed are Signs for a people that are wise."
(2:164)

This seems almost too obvious, especially for a people who already had a close relationship with trade (and the necessary travel). Yet it needs to be taken in context. The Greek philosophical tradition did not have such a focus on empiricism. Their epistemological issues with induction are a large part of what prevented them from developing any sort of real scientific tradition based on experimentation and thus their

⁴⁷ Where the efforts at preserving the religion necessitated finding the objective truth no matter the cost, as it was a matter of eternal salvation (even beyond life and death).

science was limited to “natural philosophy”. This was manifested in the preoccupation with syllogistic/deductive reasoning and avoidance of pursuing inductive knowledge through empirical experimentation. So though it seems empiricism is “common sense”, it is not so common for philosophers (and scientists need to employ the same sense of reason a philosopher does). It is very hard to back up with reason. Muslims had the benefit of having a holy book give them the go ahead. So the hitherto naive Arabs had the theological (and thus philosophical) backing to continue their pursuits in science well after they reached the level of the Greek philosophers.

Skepticism

This is a lengthier topic. First, the Qur’an lays down clear injunctions to be honest as has been shown but also very clearly puts responsibility on people to verify reports:

“O you who have believed, if there comes to you a disobedient one with information, investigate, lest you harm a people out of ignorance and become, over what you have done, regretful.”
(49:6)

“Investigate” has been alternately translated as “verify its correctness”, “ascertain the truth”, and so on. Another verse on the subject shall be covered in a few paragraphs (4:83).

The wording of this, (“a disobedient one”), necessitates finally discussing the subject of *taqlid*. A term that was better suited for the discussion on the *fiqhi* sciences, but which I put off until here due to its enormous philosophical impact in Islamic thought.

Taqlid is best translated as “blind imitation”. It is contrasted with *ijtihad* which means independent reasoning.

In the following discussion, I will refer heavily to the *The Legal Status of Following a Madhab* by Mufti Taqi Usmani which is available for free online and which I highly recommend reading for all Muslims.⁴⁸

Taqlid is further defined (by Ibn Humam and Ibn Nujaim) as:

“Taqleed is to follow the opinion of a person whose opinion is not a proof in Islamic law without asking for his [the person followed] proof.”

One of the major proofs for this practice is the following verse:

⁴⁸<http://www.cometoislam.com/fiqh/legal/main.htm>

“So ask the people of remembrance if you know not.”
(16:43)

More:

“O you who believe! Follow Allah; follow the Messenger and those of authority (Amr) amongst you.”
(4:59)

Which indicates a general command to believers, and then the second part of that verse:

“And if you dispute, then refer it to Allah and the Messenger if you really do believe in Allah and in the Last Day.”
(4:59)

Which indicates a command to the aforementioned people in authority (Amr) to judge by the Qur'an.

Going back to the aforementioned 4:83 about skepticism, it joins the two ideas:

“And when there comes to them a matter concerning (public) safety or fear, they relay it. If they had only referred it to the Messenger and to those of authority (Amr), those who can investigate and extract (information) among them would know (the rumor's validity)...”
(4:83)

In the beginning, the Prophet (saw) signed off on the *ijtihad* (independent reasoning based on the Qur'an and Sunnah) of his Companions. The *tabi'een* also engaged in *ijtihad*. At this point certain experts emerged who were considered authorities close to the first generation's *ijtihad*. A person who does *ijtihad* is a *mujtahid*. So naturally over the course of a few generations, the number of *mujtahids* who were on par with the standard of *ijtihad* of the first generations (*Salaf*) dwindled dramatically. The four Sunni Imams of *fiqh* were *mujtahids*.

This is when the practice of *taqlid* became necessarily relied upon by the general masses who were nowhere near the caliber of knowledge of the Companions. Again, *taqlid* is a term that is mostly confined to the legal sciences.

The basis for this was the general theme of the Qur'an and the Prophet's (saw) teachings that the Qur'an was the sole absolute authority, and the Prophet (saw) merely interpreted the Qur'an as intended (via divine inspiration). He was described as a “walking Qur'an”, thus the Prophet's (saw) Sunnah was integral to understanding the Qur'an.

Besides that, *nothing else* is sacred. It's all up for debate, for scrutiny. And in fact, because there was this absolute authority, it meant everything else *must* be scrutinized. All moral and philosophical pronouncements, made just as they were before Islam, were now to be held to scrutiny since the very existence of the Qur'an mandated that nothing else besides it be trusted as sacred and unquestionable. The ability to scrutinize was obviously around before Islam among the Arabs, but it's hard to use a tool when you don't have a constant epistemological reminder of the *need* to use it (and no existing tradition of it). The reminder was in this case the existence of an absolute authority⁴⁹.

Getting back to *taqlid*, around these four prominent *mujtahids*, Imams Abu Hanifah, Malik, ash-Shafi'i, and Ahmad ibn Hanbal, *madhabs* formed. I previously translated *madhab* as simply "school of thought", but this deserves more than just a cursory glance. The goal of a "school of thought" is to *preserve* a mindset, a mentality, an understanding, a view. To preserve a *pattern of thought*⁵⁰. To *prevent change*. To *purposely stagnate* innovation (*bid'ah*) and *prevent* it. There are good innovations and bad innovations. In Islam, any innovation in religion (in the *ends* of religion) was bad, and helpful innovation in the *means to an end* (the existing preserved ends of religion) was good. This is because history, unlike the other sciences, is focused on the past, not the future. If one has the belief that the pinnacle of opinion in a matter existed at some moment in the past (in this case, religion), history becomes the primary concern for them.

Eventually there were no *mujtahids* left and just various levels of jurists⁵¹ (*fuqaha*) who interpreted and applied the existing rulings and positions of their respective *madhabs* and the methodologies they represented. Thus, four schools were left standing. This is what's referred to by the phrase "closing the door to *ijtihad*". This is not a bad or a good thing in itself. It is what it is. It happened naturally and could not logically be avoided. If your goal is to preserve religion, it is a good thing. If your goal is to innovate a new religion or school of thought (or a bad *bid'ah* as its known), it's a bad thing, a hindrance, an obstacle.

So if you want to follow the *Sunnah*, to live as the Prophet (saw) lived, to travel the same spiritual path they did, in that you apply the same principles to your life that he and his Companions did to theirs, you must think like them, you have to join the pattern of thought of theirs that was preserved and maintained for 1400 years until this day, without any interruptions. The Prophet (saw) says in hadith that there will always be a group of the Ummah on the path of him and his Companions until the Last Day. With regards to *fiqh* and the *Sunnah*, the current understanding of it (what I have been referring to all the while as *orthodox*) is not new, it is not a recreation, not an interpolation or extrapolation, not a guess. It is the very same original living tradition of the Prophet (saw) himself

⁴⁹Not to imply the Qur'an can't or shouldn't be scrutinized for meaning, but rather the belief that there is no opinion higher or better than it.

⁵⁰A pattern of thought; as in a *paradigm*. Or a tradition.

⁵¹For more on the levels of jurists and how rulings are made: <http://maarifah0.blogspot.com/2011/04/levels-of-jurists-and-how-fatawa-are.html>

preserved (by the Will of Allah as Muslims would say) via the faculties of human intellect (Reason / Rationale) utilized to their fullest *methodological* extent. The key word here is *methodology* as that is what's lifted straight from a literal reading of the Qur'an. A way to view the world and view knowledge, and to preserve it.

The biggest existential challenge for the nascent Muslim community upon the death of the Prophet (saw) was not military engagements or political succession, but the preservation of knowledge. Not just knowledge, but *true* knowledge, and this is where skepticism was necessarily employed, philosophically and methodologically. *True* knowledge formed the basis of all the sciences. Which were at first the religious, legal, historical and economic sciences.

The epistemic level of skepticism (focused on the human propensity for error and deception) in the Islamic tradition thus extended to the system of law. The witness-based evidence system of the *Shariah* is a testament to this.

There's a paper by Baber Johansen on the evolution of legal thought as regards evidence in Islam⁵² that is worth reading. I'll quote at length (because it covers so much) from some of the introductory text as it's a good analysis of the basic doctrines of evidence in *fiqh*:

[...] Sunni fiqh doctrine concerning proof and procedure was based on the notion that the most effective evidence is the word. The acknowledgement of the defendant, the deposition of the witnesses, and the oath of the parties or their refusal to take the oath are the proofs that serve as the basis of a valid judgment. These words do not necessarily constitute truth: like all human speech acts they are ambiguous utterances. They oscillate, as the jurists say, between sincerity and mendacity. If one wants to determine whether the speakers are sincere or mendacious, one has to look for an external factor that tips the balance in favor of one or the other interpretation. It is highly improbable, for example, that a rational human being would, of his own choice, lie in order to burden himself with obligations that he had not, in fact, incurred. Therefore, the speaker's decision to make a confession or to acknowledge an obligation is regarded as an external factor that speaks in favor of his confession or acknowledgement. The witnesses' testimony is credible because the qadi checks their social and religious reputation carefully before he admits their testimony in his court session. Their reputation tips the balance in favor of their sincerity. The oath, insofar as it emphasizes and underlines a claim or a denial pronounced in the presence of the qadi, is also an external factor that strengthens the assertion of one of the litigants, whereas the refusal to take the oath weakens the litigant's assertions and, normally, causes the qadi to give a negative judgment.

⁵² *Signs as Evidence: The Doctrine of Ibn Taymiyya and Ibn Qayyim al-Jawziyya on Proof* [Islamic Law and Society, Vol. 9, No. 2, Evidence in Islamic Law \(2002\)](#), pp. 168-193

Basically, then, there are three types of proof: confession, testimony and the defendant's refusal to take an oath to affirm his denial of the plaintiff's claim. Although the oath may strengthen the claim of a plaintiff or a defendant, it does not have the same status as the two other forms of proof.

An utterance supported by an external factor that speaks in its favor is not necessarily sincere or true. The jurists of all four Sunni schools display a marked epistemological scepticism regarding the qadi's ability to distinguish between true and false statements. They state that enunciations (aqwal) always remain 'ambiguous information' and that one accepts them as proof only because the Qur'an and the life-praxis of the prophet, the Sunna, require their acceptance. The word of an observer, contrary to the sensory experience of the individual, can never provide 'indisputable and certain knowledge' ('ilm yaqin). Such knowledge is to be found only in the revelation, i.e. the Qur'an, the Sunna, and the consensus of the jurists (ijma'); alternatively it may be the result of sensory experience. The first type of indisputably certain knowledge serves as the basis for the derivation of legal norms from the revelation, not as a means to establish the truth of the facts; the second type is too often out of the judge's reach. The judge must issue a judgment on the basis of facts that, most of the time, he did not observe and concerning which he must rely on the observation of witnesses or the acknowledgement of the defendant.

Precisely because the utterances of witnesses and parties are always 'ambiguous information', the free choice of the speaker as to the content of his acknowledgement and his consent to its legal consequences are necessary conditions for its validity. All four Sunni schools of law construct their doctrines relating to evidence and torture on the principle that judicial torture is not a reliable and legitimate means to establish the truth of the facts. An extorted confession is null and void.

[...]

The qadi who tortures, however, is protected neither by his knowledge of the defendant's guilt nor by his competence to impose a corrective punishment (ta'zir). If a qadi forces a defendant to confess under torture and then condemns him to capital or corporal punishment on the strength of his confession, the qadi himself, according to classical Hanafi doctrine, should be condemned to death or subjected to corporal punishment. If the defendant was known to have committed the type of crime of which he was accused, the qadi is still obligated to pay his blood money. The reason is that such a qadi undermines the rationality of the procedural law and, with it, the legitimacy of the judicial decision. If the procedure hinges on the credibility of the utterances of parties, witnesses and experts, and if such

utterances must be supported by additional external factors, such as the social reputation of the witnesses or the legitimate self-interest of the litigants, torture deprives the qadi of all legal and legitimate motivations upon which to base his decision. It is evident that a defendant who is tortured does not speak in order to tell the truth but in order to please his torturers. One is therefore sure that he lies. A judgment cannot be based on lies, and a qadi who knowingly has a defendant executed on the basis of a confession elicited by torture is a criminal because he causes the defendant's death without any legally valid reason. At the same time that he deprives the spoken (or written) word of its credibility, the qadi who relies on evidence elicited by torture also undermines the status of the witnesses, which is directly linked to the status of the utterance as a decisive proof in a judicial trial. This implies, among other things, a weakening of the qadi's protection against criticism concerning his errors in fact.

[...]

Throughout the first three-quarters of the thirteenth century, this was a major divide between the European *ius commune* and the classical doctrine of Sunni law. Whereas the *ius commune*, from the beginning of the thirteenth century onwards, recognized judicial torture as a necessary instrument for the judiciary's investigation of cases, the dominant doctrine of classical Muslim law regards judicial torture as the sinful and criminal destruction of the trustworthiness of utterances, an act that deprives the qadi, the judge who applies *fiqh* norms, of the most important element on which he may base his judgment.

Whereas the torture of witnesses played an important role in Roman law and in the late medieval judicial practice of Europe, it is unknown in Muslim legal doctrine. This may be due to the fact that the validity of the witnesses' testimony, in the classical doctrine of Muslim law, is based on their social and religious standing. Since the end of the eighth century, this reputation was established in secret and public procedures performed by a special assistant of the qadi, the 'purifier' (*muzakki*). Persons recognized by the 'purifier' and the qadi as enjoying a solid social and religious reputation are registered by the qadi as 'just witnesses' (*'udut*) who are integrated as a special category into the judicial apparatus and whose testimony is accepted as evidence. The testimony of eye-witnesses to a crime is accepted as evidence in the qadi's court sessions only after the *muzakki* has examined their reputation. The classical authors call such a deposition by two male Muslim witnesses '*bayyina*', that is, 'the evidence that renders things clear'.

Oaths play an important role in the classical *fiqh* doctrine. We often find the plaintiff's oath combined with the testimony of one male witness as a form of

testimony sufficient to issue a judgment. The defendant's oath may decide a case-temporarily-if the plaintiff has no witnesses to support his claim and the defendant does not acknowledge it. If, after such a judgment, the plaintiff finds witnesses who support his claim, he may renew his demand, and the judge may then give judgment in his favor. In some narrowly defined cases, oaths may serve as the basis for a permanent judgment. This holds true for mutual imprecation (li'an) which results when a husband accuses his wife of adultery without producing the witnesses in support of his claim and without her acknowledging the accusation. If the wife swears that her husband is lying, she is not punished for adultery nor is her husband punished for calumny. Though it is evident that one of them is lying, it is not the qadi's task to establish the truth of the matter; his task is to direct the procedure and to pronounce, as a consequence of the mutual imprecation, the dissolution of the marriage. His judgment in such a case serves as a declaration of his inability to decide which of the two was lying and it thus legitimates the operative effect of the mutual imprecation.

[...]

Circumstantial evidence is also integrated into this highly formalized procedure. [...] In his article Brunschvig demonstrated that Maliki qadis in Tunisia and al-Andalus attributed great importance to architectural evidence in conflicts about real estate. They used master architects and bricklayers of the towns and cities as experts in cases in which neighbours raised conflicting claims concerning the walls, roofs and windows of buildings. In the eastern part of the Muslim world, we can trace this use of expert knowledge in conflicts over property rights back to the eleventh century, when-in the absence of witnesses and acknowledgements-the manner in which beams were put into a common wall was considered by the Hanafi jurists as an indicator of the respective property rights of the litigating neighbours. Similarly experts on weaving ('ulamd' al-hawka) would establish the market value of certain cloths and textiles.

[...]

The formalistic character of this procedure is manifested by the jurists' strong epistemological scepticism: they hold the qadis to be incapable of distinguishing, with certainty, a credible utterance from a lie. For this reason, the spoken word must be supported by external factors, such as social reputation or self-interest, which lend it additional social or psychological credibility. Three of the Sunni schools of law agree that a confession elicited under torture is invalid because the act of torture destroys the credibility of the utterance, and therefore, any validity that the confession might otherwise have enjoyed. Even if there is no torture, the testimony of duly examined

witnesses who are authorized to testify before the qadi does not guarantee the truthfulness of their deposition.

[...]

The formalistic character of the judicial procedure protects both the qadi and the rights of the defendant. It is based on an epistemological scepticism according to which the qadi has access to reality mainly through the ambiguous utterances of the litigants and witnesses. The formalistic character of the procedure, therefore, delegates responsibility for establishing the facts to the parties, the witnesses, and the experts. It relieves the judiciary of the responsibility for establishing the facts, shields the judge from pressure exerted by litigants who want to see truth recognized, and guarantees the authority of the *res judicata* against criticism based on any error of fact that the judge may have made. In making respect for formal procedure the main criterion for the legitimacy and legal validity of the qadi's judgment, the legal doctrine uses a criterion that is subject to the control of the judiciary and that is produced by members of the legal profession. The 'corrective punishment' and the 'qadi's knowledge' compensate for any shortcomings of the formal procedure and, at the same time, weaken its rationality; on the other hand, they enhance the qadi's decision making power and thus serve to strengthen the competence of the legal profession.

As his paper went on to analyze, the legal doctrines slowly changed after the 13th century. It's an interesting read. As was stated earlier, the emphasis is once again on methodology, on procedure. The methodology frees (in this case) the judge from criticism, allows the object of study (the people) to speak for themselves (with a meticulous weeding out of sources of error), is respected by all, and adhered to by all (of the legal community). The legal procedure itself parallels the scientific (I say parallels the scientific since the latter was in employ by the 9th century, though the legal system obviously goes back earlier to the origins of *Shariah* and the latter was partly derived from the tradition established by the former).

The recognition of the limited nature of our own knowledge (made apparent in contrast to the absolute authority) and uncertainty inherent in it is evident in the everyday language of Muslims. The popular phrase "*Allahu A'lam*"⁵³ or "God knows best [all things]" can be found in literally every academic work by a Muslim scholar (still to this day in religious works). It can be found almost as regularly as the opening "*Bismillah*" (In the name of Allah).

An expanded definition can be found from the Indonesian-language Wiki article:

...it means that it is God who knoweth all things. This greeting is used when

⁵³Or alternatively, "*Wallahu a'lam*"

someone has expressed his opinion about something and is saying it was as if he said that he did not escape mistakes and all knowledge belongs to God alone.

In other words, without *actually* admitting to any real or specific mistakes, it is as if they did anyway. Since one does not actually know, one cannot actually admit such a thing outright as that might be a mistake in itself if there were no mistakes and thus begs the question. The saying is, in effect, establishing *faith in one's own error and unreliability* alongside faith in God's omniscience and trust in God's guidance. It's a bit different than simply acknowledging only the possibility of error. It acknowledges an inherent uncertainty and degree of error in human knowledge and opinion, even while uttering truth.

So, on the one hand you have the belief that true knowledge is almost out of our grasp. On the other, you have strong injunctions (a responsibility, even) to find it anyway (and after doing all we can do, leaving success in God's Hands). This almost extreme skepticism is reconciled with the exhortation to methodologically pursue knowledge via simple faith in God. In other words, a certain degree of faith (or trust) is required in any epistemological view of other humans as a source of knowledge (and humans most definitely figure in Islamic epistemology in this manner, something I'll elaborate on further down). Actually putting the faith or trust in humans themselves removes the skepticism (which opens the floodgates of error). And putting faith in the procedure or methodology or even the tradition itself, as happens in contemporary culture, was not an option when a civilization was being built from the ground up with virtually no religious, legal, political, or scientific antecedent. So, faith in humans is replaced with faith in God. The situation of the Arabs, whom I earlier referred to as 'naive', can be likened to a child stepping out into the unknown. The act itself is a leap of faith.

Thus, there is a strong thematic undercurrent to the entire body of work of the Islamic scholarly tradition in which weeding out error and identifying potential causes for error is a primary concern. We witnessed it earlier even in the few bits I quoted from the Ottoman scholar al-Kawthari of the late 19th and early 20th centuries.

It was this theologically-rooted epistemic-level skepticism which al-Ghazali, widely credited as one of history's most famous philosophical Sceptics, brought to bear in his logical attack on the philosophers in the 12th century. However, though a primary concern of his was the blind imitation of Greek sources which warranted no such preferential treatment (thus, the epistemological level of skepticism), his attack was sustained with (or you could say manifested as) a potent philosophical and logical component which took philosophical skepticism (on a logical basis, rather than just the sophistry the Greeks were known for) into uncharted territory.

In his *Incoherence* al-Ghazâlî discusses twenty key teachings of the falâsifa and rejects the claim that these teachings are demonstratively proven. In

a detailed and intricate philosophical discussion al-Ghazâlî aims to show that none of the arguments in favor of these twenty teaching fulfills the high epistemological standard of demonstration (*burhân*) that the *falâsifa* have set for themselves. Rather, the arguments supporting these twenty convictions rely upon unproven premises that are accepted only among the *falâsifa*, but are not established by reason. By showing that these positions are supported by mere dialectical arguments al-Ghazâlî aims to demolish what he regarded was an epistemological hubris on the side of the *falâsifa*. In the *Incoherence* he wishes to show that the *falâsifa* practice *taqlîd*, meaning they merely repeat these teachings from the founders of their movement without critically examining them (Griffel 2005)

Griffel, Frank, "Al-Ghazali", *The Stanford Encyclopedia of Philosophy (Fall 2008 Edition)*, Edward N. Zalta (ed.)

Scientific Skepticism

Which finally brings us to the skepticism relevant to a scientific tradition. As opposed to general skepticism, scientific skepticism is defined as:⁵⁴

“...a practical, epistemological position in which one questions the veracity of claims lacking empirical evidence or reproducibility.”

In the Islamic tradition, there’s already an epistemic level of philosophical skepticism which naturally would include any endeavor in the natural sciences. Furthermore, the one thing opposed to skepticism, *taqlid*, was specifically defined and limited to the scope of the legal sciences only. It was not even allowed institutionally into the field of theology, to say nothing of the natural sciences.

In response to the question of *taqlid* in theology, G.F. Haddad on SunniPath writes:

First, the claim of *taqlid* in belief. There is no *taqlid* in belief. An adult Muslim that enquires or learns about the tenets of belief is not committing *taqlid* in belief - which is not acceptable – but rather [1] learning something basic which he or she did not know about the Divine Attributes but must believe and/or [2] formulating and clarifying what he or she already believes.

The end of Imam Abu Hanifa's foundational doctrinal text titled *al-Fiqh al-Akbar* (The Supreme Knowledge) states that when a person is boggled by something which they must resolve on pains of losing their faith, they must immediately ask a learned source to clarify it for them. An example: a person knows that Allah forgives all sins except shirk, and remembers that at one

⁵⁴http://en.wikipedia.org/wiki/Scientific_skepticism

time in their life they committed that horrible sin, then starts wondering: "but can Allah forgive me then? Does He not say that He forgives all except that?" Such a person risks kufr by not immediately asking someone knowledgeable who will tell him that Yes, Allah forgives shirk for the repentant sinner and that the gates of repentance are open until the last moments of death. This is not taqlid but necessary `ilm (knowledge) and ta`lim (education).

In other words, theology does not work like law. Someone can give a legal ruling and one follows that legal ruling without asking for the basis of it, yet reasons exist for following the rulings of one specific *madhab* (meaning, why that jurist was asked in the first place) which lay the foundation for the justification of accepting their ruling without further inquiry into the full Scriptural justification. One does not need to understand a legal ruling in order to follow it. Belief (*'aqeedah*) does not work this way. Either you understand it, or you don't. If you don't understand it, you cannot believe or disbelieve in it. The understanding precedes the act of belief. Blindly following someone else's beliefs in the main creedal articles of faith in Islamic theology is nonsensical. If someone is asked about whether they believe in the Day of Judgment or not, it would be nonsensical to say "I follow so and so's position". Either you understand it and believe in it, or you don't. At the moment such a response is made it is incorrect because a "yes" or "no" answer along with an explanation would have been possible. Pointing to someone else there is just nonsensical.

Where *taqlid* can come in for theology is only in the limited scope that it exists in everyday life. That can hardly be called the same *taqlid*. The definition between the two usages is almost completely different. *Taqlid* in the legal sciences is specifically defined and laid out, and the definition only works from within that framework. It's not the same *taqlid* that you would do if you believed your elementary school teacher that everything is made of atoms or that a man named Caesar once existed. This is in the same sense as when one believes in the idea of the Big Bang without being a physicist or evolution without being a biologist. The logic of *taqlid* applies there too in that if you too are a biologist or a physicist, you shouldn't accept the theories of evolution or the big bang without verifying and understanding them yourself. Few legitimate scientists can be said to do real *taqlid* of each other in the same specialization or field, though it happens and when it does it's bad science.

Similarly, when we get into the more advanced concepts in theology beyond the basic articles of faith, such as the intricacies of metaphysics, if one is not capable of understanding, a very limited form of *taqlid* can happen and there's nothing anyone can do to deem it right or wrong. For example, if an uneducated man has no understanding of the particulars of causality or atomism, that doesn't preclude them from saying they follow the *'aqeedah* of al-Ash'ari or al-Maturidi. It isn't completely blind because the decision is made in line with agreement between the *muqallid* and the views of the school of theology to the maximum extent of the *muqallid's* understanding, so he trusts that the rest (that is beyond his or her understanding) probably falls in line and doesn't

inquire further. No blame can fall on a person for this. It is the same as the “everyday *taqlid*” mentioned earlier. In actuality, this is a limited form of *taqlid* but it is not belief, as belief can not possibly extend to the matters which are not understood. Saying one is an Ash’ari, or Maturidi, or even an Athari in ‘*aqeedah*’ does not preclude them from meaning that they follow those schools only up to the limit of their understanding and make no decision whatsoever on the matters that are beyond their understanding. It is the same as saying “I am an Ash’ari insofar as I understand insofar as much of what I know.” Belief, or faith, can be said to be blind (as far as proof of the senses goes). But blind faith or blind belief is not the same as blind *imitation*. If one is blindly imitating without understanding, they are not believing in what the person they are imitating is believing in (this harkens back to Feynman’s discussion on cargo cult science). They are believing in the person they are imitating. Whether this is right or wrong would depend on whom they are placing such trust in and to what extent. If a poor person of 7th century Arabia was doing this for the Prophet (saw) for anything beyond the extent of a possibly very limited understanding, no fault can be laid on them for this. In this case, the situation is like the case of a real blind person. No fault can be laid on them for their blindness. However, where one is capable of understanding, it is incumbent upon them to do so. Fault can certainly be laid upon the person who has the faculty of sight and makes errors by choosing not to employ it.

To illustrate this entire phenomenon in one example; If a person of extremely limited understanding says “I believe in the metaphysics of the scholar Zayd”, they do not actually believe in the metaphysics of Zayd. They are just saying they do, but the belief is not actually there as belief can not be there before the understanding. What they are believing in is the scholar Zayd and his judgment (saying to the effect of “I believe in the scholar Zayd”). And to the extent that this means they trust Zayd (since faith or belief is defined as a type of trust), if that trust is on solid grounds with solid intentions, it is blameless, even in case of error (had Zayd been wrong). This occurs transparently and seamlessly in everyday life. We blindly imitate in how we dress, cook, eat, talk and though some could question this as wrongful *taqlid* (due to being a willful blindness and I would not argue against such criticism), it also extends to how we operate cars, microwaves, etc and since the latter are beyond many people’s understanding, that cannot be wrongful. In fact, it can only be commendable (even obligatory if one seeks to avoid error⁵⁵) to be cognizant of the limit of one’s own understanding and then seek out those in authority (in knowledge). Which is, of course, just what the Qur’an says to do.

It’s this connection between belief and understanding that is at the heart of *taqlid* and even theology. For example, in Islam, sects are delineated theologically. Sunnis, Shi’ites, Isma’ilis, etc do not pray in the same congregations. This is because the difference of understanding indicates a difference in belief, in spite of the fact they all uphold the basic *shahadah*⁵⁶. If the understanding of God of two people differs, despite the common belief in a God, they do not share belief in the same idea of God, thus

⁵⁵In fact, *taqlid* in *fiqh* is considered obligatory for the layman by traditional Sunnis and Shi’ites

⁵⁶Islamic declaration of belief: *There is no god but Allah and Muhammad (saw) is His Messenger*

their intentions are not uniform⁵⁷. It's only the verbal attestation of identifying doctrines particular to Islam (Allah, Muhammad (saw), and overall especially culture, way of life, values) which unite the various sects under the same terminology of Islam and Muslim. They are thus described as different interpretations of Islam.

When the understanding is not there, the belief can not be there. A belief might be there, but not *the* belief in question. The belief that actually exists could be in the person being emulated or imitated. In place of the person there could be a particular culture, a school of thought or philosophy, whatever.

This is as opposed to the coexistence of belief, understanding, *and* imitation, in which case these three do not really exist separately and this is merely another instance of the epistemological structure of the narrative (basic exchange of knowledge by humans) and the word "trust" might make more sense than "belief" in this context (in some cases, 'understanding' makes 'belief' better understood as 'trust' which conveys the sense of a very solid belief or foundation to belief... or a justified belief) since the person being "imitated" is not really being imitated as such but acts as the source of the knowledge in the form of a narrative connection. This will be covered later under the topic of Islamic epistemology. So, *taqlid* in belief (theology) merely acts as a hidden redirection of the belief onto something other than the original belief in question. In some contexts, this is acceptable, though it's preferable to be open about what exactly is going on. In other contexts, it's not. One final example; that of a person who claims to believe in evolution yet has no knowledge whatsoever of the science behind evolution. Such a person cannot be said to believe in the scientific theory of evolution. Rather, they believe in whomever taught them about the theory and if it's done in an intellectually honest manner, we could use the term "trust". If it's done in an intellectually dishonest manner, then they are putting blind faith in the person who taught them and blindly imitating them (*taqlid*). Morally, this is in and of itself not right or wrong for a layman. The moral judgment can be pronounced based upon an analysis of the internal consistency of this person's claims. If they are claiming to harbor an understanding of evolution alongside that belief, this is plainly deception and immoral. If they simply say "I have no idea how it works but I believe it", the deception isn't immediately apparent, but it's still there (because what they're really saying is something to the effect of "I have no idea how it works but I believe the source from where I got it").

The last point on this is regarding the legal validity of following the beliefs of theological schools in Islam (i.e, Ash'ari, Maturidi) as opposed to everyone splintering into every possible theological configuration. Since there is a consensus of all the Sunni *'ulema*

⁵⁷The congregational prayer of the traditional Muslim sects starts with the common intention by the Imam on behalf of the congregation, so it's actually dependent on the Imam leading the prayers. A Sunni and Shi'ite can pray side by side and which prayer is considered valid by their respective jurists depends on whom the Imam matched (a Shi'ite Imam invalidates the prayer of Sunnis in the congregation and vice-versa). Obviously, simply being in physical proximity has no effect.

(scholars) on the beliefs of personalities like Abu Hanifah, Ahmad ibn Hanbal, At-Tahawi, al-Ash'ari, and al-Maturidi, may the Mercy of Allah be upon them all, there is *ijma'*, and this itself constitutes enough of a legal proof to validate trust in the major accepted schools of theology (hitherto referred to as "orthodox"). Of course, due to the aforementioned reasons, the belief will still only really exist to the extent of the understanding⁵⁸.

If a non-Muslim reader was confused by how much time I spent on this, it was necessary due to controversy over the use of the terminology in some circles within theological discourse in Islam.

So now we have a pretty well defined epistemological/philosophical and even theological skepticism within Islamic discourse completely set not long after the religion's inception.

It takes almost no effort at all to apply this to the natural sciences. Ibn al-Haytham⁵⁹ (d. 1040), who needs no introduction to those familiar with the history of science as he was one of the first to employ a scientific method almost indistinguishable from that used today⁶⁰, wrote on this in his works criticizing some of the Greek philosophers, especially Ptolemy. In his *Doubts Concerning Ptolemy* he writes:

Truth is sought for itself [but] the truths, [he warns] are immersed in uncertainties [and the scientific authorities (such as Ptolemy, whom he greatly respected) are] not immune from error..⁶¹

Another translation:

Truth is sought for its own sake ... Finding the truth is difficult, and the road to it is rough. For the truths are plunged in obscurity. ... God, however, has not preserved the scientist from error and has not safeguarded science from shortcomings and faults. If this had been the case, scientists would not have disagreed upon any point of science...⁶²

⁵⁸There is something to be said for what's traditionally called the illumination or spiritual understanding that comes with faith, but that is not really relevant at this juncture.

⁵⁹This is getting into the era after the influx of Greek works, however this is limited to criticism and not emulation of the Greeks along the lines of what's already been established as being unique contributions of Islamic theology/philosophy.

⁶⁰Rosanna Gorini (2003). "Al-Haytham the Man of Experience. First Steps in the Science of Vision", *International Society for the History of Islamic Medicine*.

"According to the majority of the historians al-Haytham was the pioneer of the modern scientific method. ... [He] established experiments as the norm of proof in the field. His investigations are based not on abstract theories, but on experimental evidences and his experiments were systematic and repeatable"

⁶¹Al Sabra's translation

⁶²S. Pines (1962) as referenced in Sambursky (1974) ISBN 0-87663-712-8

He continues,

Therefore, the seeker after the truth is not one who studies the writings of the ancients and, following his natural disposition, puts his trust in them, but rather the one who suspects his faith in them and questions what he gathers from them, the one who submits to argument and demonstration, and not to the sayings of a human being whose nature is fraught with all kinds of imperfection and deficiency. Thus the duty of the man who investigates the writings of scientists, if learning the truth is his goal, is to make himself an enemy of all that he reads, and, applying his mind to the core and margins of its content, attack it from every side. He should also suspect himself as he performs his critical examination of it, so that he may avoid falling into either prejudice or leniency.

Where he clearly emphasizes the importance of criticism of theories in science. Regarding his work, *The Winding Motion*, he writes

From the statements made by the noble Shaykh, it is clear that he believes in Ptolemy's words in everything he says, without relying on a demonstration or calling on a proof, but by pure imitation (*taqlid*); that is how experts in the prophetic tradition have faith in Prophets, may the blessing of God be upon them. But it is not the way that mathematicians have faith in specialists in the demonstrative sciences.⁶³

Which pretty much says it all. There is to be no *taqlid* in science, whether of Ptolemy, Aristotle, or anyone else. In fact, it's this same basic criticism which al-Ghazali brought up in his attack on the philosophers a little while later (in which he accused them of blindly following Plato and Aristotle).

Ibn al-Haytham's criticism was purely on scientific grounds and centered around the lack of scientific demonstration and the lack of correlation with physical reality of Ptolemy's model:

Ptolemy assumed an arrangement (*hay'a*) that cannot exist, and the fact that this arrangement produces in his imagination the motions that belong to the planets does not free him from the error he committed in his assumed arrangement, for the existing motions of the planets cannot be the result of an arrangement that is impossible to exist... [F]or a man to imagine a circle in the heavens, and to imagine the planet moving in it does not bring about the planet's motion.⁶⁴

⁶³Rashed, Roshdi (2007), "The Celestial Kinematics of Ibn al-Haytham", *Arabic Sciences and Philosophy* (Cambridge University Press)

⁶⁴Rabin, Sheila, "Nicolaus Copernicus", *The Stanford Encyclopedia of Philosophy* (Fall 2010 Edition), Edward N. Zalta (ed.)

In other words, it was scientific skepticism, not merely philosophical skepticism as the author of the paper from which some of these translated quotes are taken says,

Indeed, it is one thing to raise difficulties and criticize solutions, quite another to criticize for constructive purposes. For innovative research, of whatever kind, criticism is an integral part of the heuristic procedure. For instance, Ibn al-Haytham's doubts and criticisms were not put forward as arguments for a principle, but as statements the mathematician strove to prove mathematically and with the help of disciplined observations.⁶⁵

In Ibn al-Haytham's work we find an example of the combination of empiricism and scientific skepticism. He describes his methodology in which they go hand in hand:

We should distinguish the properties of particulars, and gather by induction what pertains to the eye when vision takes place and what is found in the manner of sensation to be uniform, unchanging, manifest, and not subject to doubt. After which we should ascend in our inquiry and reasonings, gradually and orderly, criticizing premises and exercising caution in regard to conclusions—our aim in all that we make subject to inspection and review being to employ justice, not to follow prejudice, and to take care in all that we judge and criticize that we seek the truth and not be swayed by opinion.⁶⁶

And even went so far as to criticize Aristotle "for his lack of contribution to the method of induction, which Ibn al-Haytham regarded as superior to syllogism."⁶⁷ He also emphasized the use of mathematical models to describe sense experiences. His impact on scientific thought is immeasurable. Matthias Schramm writes in *Ibn al-Haytham's Weg zur Physik*:

Through a closer examination of Ibn al-Haytham's conceptions of mathematical models and of the role they play in his theory of sense perception, it becomes evident that he was the true founder of physics in the modern sense of the word; in fact he anticipated by six centuries the fertile ideas that were to mark the beginning of this new branch of science.

He will be discussed further later. In a sense, it can clearly be seen that religion, and Islam in particular, is a proponent of a sort of "methodologicalism" or an adherence to methodology, which was the clear progenitor of not just the scientific method, but perhaps many of the human endeavors in methodology (law, politics, etc). Perhaps this

⁶⁵Rashed, Roshdi (2007), "The Celestial Kinematics of Ibn al-Haytham", *Arabic Sciences and Philosophy* (Cambridge University Press), p.12

⁶⁶Bradley Steffens (2006)

⁶⁷Plott, C. (2000), *Global History of Philosophy: The Period of Scholasticism*, Motilal Banarsidass, p. 462

is a better definition for religion itself, which I have long since considered to likely have been one of the first human social orders (and I do think religion is best defined as a social order). Perhaps it's not so much man's insistence on seeing patterns everywhere which is at the root of his relationship with religion, but man's insistence on *order*. It's no wonder then that "science" is described by some atheists as simply the newest and best form of religion (they were particularly open-minded atheists, no doubt). When this insistence on order finally manifested as an insistence on methodology, only then did science as we know it today become possible.

Other examples from Muslim scientists and philosophers follow Ibn al-Haytham's lead in this skepticism of Ptolemaic cosmology (including the idea of "celestial spheres"), many who were not even Ash'arites.

From the Wikipedia page on celestial spheres, regarding the famous Ash'arite, Fakhr al-Din al-Razi:

Adi Setia describes the debate among Islamic scholars in the twelfth century, based on the commentary of Fakhr al-Din al-Razi in regard to whether the celestial spheres are real, concrete physical bodies or "merely the abstract circles in the heavens traced out... by the various stars and planets." Setia points out that most of the learned, and the astronomers, said they were solid spheres "on which the stars turn... and this view is closer to the apparent sense of the Qur'anic verses regarding the celestial orbits." However, al-Razi mentions that some, such as the Islamic scholar Dahhak, considered them to be abstract. Al-Razi himself, was undecided, he said: "In truth, there is no way to ascertain the characteristics of the heavens except by authority [of divine revelation or prophetic traditions]." Setia concludes: "Thus it seems that for al-Razi (and for others before and after him), astronomical models, whatever their utility or lack thereof for ordering the heavens, are not founded on sound rational proofs, and so no intellectual commitment can be made to them insofar as description and explanation of celestial realities are concerned."

Though it should be added that the Qur'anic verses on heavenly motion are scant and only refer to, as mentioned, orbits (thus we disagree with Adi Setia's assessment of them obviously). From the same article,

Later in the century, the Islamic theologian Adud al-Din al-Ijli (1281–1355), under the influence of the Ash'ari doctrine of occasionalism, which maintained that all physical effects were caused directly by God's will rather than by natural causes, rejected philosophy and astronomy,[38] and maintained that the celestial spheres were "imaginary things" and "more tenuous than a spider's web".[39] Al-Ijli's rejection of astronomy was, in turn, challenged by al-Sharif al-Jurjani (1339–1413), who maintained that "even

if they do not have an external reality, yet they are things that are correctly imagined and correspond to what [exists] in actuality"

Some clarification: The Ash'aris, heavily focused on empirical proofs for science and rational proofs for theology, thought astronomy was more philosophy than science although al-Ghazali does equate some astronomy with mathematical truth as mentioned earlier in the quotation from the beginning of his *Tahafut*. So there's a distinction between astronomy as a science (which most did not consider it unless it was as a "mathematical science" like al-Ghazali hinted at due to the inability to gain much empirical evidence) and astronomy as a philosophy (as practiced by Ptolemy and the Islamic Peripatetics, or *al-falasifah*). Astronomy as a "mathematical science" refers to the predominant use of mathematical models whereas the philosophical variant can be informally, for our purposes here, referred to as "cosmology".

Fakhr al-Din al-Razi also explicitly mentions the use of Qur'anic verses to disprove the idea that the distance between worlds is not traversable (another point which violates traditional Ptolemaic celestial sphere cosmology).

The Persian astronomer Abu Rayhan al-Biruni (d. 1048) says about heliocentrism (referring to a heliocentric astrolabe),

"I have seen the astrolabe called Zuraqi invented by Abu Sa'id Sijzi. I liked it very much and praised him a great deal, as it is based on the idea entertained by some to the effect that the motion we see is due to the Earth's movement and not to that of the sky. By my life, it is a problem difficult of solution and refutation. [...] For it is the same whether you take it that the Earth is in motion or the sky. For, in both cases, it does not affect the Astronomical Science. It is just for the physicist to see if it is possible to refute it."

And,

"Rotation of the earth would in no way invalidate astronomical calculations, for all the astronomical data are as explicable in terms of the one theory as of the other. The problem is thus difficult of solution."

A succinct quotation from Averroes (Ibn Rushd),

"The astronomy of our time offers no truth, but only agrees with the calculations and not with what exists."

The Wikipedia page on Cosmology in medieval Islam continues,

By the 15th century, the influence of Aristotelian physics and natural

philosophy was declining due to religious opposition from Islamic theologians such as Al-Ghazali who opposed to the interference of Aristotelianism in astronomy, opening up possibilities for an astronomy unrestrained by philosophy. Under this influence, Qushji, in his Concerning the Supposed Dependence of Astronomy upon Philosophy, rejected Aristotelian physics and completely separated natural philosophy from astronomy, allowing astronomy to become a purely empirical and mathematical science. This allowed him to explore alternatives to the Aristotelian notion of a stationary Earth, as he explored the idea of a moving Earth. He also observed comets and elaborated on al-Tusi's argument. He took it a step further and concluded, on the basis of empirical evidence rather than speculative philosophy, that the moving Earth theory is just as likely to be true as the stationary Earth theory and that it is not possible to empirically deduce which theory is true.

Delving into the specific scientific accomplishments of Muslim scientists is beyond the scope of this work which is concerned with philosophy and methodology, so we leave it there.

But before we shift away from this topic, one more thing needs to be discussed under this category.

Verification

The Qur'an describes the idea of verification many times and in the usual language, although with an emphasis on procedure (with regards to witnesses as evidence). The legal procedure has already been discussed, so here is the quote on the basic idea of verification:

“...قل هاتوا برهانكم إن كنتم صادقين”

“...qul ha^ṭoo burhaⁿakum in kuntum sadiqueena”

“...Say, ‘Bring your proof, if you are truthful.’”

(2:111) (27:64)

This appears in many variants, but the form most relevant for verification is this one. This seems like straight up “show your proof, prove your claim”, but on closer analysis, it's apparent that what's being referenced isn't the claim itself. This isn't philosophical verificationism (the idea that a claim is meaningful if it can be verified). Almost all translations use “bring your proof, if you are truthful”. Here's an alternate translation:

M. Asad:

Say: “[If you think so,] produce your evidence - if you truly believe in your claim!”

(27:64)

The verses are not referring to the truth of the claim, but rather the truthfulness of the claimant. One will find the same terminology in use in every manifestation of this verse, all of which concur on the “if you are truthful” part. This fits in line with the previously discussed epistemological skepticism that served as the basis for the legal procedure. Human knowledge is fallible and prone to error, God’s knowledge is ultimate and perfect, that’s established. So what matters to God (and to humans amongst each other since Muslim and non-Muslim alike are quoted as saying this in the Qur’an) is whether humans are lying or being truthful, the latter of which means believing one’s own claim (even if incorrect).

The people being addressed are those who believe they are truthful. Allah does not ask all claimants (of what is contrary to the Qur’an) to prove their claims. The liars are not addressed except indirectly (insofar as they pretend to be truthful). This saying is to those who believe they are true in contradicting the Qur’an and is inviting them to revisit their claim by having to prove it. In so doing, they might come to reflect on their own claim and arrive at the truth. It’s sort of like saying, “if you really believe what you’re saying, why don’t you do this to prove it to yourself”, and then goes on to call out those who might be hesitant out of doubt in their own position.

In other instances, it takes the form of “if you really believed what you were saying, wouldn’t you have done this which would have proven it?” to cast doubt on the addressees’ conviction in their beliefs. For example, for those who say they believe they are favored to go to Heaven, the Qur’an challenges them to long for death if they are truthful. The idea being such a person will reflect on their own state and realize they fear death, thus they don’t really believe they know their fate in the afterlife.

In other places, the Qur’an simultaneously calls for the people to produce witnesses with their evidence.

Overall the implication is clear. That the person who is truthful and really believes what they’re saying will not seek to hide their own error from themselves. They would not be afraid to falsify their own claims if what they really sought was the truth. So the Qur’an asks people to verify their own claims with an eye to falsify them (or verify with the intent to falsify). Verification and falsification are treated as *if* they were two sides of the same coin, if verification is done properly (with the goal of critical scrutiny kept in mind).

I put “as if” in italics to emphasize that I’m not saying verification and falsification *are* actually two sides of the same coin or that there’s some inherent symmetry between them. This is a controversial philosophical idea and my intention is not to get involved in

that.

Falsification

That was for the truthful. With regards to the rest who are not truthful but only claim to be, the Qur'an challenges them to falsify the Qur'an's doctrines outright. The best example is the famous challenge of the *Ijaz al-Qur'an*. That refers to the inimitable, irreproducible, unique nature of the impossible linguistic structure of the Qur'an. This is often referred to as the biggest part of what constitutes "the miracle of the Qur'an." Most all prophets get sent with miracles, that is one of the hallmarks of a prophet. In Islamic theology, the prophet Muhammad's (saw) main miracle is the Qur'an itself. There were other temporal or transient miracles during his life too, but they cannot possibly apply for those who were not there to witness them. Witnessing is important. So the miracle is within the Qur'an's own linguistic structure.

The doctrine of *ijaz al-Qur'an* will be discussed in detail much later. Briefly, it refers to how the Qur'an fits no existing category of Arabic speech (which are pretty clearly defined). All human speech in the Arabic language before or after Islam falls within the existing categories. Any attempt to make a composition of more than a few lines which does not do so becomes incoherent gibberish. The entire Qur'an does not fall into any existing category. This is the miracle. The verification of this is straightforward (learn Arabic and analyze the Qur'an). But even those who perceive the miracle may deny the verification (whether the results or even refusing to attempt it). The Qur'an then makes the challenge known to them. The Qur'an's inimitable nature will clearly be falsified if the Qur'an is imitated. So,

“And if ye are in doubt concerning that which We reveal unto Our slave (Muhammad), then produce a surah [chapter] of the like thereof, and call your witnesses beside Allah if ye are truthful.”
(2:23)

The challenge is laid to falsify the Qur'an's miraculous nature and call anyone to judge the attempt if they believe their own claims. In other words, if you reject the verification, then you cannot definitively prove it wrong until you have falsified it. Falsification is definitive (whereas verification better establishes the truthfulness of the claimant rather than the truth of a claim due to inherent uncertainty in human knowledge). The best way to falsify a case of miraculous inimitability is by reproducing the thing in question. Yet even falsification requires independent judgment/witnessing (to verify the falsification). So as we can see, the skepticism of human knowledge runs deep in the Qur'an.

Observational Deductive Falsification

I was not sure what else to call this, as the use of the term “hypothetico-deductive” would certainly be an anachronism outside of modern usage in the context of the scientific method.

The Qur’an gives an example in 2:258,

ART THOU NOT aware of that [king] who argued with Abraham about his Sustainer, (simply] because God had granted him kingship? Lo! Abraham said: "My Sustainer is He who grants life and deals death." [The king] replied: "I [too] grant life and deal death!" Said Abraham: "Verily, God causes the sun to rise in the east; cause it, then, to rise in the west!" Thereupon he who was bent on denying the truth remained dumbfounded: for God does not guide people who [deliberately] do wrong.

In a confrontation between Nimrod and Abraham over the subject of God, Abraham first puts forth God’s control over life and death, which Nimrod immediately twists in spurious or sophist fashion. Then Abraham puts forth another indisputable definition of God to counter Nimrod’s claim to divinity and challenges him to falsify that instead, which Nimrod is obviously unable to do. Al-Ghazali describes this verse in *Al-Qistas Al-Mustaqim*:

Is it possible for someone to consider these two premises and then to doubt the conclusion? [...] Certainly not! For our statement: God is He Who is able to raise the sun, contains no doubt, in that for them and for everyone the term “God” denotes Him Who is All-Powerful, which includes among other things the power to make the sun rise. This premise is known by convention and common agreement. Our proposition [...] is known by examination. The inability of Nimrud and the inability of everyone else [...] is known by the senses. [...] Thus, it follows from the knowledge of the first premise, known from the convention accepted by all, and from the second premise, known by examination, that Nimrud is not God... [...] This knowledge follows necessarily, and it is not possible [...] to doubt these premises or the conclusion which follows from them.

He derives from this incident a rule of syllogisms (deductive logic). In this work he derives a basic system of logic from the proof of examples in the Qur’an (examples which are literally described as proofs in the Qur’an). What’s remarkable is that he starts with empiricism and the Qur’anic emphasis on measurement with fair balances, and justifies logic as a type of “measurement” system, a “balance concerning knowledge”. He even calls these logical principles or rules that he derives: “rules of measurement” and compares different logical rules to different styles of scales/balances. Logic is expressed in empirical terms. Thus even if logic were not accepted *a priori*, al-Ghazali has established a proof for the use thereof based on Scripture.

Another example used is 6:91,

And in no way have they estimated Allah His true estimate as they said, "In no way has Allah sent down anything on any mortal." Say, "Who sent down the Book that Musa (Moses) came with (as) a light and a guidance to mankind?..."

Which is specifically referencing a claim of the Jews in response to Muhammad's (saw) claims of prophethood. Al-Ghazali describes the principle thusly,

It is necessary to establish a specific decree, which is that some men [Moses, whom the Jews acknowledge] have received the Scripture. By means of this decree we revoke the general proposition that no Scripture has ever been sent to any man.

The Unity and Hierarchy of the Sciences

Another thing particular to Muslims was a belief in the unity of knowledge (*'ilm*, the sciences), and the hierarchy of knowledge. Dr. Osman Bakar, author of *Classification of Knowledge in Islam* writes:

My study of three Muslim classifications of the sciences - composed by al-Farabi, al-Ghazzali, and Qutb al-Din al-Shirazi - shows that these classifications are at once based on philosophical ideas that are common to all Islamic intellectual schools and ideas which are specific to the intellectual and religious worldview of its author and of the school he represents. There are two dominant ideas that shape the underlying philosophical basis of each classification. One is the idea of the hierarchy and the unity of the sciences. Another is the idea of the distinction between religion and philosophy. The latter idea is also related to the distinction between revelation and reason.

The general idea of hierarchy of reality is shown to be rooted in Islamic revelation. The Qur'an and *hadiths* contain numerous references to such ideas as the hierarchy of creation, hierarchy of believers and knowers, hierarchy of witnesses of divine unity, and the hierarchic structure of the Qur'an itself.

Al-Ghazali represented the theological orthodoxy with al-Shirazi and his Illuminationist (*ishraqi*) school of philosophy instead favoring a philosophical systematization and expression of Sufism, an expansion of al-Ghazali's ideas of Sufism and the path to gnosis of God transcending the divide between revelation and reason. Revelation was, however, "walled off" from change in al-Ghazali's view. Al-Shirazi and the Illuminationists also became unduly influenced by Neoplatonism, though the basic idea of their

philosophy could well have been applied to any theology.

Al-Farabi, however, in his more fundamental emulation of the Greeks, reduced theology into philosophy to express the overlap between revelation and reason. His philosophy taken to its natural extent meant revelation could be subject to man's reason, which put his school of philosophy, the Islamic Peripatetic school (Aristotelian), at odds with the orthodoxy.

What Muslims Picked Up From the Greeks

Though this is generally discussed elsewhere, some mention needs to be made of the basics. The biggest contributions to Islamic civilization without a doubt had to be the Greeks' mastery of philosophy, logic, and rhetoric. Arabic and Islamic philosophy and theology are both built on the language of Greek philosophical discourse. Even the orthodox creedal texts use terminology inherited from the Greeks. Though this can be stated in simply a sentence, it is of huge significance. Islamic civilization was the inheritor of the Greek. Much of what survived of Greek ideas and what was in actual use (not just in terms of historical record), was inherited from Islamic civilization which was responsible for critiquing the works of the Greek philosophers, distilling what was useful from it and building on it.

Hellenistic Philosophy and Neoplatonism

It should be clarified that it was not pure Aristotelian or Greek philosophy which made its way into the Muslim world, but rather Hellenistic philosophy, and especially Neoplatonism.

During the Hellenistic period (323-43 bc), classical Greek philosophy underwent a radical transformation. From being an essentially Greek product, it developed into a cosmopolitan and eclectic cultural movement in which Greek, Egyptian, Phoenician and other Near Eastern religious and ethical elements coalesced. This transformation is best symbolized by the role Alexandria played as the hub of diverse currents of thought making up the new philosophy.

When the Abbasid Caliphate was founded in Baghdad in 750 ad, the centre of learning gradually moved to the Abbasid capital, which became in due course the heir of Athens and Alexandria as the new cultural metropolis of the medieval world. About two centuries later Cordoba, capital of Muslim Spain, began to vie with Baghdad as the centre of 'ancient learning'. From Cordoba,

Greek-Arabic philosophy and science were transmitted across the Pyrenees to Paris, Bologna and Oxford in the twelfth and the thirteenth centuries.

The initial reception of Greek-Hellenistic philosophy in the Islamic world was mixed. It was frowned upon at first as being suspiciously foreign or pagan, and was dismissed by conservative theologians, legal scholars and grammarians as pernicious or superfluous. By the middle of the eighth century the picture had changed somewhat, with the appearance of the rationalist theologians of Islam known as the Mu'tazilites, who were thoroughly influenced by the methods of discourse or dialectic favoured by the Muslim philosophers.⁶⁸

With regard to Neoplatonism,

Neoplatonism has been described as the final summation or synthesis of the major currents in Greek philosophy, Pythagoreanism, Stoicism, Platonism and Aristotelianism, into which an oriental religious and mystical spirit was infused. Its founder, Plotinus, was born in Lycopolis in Egypt, studied at Alexandria and lectured in Rome.⁶⁹

Islamic Neoplatonist metaphysics were basically Plato's Forms represented in celestial spheres corresponding to passive "self-manifestations" of the Divine intellect in a ladder from the creation to the Creator, which wound up chaining the Creator to the creation. In this manner they were used to justify either the Aristotelian Deism of the Mu'tazilah or the Pantheism of the Jahmiyyah, or anything inbetween. It's perhaps ironic that the Islamic orthodoxy stayed truer to Aristotle's roots by rejecting the idea of essence preceding existence, however a semblance of what it represented was always there in Islamic theology, due to the notion that God obviously creates according to a plan. This was later elaborated into a non-Neoplatonic account by the Sufis, such as Ibn al-Arabi (his work can be interpreted both in Neoplatonic fashion or in a sense that better resembles the active and Willful Creator of the orthodoxy's view with any notion of "forms" corresponding better to the idea of simple archetypes in God's plan).

Aristotelian natural philosophy or science was packaged with Neoplatonism you could say. Very few had any issue with that, in fact many of the scientists of orthodox theological persuasion accepted Aristotelian natural philosophy immediately and wholeheartedly. Al-Ghazali's critics, those of whom are ignorant of history, often confuse his intention for refuting the former as an attempt to refute natural philosophy altogether.

Al-Farabi (872-950)

⁶⁸Fakhry (1998), Routledge., <http://www.muslimphilosophy.com/ip/rep/H011>

⁶⁹*Ibid.*

Abu Nasr al-Farabi could be said to have been the most major of the early proponents of Greek philosophy in Islam. He was particularly faithful to Aristotle over the other Greeks with regards to logic, but like most other Muslim philosophers adopted a type of Neoplatonist metaphysics that combined aspects of both Plato and Aristotle's views. Keeping in line with his Islamic views, he emphasized methodology and built upon what Aristotle wrote of induction by promoting "scientific induction".⁷⁰ It's worth noting that he attempted to circumvent the problem of induction by implying induction could give certain knowledge, which made his philosophy vulnerable to the later attack of al-Ghazali. He was most known for inspiring Ibn Sina and Ibn Rushd, the two biggest names of the Islamic Peripatetic school. While Ibn Sina contributed many new ideas of his own, Ibn Rushd was most noted simply for staying loyal to Aristotle and being the prime source of commentaries on Aristotle that later made their way into Europe.

Beyond the Greeks: Contributions of Muslims

Again, this is concerned with what's relevant to the philosophy of science. The full range of contributions of Islamic civilization would be too numerous to cover.

The Scientific Method

The scientific method didn't emerge solely with the following two scientists; indeed it emerged among quite a few Muslim scientists simultaneously. But these are the best proponents of what became its most popular conception, especially as they were also representatives of the orthodox theological schools. Both of the following came to prominence in the West as well, of course. There are even craters on the moon named after the both of them.

Ibn al-Haytham (965-1040)

Much has already been written on Ibn al-Haytham (Alhazen) and his contributions to the scientific method. I'll only briefly quote again Rosanna Gorini:

"According to the majority of the historians Ibn al-Haytham was the pioneer of the modern scientific method. With his book he changed the meaning of the term optics and established experiments as the norm of proof in the field. His investigations are based not on abstract theories, but on experimental

⁷⁰*Classification of Knowledge in Islam* - Dr. Osman Bakr

evidences and his experiments were systematic and repeatable."⁷¹

In addition to formulating a basic experimental inductive method, Ibn al-Haytham emphasized the use of mathematical models, which Schramm describes as,

“Through a closer examination of Ibn al-Haytham's conceptions of mathematical models and of the role they play in his theory of sense perception, it becomes evident that he was the true founder of physics in the modern sense of the word; in fact he anticipated by six centuries the fertile ideas that were to mark the beginning of this new branch of science.”⁷²

George Henry Lewes, the 19th century English philosopher, remarks in his *The History of Philosophy from Thales to Comte*,

“He explains reflection and refraction; and astonishes us with his knowledge that the atmosphere increases in density as it decreases in height, and that the path of a ray of light through it, on entering obliquely, must be curvilinear and concave to the earth. Hence, as the mind refers the position of an object to the direction in which the ray of light enters the eye, the stars must appear to us nearer the zenith than they really are. Hence we see the stars before they have arisen and after they have set.

It is eminently probable that Kepler borrowed his optical views from Alhazen. It is certain that he has no just title to originality as the discoverer, which is sometimes claimed for him.”

Abu Rayhan al-Biruni (973-1048)

Al-Biruni, another Ash'arite⁷³, criticized Aristotle for relying too heavily on authority with regard to the nature of the heavens, and not using his own observations. He went on to criticize Muslims who put too much faith in Aristotle,

The trouble with most people is their extravagance in respect of Aristotle's opinions; they believe that there is no possibility of mistakes in his views, though they know that he was only theorizing to the best of his capacity.⁷⁴

⁷¹Rosanna Gorini (2003), "Al-Haytham the Man of Experience, First Steps in the Science of Vision", *International Society for the History of Islamic Medicine*, Institute of Neurosciences, Laboratory of Psychobiology and Psychopharmacology, Rome, Italy

⁷²Schramm, Matthias - *Ibn al-Haytham's Weg zur Physik*

⁷³Sardar (1998), Routledge., <http://www.muslimphilosophy.com/ip/rep/H016.htm>

⁷⁴Abdus Salam, H. R. Dalafi, Mohamed Hassan (1994), *Renaissance of sciences in Islamic countries*, World Scientific, p. 96

With regard to the scientific method,

...al-Biruni was concerned with how to conceptualize and therefore prevent both systematic observations and random errors. Small errors that result from the application of trigonometric tables become particularly appreciable when “added to errors caused by the use of small instruments and errors made by human observers” (Sheynin, 301). We have seen with regard to instrumental accuracy his predilection for large observational instruments, and the larger the better. In his book on the distances between cities he discusses a variety of errors due to methods of observation and even errors due to the nature of the astronomical model employed. Such errors are systemic, but he also understood the inevitability of random errors, both in astronomical observation and in other areas such as the measurement of time. If instruments, because of their imperfections or idiosyncratic qualities, produce random errors, then multiple observations had to be taken, analyzed qualitatively, and on this basis arrive at a “common-sense single value for the constant sought” (Sheynin, 304) whether an arithmetical mean or a “reliable estimate”.⁷⁵

He also distinguished philosophers from scientists, considering himself a “mathematical scientist”, and thus uniting the idea of empirical scientific endeavor and mathematics as the only reliable sources of evidence in the natural sciences, as did Ibn al-Haytham.

Biruni's example illustrates how the systematic application of rigorous mathematical reasoning led to the mathematization of astronomy and, by extension, to the mathematization of nature. Rather than subsuming the various sciences under the all-encompassing umbrella of philosophy, many scientists considered their professions as autonomous mathematical enterprises, separate from, and on par with philosophy.⁷⁶

Al-Biruni writes on the subject of the Qur'an and science,

"[the Qur'an] does not interfere in the business of science nor does it infringe on the realm of science."⁷⁷

Somewhat interestingly, he is construed to have made comments regarding nature's selection that foreshadowed modern ideas of evolution (emphasis mine):

"The agriculturist selects his corn, letting grow as much as he requires,

⁷⁵Glick, Livesey, and Wallis - *Medieval science, technology, and medicine: an encyclopedia*, p.90

⁷⁶Dallal, Ahmad (2001-2002), *The Interplay of Science and Theology in the Fourteenth-century Kalam*, From Medieval to Modern in the Islamic World, Sawyer Seminar at the University of Chicago

⁷⁷Alberuni's *Indica*

and tearing out the remainder. The forester leaves those branches which he perceives to be excellent, whilst he cuts away all others. The bees kill those of their kind who only eat, but do not work in their beehive. [...] *Nature proceeds in a similar way*; however, it does not distinguish for its action is under all circumstances one and the same. It allows the leaves and fruit of the trees to perish, thus preventing them from realising that result which they are intended to produce in the economy of nature. It removes them so as to make room for others."⁷⁸

Though that is a bit of a stretch and still nowhere near the outright LaMarckism of Ibn Khaldun. He also comments on heliocentrism and the rotation of the Earth. His contemporary, Abu Sa'id al-Sijzi made a heliocentric astrolabe:

"I have seen the astrolabe called Zuraqi invented by Abu Sa'id Sijzi. I liked it very much and praised him a great deal, as it is based on the idea entertained by some to the effect that the motion we see is due to the Earth's movement and not to that of the sky. By my life, it is a problem difficult of solution and refutation. [...] For it is the same whether you take it that the Earth is in motion or the sky. For, in both cases, it does not affect the Astronomical Science. It is just for the physicist to see if it is possible to refute it."⁷⁹

He said the difference between heliocentrism and geocentrism was thus only philosophical, but like most of the Muslim astronomers, refrained from going to the heliocentric model. One interesting thing to note is his emphasis on refutation rather than justification.

He also made many contributions to the branch of physics known as mechanics,

"Using a whole body of mathematical methods (not only those inherited from the antique theory of ratios and infinitesimal techniques, but also the methods of the contemporary algebra and fine calculation techniques), Muslim scientists raised statics to a new, higher level. The classical results of Archimedes in the theory of the centre of gravity were generalized and applied to three-dimensional bodies, the theory of ponderable lever was founded and the 'science of gravity' was created and later further developed in medieval Europe. The phenomena of statics were studied by using the dynamic approach so that two trends - statics and dynamics - turned out to be inter-related within a single science, mechanics. The combination of the dynamic approach with Archimedean hydrostatics gave birth to a direction

⁷⁸Jan Z. Wilczynski (December 1959), "On the Presumed Darwinism of Alberuni Eight Hundred Years before Darwin", *Isis* 50(4): 459–466

⁷⁹Seyyed Hossein Nasr (1993), *An Introduction to Islamic Cosmological Doctrines*, p. 135-136. State University of New York Press

in science which may be called medieval hydrodynamics. [...] Numerous fine experimental methods were developed for determining the specific weight, which were based, in particular, on the theory of balances and weighing. The classical works of al-Biruni and al-Khazini can by right be considered as the beginning of the application of experimental methods in medieval science."⁸⁰

To delve further into the full range of al-Biruni's work would be an endeavor fit for several volumes. This is but a brief mention as the focus of this work is specifically scientific philosophy.

Peer Review

It's obvious from what's been discussed so far the place of peer review in the academic and scientific community.

So, just for good measure, here's a mention of the first recorded instance of a professional peer review process:

Perhaps the first documented description of a peer-review process is in a book called *Ethics of the Physician* by Ishap bin Ali Al Rahwi (854-931) of Al Raha, Syria. This work, and its later variants or manuals, states that it is the duty of a visiting physician to make duplicate notes of the condition of the patient on each visit. When the patient had been cured or had died, the notes of the physician were examined by a local council of physicians, who would adjudicate as to whether the physician had performed according to the standards that then prevailed. On the basis of their rulings, the practicing physician could be sued for damages by a maltreated patient.⁸¹

Secularism

One of the biggest issues today with regards to Islam is its compatibility with "secularism". There's also this correlation between the physical sciences or the "natural sciences" and "secular knowledge". Upon a deeper inquiry of history, however, it becomes apparent that Islamic philosophy was instrumental in the evolution of secular thought in Europe.

⁸⁰Mariam Rozhanskaya and I. S. Levinova (1996), "Statics", in Roshdi Rashed, ed., *Encyclopedia of the History of Arabic Science*, Vol. 2, p. 614-642, Routledge, London and New York

⁸¹Spier (2002), "The history of the peer-review process", *Trends in Biotechnology*, Vol. 20, Issue 8

Ibn Rushd (Averroes) (1126-1198)

Being of the Peripatetics, Ibn Rushd echoed the philosophy of al-Farabi and Ibn Sina that philosophy (reason) was as equal a path to the truth as revelation. He put philosophers in such a high position that when al-Ghazali wrote *Maqasid al-Falasifah* (*Aims of the Philosophers*) in which he elucidated the metaphysics and logic of the Greek philosophical method, making them accessible to the layman, he was received with hostility from both camps:

This he did, much to the dismay of his compatriots who claimed that you have done the philosophers task by simplifying their teachings for the layperson. Ibn Rushd would vent his anger on him years later for doing this as well. How could he bring to the masses the literature of the elite that has been hidden by complex terminology and vague statements that only the select [could] understand after undergoing thorough training ?

[muslimphilosophy.com]

Indeed, one of al-Ghazali's protests against the philosophers intoxicated with their own brilliance was their idea that they could essentially rewrite the *Shari'ah* as they put themselves on equal standing of authority as revelation, which some of the philosophers considered to be heavy metaphorical wording intended for the far less erudite public masses. Ibn Rushd himself didn't necessarily do this, this was the natural extension of this philosophical view, and the extent to which others took it. It was also the extent to which Europeans took his work who were the primary recipients of much of it (often in corrupted form), due to his huge focus on Aristotle.

Secularism, in contrast to its modern implementation as an equal repression or negation of religion in the public sphere, originated as a form of true pluralism, perennialism.

Perennialism

Ibn Rushd inherited the idea from al-Farabi,

...the 10th century Islamic philosopher advocated the idea of philosophy and religion being two avenues to the same truth. His own personal philosophy strongly emphasized a classification of knowledge and science on the basis of methodology. Thus, he described his notion of an esoteric philosophy which referenced the eternal truth or wisdom which lies at the heart of all traditions as a "science of reality" based on the method of "certain demonstration" (*al-burhan al-yaqini*). This method is a combination of intellectual intuition and logical conclusions of certainty (*istinbat*). He

reasoned that it was therefore a superior kind of knowledge to the exoteric domain of religions (*millah*) since that relied on a method of persuasion (*al-iqna*), not demonstration. This philosophy is compared with the *philosophia perennis* of Leibniz and later in the 20th century, Schuon.

Al-Farabi developed a theory to explain the diversity of religions. He posited that religions differed from one another because the same spiritual and intellectual truths can have different "imaginative representations". He further stated that there was a unity of all revealed traditions at the philosophical level, since all nations and peoples must have a philosophical account of reality that is one and the same.⁸²

It was closely tied to the notion of empiricism, as will be evidenced during discussion of Ibn Sina's concept of *tabula rasa* to follow shortly. The foundation is laid in these views of al-Farabi.

It's ironic that Ibn Rushd initially argued for the separation of religion and philosophy and the elevation of the latter due to a perceived need to protect philosophy from religion (in a time where religion was in the seat of State). In fact, the secular tradition in the West itself, particularly in its American manifestation, operates on the presumption that the State needs to be protected from the Church (no doubt influenced by the state of affairs in Europe where the Catholic Church exercised dominant control). These days, it's actually the reverse in many areas. Many proponents of religion favor secularism as a way to protect their religious beliefs from philosophical or political influence and meddling. In response, there's been a transmutation (or a misappropriation, by various nationalistic and atheistic ideologies) of the very definition of secularism into a more militant form where it's, as I said above, used to equally negate all religious presence from the public sphere (like in France, or for a while, Turkey). Communism can be seen as this taken to its natural and fullest extent, although it comes at the cost of an untenable social and economic order.

Averroism

What Europe came to call these ideas was "Averroism". What it boiled down to was the primacy of reason over revelation. Apparently his influence was so widespread that he's attributed with being one of the major influences which drove the European Enlightenment. Frederick II (d. 1250), the Emperor of the Holy Roman Empire (Germany), even had Ibn Rushd's works translated so that he could use them as arguments in his war with religious authorities.⁸³ The parallel between his lofty view of himself and his philosophical contemporaries and the similarly grandiose position that European Enlightenment thinkers allotted themselves in the social hierarchy is rather

⁸²Bakar, Osman - *Classification of Knowledge in Islam*, 1998 p.81-83

⁸³Fauzi M. Najjar - [The Debate on Islam and Secularism in Egypt](#), p.12 *Arab Studies Quarterly*

obvious. The appeal of such ideas to philosophers and scientists battling the Christian theological tradition cannot be understated. The state of Christian theology was far different from the Islamic, where more than a few scientists were themselves theologians and where its biggest proponent, al-Ghazali, spoke of the necessity for endeavor in the physical sciences and how religion can not be painted to contradict empirical truths arrived at in such scientific pursuits.

Tabula Rasa

Tabula rasa, as defined at Wikipedia,

Tabula rasa is the epistemological theory that individuals are born without built-in mental content and that their knowledge comes from experience and perception. Generally proponents of the *tabula rasa* thesis favour the "nurture" side of the nature versus nurture debate, when it comes to aspects of one's personality, social and emotional behaviour, and intelligence. The term in Latin equates to the English "blank slate" (or more accurately, "erased slate") (which refers to writing on a slate sheet in chalk) but comes from the Roman *tabula* or wax tablet, used for notes, which was blanked by heating the wax and then smoothing it to give a *tabula rasa*.

In Western philosophy, traces of the idea that came to be called the *tabula rasa* appear as early as the writings of Aristotle. Aristotle writes of the *unscribed tablet* in what is probably the first textbook of psychology in the Western canon, his treatise "Περί Ψυχῆς" (*De Anima* or *On the Soul*, Book III, chapter 4). However, besides some arguments by the Stoics and Peripatetics, the notion of the mind as a blank slate went largely unnoticed for more than 1,000 years.

As we can see, it's closely related to empiricism as a philosophy or rather a combination of empiricism and rationalism (man perceives with his senses and his rational intellect makes sense of the input into conclusions).

Ibn Sina (Avicenna) (980-1037)

Ibn Sina is one of the most celebrated intellectual personalities in Islamic and Western history. He's probably the most well known Islamic scientist and philosopher of all time. His contributions in medicine and anatomy singlehandedly formed the foundation of Islamic and European knowledge on the subject for centuries. More on his life and his illustrious career can be learned elsewhere as it would be way too long to cover here. I'd like to point out that he continues to enjoy a very good reputation among the orthodox

of today as well as of previous generations. Despite being of the Peripatetic school, even al-Ghazali spoke of him as kindly as possible while limiting his criticism to his metaphysical philosophies (based on Neoplatonism). Basically, no one questioned his sincerity so it was easy to overlook his “errors”.

He made philosophical contributions all across the board, from essentialism to existentialism. What we’re concerned with here is his notion of *tabula rasa*.

The second most influential idea of Avicenna is his theory of knowledge. The human intellect at birth is rather like a *tabula rasa*, a pure potentiality that is actualized through education and comes to know. Knowledge is attained through empirical familiarity with objects in this world from which one abstracts universal concepts. It is developed through a syllogistic method of reasoning; observations lead to prepositional statements, which when compounded lead to further abstract concepts. The intellect itself possesses levels of development from the material intellect (*al-‘aql al-hayulani*), that potentiality that can acquire knowledge to the active intellect (*al-‘aql al-fa‘il*), the state of the human intellect at conjunction with the perfect source of knowledge.⁸⁴

This concept was further elaborated upon by his successor, Ibn Tufayl.

Ibn Tufayl (Abubacer) (1105-1185)

Ibn Tufayl was also an Andalusian scholar and thus followed in the tradition of Ibn Sina. Like Ibn Sina, he too was a physician and also a Sufi mystic. He’s most known in the West for his contributions to philosophy, particularly in this respect. Ibn Tufayl took Ibn Sina’s concept and fleshed it out to its fullest possible extent in the form of a philosophical novel, one long thought experiment, titled *Hayy ibn Yaqdhan*.

Philosophus Autodidactus

This novel came to be known in the West as *Philosophus Autodidactus*. The original title was *Hayy ibn Yaqdhan*, or “Alive, son of Awake”. The name was taken from an earlier story of Ibn Sina’s, though that was unrelated to this subject matter. Ibn Sina’s story was a thought experiment in which an Al-Khidr-like sage taught the narrator about the nature of the universe, in line with the “active intellect” philosophy that al-Farabi adopted from the Greeks. Al-Farabi, however, usually identified the active intellect with the archangel Gabriel, with the Prophet (saw) acting as the recipient of the inspiration/knowledge.

Ibn Tufayl’s novel takes the form of a desert island story (set on an unnamed island in

⁸⁴*Internet Encyclopedia of Philosophy* - [Avicenna](#)

the Indian ocean) and is often credited as the first such story. The novel's protagonist is an autodidactic feral child who was raised by a gazelle. Upon the death of his "mother", he dissects the body (keeping in line with Ibn Tufayl's strong emphasis on autopsy, dissection, and anatomy as a physician) to investigate the cause of her death. This sets him on a path of self-discovery, away from contact with other human beings, where he uses a systematic process of reasoned inquiry (especially empiricism) to come to true knowledge about the world.

A summary of the plot is found on muslimphilosophy.com and I shall reproduce it here, owing to the relevance of its subject matter to the discussion at hand:

The story of Hayy Ibn Yaqzan takes place on an equatorial island uninhabited by human beings. There Hayy is found alone as an infant. Philosophers were of the opinion that he was born spontaneously when the mixture of elements reached an equilibrium state, making it possible for this mixture to receive a human soul from the divine world. Traditionalists believed that he was the son of a woman who chose to keep her marriage to her relative, Yaqzan, secret from her brother who ruled a neighbouring island and did not find any man qualified to marry his sister. After breastfeeding Hayy well, she put him in a box and threw it into the waters, which took him to the uninhabited island.

A deer who had just lost her son and was still experiencing the feelings of motherhood heard Hayy's cries. She suckled him, protected him from harmful things and took care of him until she died when he was seven years of age. By then he had learned to imitate other animals in speech, and he covered parts of his body with leaves after noticing that those animal parts are covered with hair or feathers. The deer's death transformed Hayy's life from one of dependency to one of exploration and discovery.

In an effort to find out the reason for the deer's death, a reason which he could not locate by observing her appearance, he dissected her with sharp stones and dry reeds. Noticing that every bodily organ has a proper function and that the left cavity of her heart was empty, he concluded that the source of life must have been in this cavity, and must have abandoned it. He reflected on the nature of this vital thing, its link to the body, its source, the place to which it has departed, the manner of its departure and so on. He realized that it was not the body but this vital entity that was the deer and the source of its actions. With this realization he lost interest in the deer's body, which he then viewed as a mere instrument. While he could not decipher the nature of this vital thing, he observed that the shape of all deer was similar to that of his mother. From this he concluded that all deer were managed by something similar to the vital thing that managed his mother's life.

After his discovery of life, he came across a fire. He noticed that, contrary

to other natural objects, which move downward, fire moves upward. This indicated to him that the essence of fire is other than that of natural things. He continued to investigate other parts of nature: animal organs, their arrangement, number, size and position, as well as the qualities that animals, plants and inanimate things have in common and those that are proper to each of them. Through continued reasoning he grasped the concepts of matter and form, cause and effect, unity and multiplicity, as well as other general concepts concerning the earth and the heavens. Concluding that the universe is one in spite of its multiple objects, he moved on to consider whether it is created or eternal. Through highly sophisticated reasoning, he found that neither the idea of creation nor that of eternity is immune to objection. Though he could not rationally decide whether the universe is created or eternal, he concluded that it must have a cause on which it remains dependent and that this cause or necessary being is non-physical and above it in essence, even if not in time.

He also concluded that the thing in him which knew this cause must also be non-physical. The more detached this non-physical thing in him was from sensory perceptions, the clearer was its vision of this cause, a vision that gave the highest joy. Even though sensations obstructed this vision, he felt obliged to imitate animals by experiencing sensations to preserve his animal soul, which would enable him to imitate the heavenly bodies. Imitating the heavenly bodies by doing things like circular movement provided him with continuous but impure vision, for attention in this type of imitation is still paid to the self.

By knowledge of the necessary being, Hayy sought to imitate this being's positive attributes; by an attempt to transcend the physical world, he sought to imitate the negative ones. Imitation of the necessary being for the sake of this being involved no attention to the self and hence provided him with pure vision. Not only was Hayy's self or essence obliterated in this state, but so also was everything other than the necessary being. No human sight, hearing or speech could grasp this state, as it lies beyond the world of nature and sense experience. Therefore no explanation of necessary being can be given, only mere signs, as Ibn Sina contends in *al-Isharat wa-'l-tanbihat (Remarks and Admonitions)*. One who seeks an explanation of this state is like one who seeks 'the taste of colours inasmuch as they are colours'. Verification requires direct experience. Using human language, which is described as an inadequate instrument, to hint at the truth Hayy is said to have witnessed in this state, the necessary being is said to pervade the universe as sunlight pervades the physical world. Trying to express the inexpressible, the author says that Hayy realized in this state that the whole is one, even though unity and multiplicity, like other contraries, exist only for sense perception.

On a neighbouring island a group of people, including the king, Salaman, practised a religion which was sound yet provided the masses with symbols, not direct truths. Absal, a friend of Salaman, observed the rituals of this religion but, contrary to others who adhered to its literal meaning, he delved into its inner truths. Being naturally inclined to solitude, which was in agreement with certain passages of the Scripture, Absal moved to the island on which Hayy lived. When he encountered Hayy he was frightened, until Hayy made it clear that he intended no harm. Absal then taught Hayy human language by pointing to objects while uttering the corresponding words.

With the acquisition of language, Hayy was able to explain to Absal his development in knowledge. At hearing this, Absal realised that what Hayy had witnessed were the realities described in his own religion: God, the angels, the holy books, prophets, afterlife and so on. When Absal discussed the truths as detailed in his religion, Hayy too found these truths in agreement with what he had come to know. However, Hayy could not understand why Absal's religion resorted to symbols and permitted indulgence in material things.

Hayy expressed interest in visiting the neighbouring island to explain to its people the pure truth. Absal, who knew their nature, reluctantly accompanied him. Addressing the most intelligent group on this island, Hayy was shown respect until he tried to go beyond the literal meaning of their Scripture. The people then shunned him, distracting themselves from the truth by commercial activity. Hayy understood then that such people are incapable of grasping the direct truth and that religion is necessary for their social stability and protection. Social stability and protection, however, in no way secure happiness in the afterlife. Only preoccupation with the divine, which is rare among people of this kind, can provide such security. In contrast, the preoccupation with this world in which the majority of people indulge results in darkness or hell. While the truths of reason and revelation are the same, the majority of those adhering to the latter do so for worldly success and hence achieve eternal misery. Realizing that an attempt to enlighten those incapable of vision will only destabilize them without preparing them for happiness, Hayy asked people to continue practising their religion, warning them only against indulgence in worldly matters. Hayy and Absal returned then to the deserted island to practise their mysticism in isolation.

As one can see, all the elements of the Peripatetic philosophy are there. Using philosophy, especially empiricism, to learn about the world and derive religious truths that are otherwise delivered to the masses through symbolic messages in Scripture. The implication is that the one who derives the truth themselves through their own rational faculties (a philosopher, obviously, as the elitist streak is a constant in their works) has

transcended the need for Scripture. In this the mystic tradition of Sufism is implicit in the rational process as a means of illumination (a counterintuitive thought in the modern Western naturalist worldview).

The protagonist eventually comes to understand that the world is divided between a very few who understand spiritual truths through their unaided reason, a larger group who apprehend truth through spiritual symbols, and the great mass who simply accept the laws that emanate from those symbols.¹⁰⁸

This novel is perhaps the best succinct statement of the Islamic Peripatetic worldview.

The novel was a huge hit, both in the Islamic world and in Europe. Here's a bit of the sourced claims from the entry on Wikipedia:

Hayy ibn Yaqdhan had a significant influence on Arabic literature, Persian literature, and European literature,⁸⁵ and went on to become an influential best-seller throughout Western Europe in the 17th and 18th centuries.⁸⁶ The work also had a "profound influence" on both Islamic philosophy and modern Western philosophy.⁸⁷ It became "one of the most important books that heralded the Scientific Revolution" and European Enlightenment, and the thoughts expressed in the novel can be found "in different variations and to different degrees in the books of Thomas Hobbes, John Locke, Isaac Newton, and Immanuel Kant."⁸⁸ George Sarton considered the novel "one of the most original books of the Middle Ages."

Middle East

In the late 12th century, Avicenna's original Persian version of *Hayy ibn Yaqzan* inspired Shahab al-Din Suhrawardi to write *Story of Western Loneliness*, in which he began the story from where Avicenna ended *Hayy ibn Yaqzan*.

In the 13th century, Ibn Tufail's *Hayy ibn Yaqdhan* inspired Ibn al-Nafis to write the first theological novel, *Al-Risalah al-Kamiliyyah fil Siera al-Nabawiyyah (The Treatise of Kamil on the Prophet's Biography)*, known in

⁸⁵Martin Wainwright, [Desert island scripts](#), *The Guardian*, 22 March 2003

⁸⁶G. A. Russell (1994), *The 'Arabick' Interest of the Natural Philosophers in Seventeenth-Century England*, p. 228, Brill Publishers, ISBN 9004094598

⁸⁷G. J. Toomer (1996), *Eastern Wisdom and Learning: The Study of Arabic in Seventeenth-Century England*, p. 218, Oxford University Press, ISBN 0198202911.

⁸⁸Samar Attar, *The Vital Roots of European Enlightenment: Ibn Tufayl's Influence on Modern Western Thought*, Lexington Books, ISBN 0739119893

the West as *Theologus Autodidactus*,⁸⁹ written as a critical response to Ibn Tufail's *Hayy ibn Yaqdhan* and in defense of some of al-Ghazali's views.⁹⁰ *Theologus Autodidactus* was also based on a feral child living on a desert island but the plot later expanded beyond this setting and evolved into the first example of a science fiction novel.⁹¹ Ibn al-Nafis' novel was also later translated into English in the early 20th century as *Theologus Autodidactus*.

In 2001, an Arabic animated cartoon, *Hay - The Gazelle Child*, was produced as an adaptation of Ibn Tufail's *Hayy ibn Yaqdhan*.

Europe

A Latin translation of Ibn Tufail's work, entitled *Philosophus Autodidactus*, was first published in 1671, prepared by Edward Pococke the Younger, who had completed the translation prior to 1660.⁹² The novel inspired the concept of tabula rasa developed in *An Essay Concerning Human Understanding* (1690) by John Locke, who was a student of Pococke,^{93 94} and who referred to his translation as a "novelty".⁸⁵ *Philosophus Autodidactus* also inspired Robert Boyle, another acquaintance of Pococke, to write his own philosophical novel set on an island, *The Aspiring Naturalist*.⁹⁴

The first English translation of the novel was published by George Ashwell in 1686, based on Pococke's Latin translation.⁹⁵ The first English translation of the Arabic original, entitled *The Improvement of Human Reason: Exhibited in the Life of Hai Ebn Yokdhan*, was published shortly after by Simon Ockley in 1708,⁹⁶ followed by two more English translations. Baruch Spinoza also read the work and soon encouraged a Dutch translation, which was published by his friend Johannes Bouwmeester in 1672.^{97 85} Another Dutch translation, *De*

⁸⁹Muhsin Mahdi (1974), "*The Theologus Autodidactus of Ibn al-Nafis* by Max Meyerhof, Joseph Schacht", *Journal of the American Oriental Society*

⁹⁰Nahyan A. G. Fancy (2006), "Pulmonary Transit and Bodily Resurrection: The Interaction of Medicine, Philosophy and Religion in the Works of Ibn al-Nafis (d. 1288)", pp. 95-102, *Electronic Theses and Dissertations*, University of Notre Dame

⁹¹Dr. Abu Shadi Al-Roubi (1982), "Ibn Al-Nafis as a philosopher", *Symposium on Ibn al-Nafis*, Second International Conference on Islamic Medicine: Islamic Medical Organization, Kuwait

⁹²G. J. Toomer (1996) p.220-221

⁹³G. A. Russell (1994) p. 224-239

⁹⁴G. J. Toomer (1996) p.221-222

⁹⁵Al-'Allāf, Mashhad (2003), *The Essence of Islamic Philosophy*, St. Louis, Mo, p. 275, ISBN 0972272216

⁹⁶Simon Ockley (1708), *The Improvement of Human Reason: Exhibited in the Life of Hai Ebn Yokdhan*, Oxford University.

⁹⁷G. A. Russell (1994) p.224-262

natuurlijke wijsgeer, was published by Adriaan Reland in 1701.

There were also two German translations of the novel, the first based on the Latin translation and the second based on the Arabic original.⁹⁵ One of these translations was read by Gottfried Leibniz, who praised it as an excellent example of classical Arabic philosophy. In Paris, Pococke's agent also wrote to him stating that he "delivered a copy to the Sorbonne for which they were very thankful, being much delighted with it."^{85 97}

In 1719, one of the English translations of *Hayy ibn Yaqdhān* inspired Daniel Defoe to write *Robinson Crusoe*, which was also set on a deserted island and was regarded as the first novel in English.^{98 99 100 85} In turn, *Robinson Crusoe* had an "enormous impact" on the thought of the Enlightenment.¹⁰¹ In 1761, an anonymous Crusoe story was printed in London, entitled *The Life and Surprising Adventures of Don Antonio de Trezannio*, much of which was conveyed or paraphrased from Ockley's translation of *Hayy ibn Yaqdhān*. Ockley's translation was also published again in 1804 by Paul Bronnie in London. Despite *Hayy ibn Yaqdhān* originally being written in Islamic Spain, the first Spanish translation of the novel wasn't published until 1900, by F. Pons Boigues in Zaragoza. An accurate French translation was also published that same year by Prof. L. Gauthier at Algiers.⁹⁵

The story of *Hayy ibn Yaqdhān* also anticipated Jean-Jacques Rousseau's *Emile: or, On Education* in some ways, and is also similar to the later story of Mowgli in Rudyard Kipling's *The Jungle Book*. Both Rousseau and Kipling were likely to have been influenced by *Hayy ibn Yaqzan*.¹⁰² Other early modern European scholars and writers who were also influenced by *Philosophus Autodidactus* include Melchisédech Thévenot, John Wallis, Christiaan Huygens,¹⁰³ George Keith, Robert Barclay, the Quakers,¹⁰⁴ Samuel Hartlib,⁹⁴ Karl Marx,¹⁰⁵ and Voltaire.¹⁰²

⁹⁸Nawal Muhammad Hassan (1980), *Hayy bin Yaqzan and Robinson Crusoe: A study of an early Arabic impact on English literature*, Al-Rashid House for Publication.

⁹⁹Cyril Glasse (2001), *New Encyclopedia of Islam*, p. 202, Rowman Altamira, ISBN 0759101906

¹⁰⁰Amber Haque (2004), "Psychology from Islamic Perspective: Contributions of Early Muslim Scholars and Challenges to Contemporary Muslim Psychologists", *Journal of Religion and Health* 43 (4): 369

¹⁰¹Ghada H. Talhami (2008), "Samar Attar. The Vital Roots of European Enlightenment: Ibn Tufayl's Influence on Modern Western Thought", *Arab Studies Quarterly* (Spring 2008)

¹⁰²Tor Eigeland, [The Ripening Years](#), *Saudi Aramco World*, September-October 1976

¹⁰³G. A. Russell (1994) p.227

¹⁰⁴G. A. Russell (1994) p.247

¹⁰⁵Dominique Urvoy, "The Rationality of Everyday Life: The Andalusian Tradition? (Aropos of Hayy's First Experiences)", in Lawrence I. Conrad (1996), *The World of Ibn Tufayl: Interdisciplinary Perspectives on Ḥayy Ibn Yaqzān*, pp. 38-46, Brill Publishers, ISBN 9004093001

North America

The English translation of *Hayy ibn Yaqdhan* was known to the Royal Society and the New England Company in North America by 1721, when Cotton Mather's *The Christian Philosopher* cited *Hayy ibn Yaqdhan* as an influence. Despite condemning the 'Mahometans' as infidels, Mather viewed the protagonist of the novel, Hayy, as a model for his ideal 'Christian philosopher' and 'monotheistic scientist'. Mather also viewed Hayy as a noble savage and applied this in the context of attempting to understand the Native American 'Indians' in order to convert them to Puritan Christianity.¹⁰⁶

G.A. Russell in his *The 'Arabick' Interest of the Natural Philosophers in Seventeenth-century England* devotes considerable time to establishing the influence of the novel on John Locke specifically, and his ideas on tabula rasa, starting on page 224 (this portion of the book can be read online on [Google Books](#)).¹⁰⁷ Locke was considered one of the most major of the early proponents of empiricism in the West and went on to influence such prominent personalities of that tradition as George Berkeley and David Hume, who will be discussed further later.

It's fairly easy to see how many of these ideas about Ibn Tufayl's worldview¹⁰⁸ would instinctively ring true for the Enlightenment-era philosophers of Europe in their struggle to free themselves of the intellectual shackles of the Church.

One interesting anecdote about *Philosophus Autodidactus* and current events is Molyneux's Problem. It was a question posed to John Locke by his contemporary, William Molyneux:

Suppose a man born blind, and now adult, and taught by his touch to distinguish between a cube and a sphere of the same metal, and nighly of the same bigness, so as to tell, when he felt one and the other, which is the cube, which is the sphere. Suppose then the cube and the sphere placed on a table, and the blind man made to see: query, Whether by his sight, before he touched them, he could now distinguish and tell which is the globe, which the cube? To which the acute and judicious proposer answers: 'Not. For though he has obtained the experience of how a globe, and how a cube, affects his touch; yet he has not yet attained the experience, that what affects his touch

¹⁰⁶Quiggle, Doyle R. (Summer 2008), "Ibn Tufayl's *Hayy Ibn Yaqdan* in New England: A Spanish-Islamic Tale in Cotton Mather's *Christian Philosopher*?", *Arizona Quarterly: A Journal of American Literature, Culture, and Theory* 64 (2): 1

¹⁰⁷The influence of this idea survives to such an extent in popular culture that in the television series, *Lost*, about the survivors of an airplane crash deserted on an island, an episode was named *Tabula Rasa* and featured a character named John Locke

¹⁰⁸<http://www.bookrags.com/research/ibn-tufayl-abubacer-scit-0212/>

so or so, must affect his sight so or so...'

Ibn Tufayl had put the issue in his novel, though using colors instead of shapes. Ibn Tufayl had replied in the positive (that the blind man, upon regaining sight, would be able to instantly associate prior data from his other senses with his new data gained from sight). However, Ibn Tufayl's version of the problem is fundamentally different in that it employs colors which is perhaps a fundamental flaw in his illustration of the question since explaining to a blind man the nature of color itself, let alone the differences between the respective colors, is a questionable undertaking. In addition, simply telling the blind person that one particular object was another particular color would lead the blind person to instantly associate the color if he were able to recognize the object on some other basis, making it a muddled problem. Nonetheless, being that Ibn Tufayl was himself of the Peripatetic school and favored rationalism, it's not unreasonable to predicate a "yes" answer of him. Molyneux's use of shapes and the sense of touch was a better restatement of the problem. The empiricists, including Locke, answered in the negative (that the blind man would not be able to associate before touching), whereas the more rationalist-oriented philosophers said yes.

This was finally settled in a scientific experiment published a few weeks before I began writing this in April of 2011. Pawan Sinha of MIT ran a study on blind patients in India who had their sight restored.¹⁰⁹

For the critical test, however, in which the children first felt an object and then tried to distinguish visually between that same object and a similar one, the results were barely better than if they had guessed.

"They couldn't form the connection," said Yuri Ostrovsky, also a researcher at MIT and a co-author of the study.

"The conclusion is that there does not seem to be any cross-modal" -- that is, from one sense to the other -- "representation available to perform the task," he said by phone.

The answer to Molyneux's question, then, appears to be "no": the data blind people gather tactically that allows them to identify a cup and a vase, and to tell them apart, is not accessible through vision.

At least not at first.

"From a neuro-scientific point of view, the most interesting finding is the rapidity with which this inability was compensated," said Richard Held, an emeritus professor at MIT and lead author of the study.

¹⁰⁹<http://www.nature.com/neuro/journal/v14/n5/full/nn.2795.html>

"Within about a week, it's done -- and that is very fast. We were surprised," he said by phone.¹¹⁰

Ibn Tufayl had written this novel partly as a defense of Ibn Sina from al-Ghazali's *Incoherence of the Philosophers*. Luckily for us, an Ash'arite would write a response to Ibn Tufayl also in the form of a tabula rasa thought experiment, which makes contrasting the orthodox view with the old Islamic Peripatetics easier.

Ibn al-Nafis (1213-1288)

Ibn al-Nafis was situated far from al-Andalus. He spent most of his career in Damascus and Cairo. He was a prominent physician and scientist of the Mameluke period.

He's perhaps most notable for discovering pulmonary circulation. His knowledge of circulatory physiology was centuries ahead of its time (by Western standards).

For more reading on the subject of his scientific contributions, see this link:

<http://www.islamset.com/isc/nafis/index.html>

In his doctoral thesis at the History and Science of Philosophy department at the University of Notre Dame, Dr. Nahyan Fancy analyzes Ibn al-Nafis' contributions to science in the context of his theological worldview¹¹¹. Here's the abstract:

Traditionally, historians of science have only been interested in Islamic science because of its relationship to Greek science, and in the ways in which it was instrumental in transporting Aristotle, Ptolemy and Galen to the West. Moreover, the successes and failures of Islamic science have been judged according to the metric of the Scientific Revolution. As such, the actual context of the works of Islamic scientists and physicians has been overlooked, thereby producing a skewed picture of science in Islamic societies. This dissertation seeks to correct this picture by placing Islamic medicine firmly within its context. In the process, it provides a new framework with which to understand the relationship between reason and revelation in Islamic societies, and suggests new ways to revisit the entire problem of the decline of Islamic science.

The dissertation specifically examines the corpus of writings of an Egyptian physician-jurist, Ibn al-Nafis (d. 1288), best known to Western historians of

¹¹⁰[Google News](#)

¹¹¹Fancy, Nahyan A. G. (2006), "Pulmonary Transit and Bodily Resurrection: The Interaction of Medicine, Philosophy and Religion in the Works of Ibn al-Nafis (d. 1288)", *Electronic Theses and Dissertations* (University of Notre Dame)

science as the discoverer of the pulmonary circulation of blood. Although his discovery has been known for a century, there has been no study that situates Ibn al-Nafīs' discovery within the context of his time. This dissertation seeks to fill that lacuna. Focusing on his views on the soul (nafs) and spirit (rūh)--two concepts central to theological discussions about the afterlife and medical physiology, this dissertation positions Ibn al-Nafīs' philosophical and physiological discussions against the background of earlier and contemporary philosophical, medical and theological works. Through this contextualization, this study reveals that Ibn al-Nafīs' new theory of the pulmonary transit of blood is the offspring of his new psychology and physiology. It also reveals that on the basis of his new physiology, Ibn al-Nafīs rejected the Galenic theory of pulsation and posited a new theory in its stead; an important point that has hitherto been missed by historians. Moreover, this work reveals that Ibn al-Nafīs' new physiological and psychological theories are themselves the direct result of his solution to the thirteenth century debates over reason and revelation. Consequently, the dissertation problematizes existing historical accounts, and seeks to replace historical models that posit an antagonistic and destructive relationship between reason and revelation during this period.

Ibn al-Nafīs wrote his own thought experiment story response to *Hayy ibn Yaqzan* (*Philosophus Autodidactus*), which he titled *al-Risala al-Kamiliyya fil-Sira al-Nabawiyya* or as it became known in the West, *Theologus Autodidactus*. As the name implies, it emphasizes theology where Ibn Tufayl emphasized philosophy.

The aforementioned Dr. Fancy describes Ibn al-Nafīs' intention:¹¹²

His critique was necessitated by the appearance of Ibn Tufayl's (d. 1186) philosophical narrative, *Hayy ibn Yaqzan*, in which Ibn Tufayl suggests that it is possible for an individual raised on a deserted island to rationally discover the underlying reality that is presented merely symbolically, and thus, imperfectly in revelation. Ibn al-Nafīs counters with his own narrative, *Fadil ibn Natiq*¹¹³, to show that not only is autodidactic learning in religious and theological matters impossible, but that exoteric revelation is rational and, thus, should be permissible in philosophical arguments.

[...]

Ibn al-Nafīs's goal is not to show how a person can independently arrive at all the exoteric truths of revelation. That would run counter to his traditionalist belief in the necessity of revelation for arriving at the Truth. Rather, the goal is to show that exoteric revelation is itself rational and, thus, should be accepted

¹¹²Fancy, Nahyan - *The Virtuous Son of the Rational: A Traditionalist's Response to the Falasifa* - Conference paper for Ancient and Medieval Philosophy, Fordham University, 2005

¹¹³Another title for the same work

within the confines of a demonstrative argument.

Theologus Autodidactus

Ibn al-Nafis wrote it as the Ash'arite response to Ibn Tufayl's work, to use the same concept to illustrate the Ash'arite view of the relationship between reason and revelation. It basically became a rational statement of Ash'arite theology, arguing for all the major points on the basis of rational thought and scientific reasoning, not by virtue of their theological origin. Due to his considerable scientific expertise, it wound up being the more accurate work compared to Ibn Tufayl's. In it he addressed, for example, Ibn Sina's problem with the notion of bodily resurrection as being unsupportable by reason. He showed how it could be possible rationally. The entire story takes this approach (resembling perhaps more of a Maturidi view of theology than Ash'ari). For this reason, *Theologus Autodidactus* has been described as the first true sci-fi novel.

He devotes considerable time to rationalizing the nature of prophethood and Muhammad's (saw) claim to it, some of the political issues of his time, even the major signs of the Day of Judgment from Islamic eschatology.

It was only translated into English in the 20th century, thus it had no influence outside of the Islamic world in its time (due in no small part to his location, unlike Ibn Tufayl's work which made it from Al-Andalus into Europe quite easily) and even limited influence within it, as the primary concern of his time was the Mongol and Crusader threat, and the centers of power were shifting away from his Mameluke Egypt to Ottoman Turkey and Mughal India. This transition accompanied a marked decrease in attention to the basic sciences in the Islamic world and more of a concentrated focus on engineering and technology, especially military applications (the "gunpowder empires").

This work can also be seen as the forerunner to modern Muslim movements seeking to rationalize theology in known scientific terminology, especially those coming out of Turkey (which strongly inherited the Maturidi tradition) in the 20th century. However, where Ibn al-Nafis wrote this as a thought exercise, a fictional novel response to Ibn Tufayl's work, these movements advocate more of a complete overhaul in theological understanding and elevate reason to a standing almost but not quite on par with revelation. Instead of altering theology, the wording of the scriptural texts isn't altered, but rather the understanding or meaning is, and old understandings are discounted. In this way these modern movements seem like an interesting hybrid of Maturidi and old *Falasifah* tradition in the context of contemporary Western naturalist¹¹⁴ epistemology (where the orthodox epistemological emphasis on the uncertainty of human knowledge and interpretation isn't taken into account).

Most of the story takes place as thoughts of contemplation or reflection within the

¹¹⁴e.g. *Scientific naturalism*, what some may describe as *scientism*.

protagonist's mind regarding his surroundings and himself. So there is not much in the way of plot, but the story rather serves as a pretext for discussing the purely rational thought of the individual. I'll summarize it here:

The First Part

On how this man called Kamil came to be formed and how he came to know the (natural) sciences and the missions of the prophets.

The First Section

Kamil is "spontaneously generated" in a cave on an island after a flood. The floodwater pushed into the cave a great deal of different kinds of clay and herbs and then still more earth which sealed the mouth of the cave, locking the contents therein even after the floodwater receded. Time passed until summer came around and the contents of the cave became "hot and fermented". The clay contents were of different kinds, corresponding to the four elements¹¹⁵, and reached an equilibrium state of mixture. "Their consistency became viscous and capable of having organs formed from them; their single parts were differentiated because the kinds of clay with which they had been mixed were different."

When these parts were capable of forming organs, "Allah in His generosity does not withhold his right from anyone who deserves it, and grants to everyone who is prepared for something that for which he is prepared." Then Allah created the organs, and from the organs, the body of a man. From the vapors, which were "refined and airlike", the human spirit (*ruh*) was formed to complete the process.

"This man was different from a man formed in the womb in several respects. Firstly, the formation of this man resembled that of the chicken in the egg, as the cave resembled the shell of the egg, its material contents the yolk and white of the egg, the parts similar to the temperaments of the organs those parts from which the chicken is formed..."

He goes on to say the man spent 10 or 12 years in this makeshift "egg", owing to the large constituent parts from which he was formed (whereas the organs of the fetus in the womb are formed from tinier "particles of sperm").

The account of the protagonist's "spontaneous generation" is more aptly, albeit perhaps anachronistically, described as "abiogenesis". The difference between the two terms is subtle. Spontaneous generation refers to the ancient belief that life spontaneously and constantly arises from inanimate matter (like worms from rotten things). Abiogenesis

¹¹⁵Corresponding to wet, cold, hot, dry, derived from the ancient Greek notion of four elements.

is the modern theory of how life first formed (the amino acids of the primordial soup). Considering Ibn al-Nafis' clear reference to and use of the four elements¹¹⁶, it's likely he's doing something more aptly described as the latter.

To further reinforce that assertion, Ibn al-Nafis stays true to the verses of the Qur'an and hadiths of the Prophet Muhammad (saw) in which is described the creation of Adam in Heaven "according to the composition of the Earth"¹¹⁷, a process that took a considerable amount of time in which water and clay were heated/fermented and formed a "sticky", "altered mud", from which God molded Adam and eventually breathed life into him.

Second Section: *On how Kamil came to acquire sciences and wisdom*

Kamil emerges from the cave, discovers his senses and how to use them and what sort of information he could gain from them. He became familiar with his motor functions (walking, running, etc) and with the general idea of functions for external body parts. He began dissecting dead animals he found and observed the internal organs. He deduces the purposes of various organs as they branch off from the main digestive tract, whose purpose was easily deduced. He also becomes acquainted with the lungs, heart, diaphragm and deduces that circulation of blood and respiration of breathed air are involved with these.

This process continues for quite some time until he builds up a considerable knowledge of anatomy. He also observes the various species of animals and their characteristics, as well as plants. He develops the basic idea that everything has a specific function and use. He also observes nature and the weather (meteorological phenomena).

Much time passes and Kamil develops a great deal of life experience and his reflection turns to existential issues. He observes causality, that things are caused by other things. He notices that nothing is really persistent and all things come and go. Here he deduces, by way of the traditional cosmological argument's rationale, the existence of a Creator since all causes had to lead back to something, and something had to be orchestrating everything (I'm obviously paraphrasing it).

Unfortunately, I have to gloss over most of the logical and scientific details in the thought of the protagonist. I would recommend reading it for yourself if you're interested. A PDF version of it can be found via Google.

¹¹⁶Which itself suggests perhaps an association with the Maturidi tradition where elements were more often the subject of focus than *jawhar* (atoms)

¹¹⁷Musnad of Ahmad ibn Hanbal, the process is additionally described by Ibn Kathir & al-Tabari

The Third Section: *On how Kamil came to know the existence of prophets*

While ruminating on the nature of the Creator, a ship crashes on the island. Hesitant at first, Kamil eventually met them. They were surprised but came to accommodate him. He stayed with them and they taught him their language. They told him about the outside world and took him with them on their ship to the nearest city. Indulging in the amenities of civilization, Kamil came to realize that humans had to live in societies. He further reasoned that societies had to be ruled by laws by which all inhabitants were bound, and the only way to ensure that humans trusted a common law, it had to come from a higher source so they must believe the laws were from the Creator. From this he deduced there had to be lawgivers claiming to bring law from the Creator, prophets. The rest of the section is spent in thought deducing the nature of prophethood, such as the necessity of prophets being accompanied by miracles in order to get people to believe them.

Most of the rest of the work deals with this subject (the title is actually translated as "*Kamil on the Life-History of the Prophet*"). Kamil goes into minute detail over the various attributes that a legitimate prophet from the Creator had to possess, and these all matched up with the prophet Muhammad (saw). In writing it, Ibn al-Nafis is clearly arguing that the case of the Prophet's (saw) life was perfectly divinely ordained by God and his life story itself was evidence of his prophethood, because it all just made perfect sense.

In one interesting train of thought about the nature of body and soul the author makes an interesting observation:

“...the body of man as an infant is different from his body as an old man, and likewise the parts of the body, because both the body and its parts are continuously in dissolution and reconstruction, and unavoidably in constant change.”

In it, Ibn al-Nafis offers up one of the first recognitions of biological metabolism. Something not described in Europe until the 16th-17th century and still not to the same effective definition. Our modern definition of metabolism is split into two categories, catabolism or the breakdown of organic matter, and anabolism or the construction of the components which form our cells. It's a constant and ongoing process.

Back in the story, the protagonist continues ruminating over the events that could transpire during such a prophet's lifetime and even after it. After having rationalized the dictates of religion, he uses those to rationalize events, such as the downfall of Islamic civilization (due to leaving the religion and engaging in sins).

Then it gets to the attempt to scientifically explain, using the knowledge of his time,

the end of the world. He says that there's a deviation in the movement of the Sun and planets (he believed in geocentrism) which, when extrapolated, suggests the Sun would one day rise from the West (a sign of the end times in Islamic eschatology), resulting in chaos in the length of the day and night, and the subsequent effects (intensely hot near the equator, cold elsewhere). He theorizes about what effects this would have on the human population.

“...their characters and relationships will become bad, and evil deeds and litigation shall prevail. Their characters will also become widely different, and this will cause many wars, troubles, and bloodshed; the bad people will be to the fore and the good people in the background.”

He even describes the Beast (also mentioned in Judeo-Christian eschatology) in interesting terms:

“On account of the difference in temperaments of men their appearance will be different, too, and their looks ugly. Therefore there may possibly appear a man who is able to speak to his fellow men but has the external appearance of (a composite of) beasts.”

He describes the creature as more of a natural occurrence or transformation in man based on the changes in the environment rather than as a purely supernatural phenomenon.¹¹⁸

He then describes how the Sun would eventually settle itself and the Earth will become fruitful for life once again. He then describes how mankind would be resurrected, by the tiny bits of their remains that were left (the word used is often identified with the coccyx bone), to which their souls were still attached, and grow new bodies. This was a rather simple and reasonable explanation for the resurrection which eluded Ibn Sina and some of the other philosophers who, as mentioned earlier, wound up concluding such a thing wasn't even rationally feasible and thus altered theology to suit their conclusions.

Keeping in line with the general Ash'arite attitude, Ibn al-Nafis illustrated how conclusions could eventually be reached to explain things which could not previously be explained, so long as one devoted their efforts to the sciences and waited for science to “catch up” to theology. This has been the general attitude of the orthodox theology post-Ash'ari until this day. Within the time from Ibn Sina to Ibn al-Nafis, there had already been discoveries in human biology (including many of his own) which allowed the latter to build a rational foundation to explain things which his predecessors couldn't. He also in general rationalized not just the dictates of the religion, but the entire life

¹¹⁸The idea of transformation or transmutation of species is present even in the Qur'an and within the century after Ibn al-Nafis mentioned by Ibn Khaldun, another orthodox Ash'arite, in a Lamarckist theory of evolution. What's described here is, however, not transmutation. Man isn't transformed into a beast, only gains their likeness through plain natural change.

history of the Prophet (saw) and much of Islamic eschatology showing that even if one is to stick to reason, theology retains rational supremacy over philosophy (provided one is capable of properly wielding reason and knowledge).

So while both started off as tabula rasa thought experiments and focused on empiricism, the Peripatetic view focused on empiricism as a personal means of gaining knowledge. Whatever they couldn't immediately verify or rationalize must be symbolic and meant for the masses who couldn't think for themselves. The orthodox, however, held religious truths to be empirically verifiable and not immediately symbolic. If one couldn't immediately express them in rational/scientific terms, then one should simply wait and see, meanwhile accepting them on faith (it was, after all, a religion) as far as they understood them. After all, science might not be able to explain a religious truth until well after one's own lifetime. According to the orthodox, this doesn't mean one abandons the sacred law. So while the Peripatetics put rationalism over empiricism, the orthodox put empiricism over rationalism, and revelation over them both. Or one could say rationalism is what's connecting empiricism to revelation, so it's "above" empiricism in only that way. The relationship between empiricism and revelation¹¹⁹ (in that revelation was seen as a form of empirical evidence) was the focus of the orthodox (especially Ash'arite which I'll get to later) theologian scientists such as Ibn al-Nafis. It's not exactly the "reason vs. revelation" dichotomy as is so often expressed in literature.

For a much more detailed comparison of Ibn al-Nafis' work with Ibn Tufayl's, I highly recommend reading Nahyan Fancy's paper: *The Virtuous Son of the Rational: A Traditionalist's Response to the Falasifa* - Conference paper for Ancient and Medieval Philosophy, Fordham University, 2005.

Occasionalism

The doctrine whose contribution to philosophy that Islamic theology is perhaps most known for is what's known in the West as occasionalism.

While it became most famous due to the theology of Imam al-Ash'ari and the subsequent philosophical attacks of Imam al-Ghazali, the doctrine emerges from the verses of the Qur'an itself and the teachings of the prophet Muhammad (saw). It was Imam Abu Hanifah who first stated it outright as an article of faith in his theological work, *Al-Fiqh Al-Akbar*:

“All actions of the creation of Allah, whether motion or standstill, are truly acquired by them; yet Allah Ta'ala is their creator. All of them are executed by

¹¹⁹Recall al-Farabi's assertion that religion didn't rely on demonstrative proofs thus it wasn't higher in the hierarchy than philosophy. The orthodox obviously didn't agree with that.

His Will, Knowledge, Ruling, and Decree.”¹²⁰

It was also acknowledged in Imam at-Tahawi’s work, *‘Aqeedah Tahawiyyah*:

“Human actions are God’s creations but humanity’s acquisitions.”¹²¹

It was likely Imam al-Ash’ari who first developed this into a full fledged doctrine of causality (which we call in English occasionalism), though it could have been Imam al-Maturidi who was first (since al-Ash’ari started off his career as a Mu’tazilite and did not leave them until the age of 40).

Here are definitions of it. From Wikipedia,

Occasionalism is a philosophical theory about causation which says that created substances cannot be efficient causes of events. Instead, all events are taken to be caused directly by God. [...] The theory states that the illusion of efficient causation between mundane events arises out of God's causing of one event after another. However, there is no necessary connection between the two: it is not that the first event *causes* God to cause the second event: rather, God first causes one and then causes the other.

From the *Stanford Encyclopedia of Philosophy*:

Occasionalism attempts to address these questions by presenting as its core thesis the claim that God is the one and only true cause. In the words of the most famous occasionalist of the Western philosophical tradition, Nicolas Malebranche, “there is only one true cause because there is only one true God; ...the nature or power of each thing is nothing but the will of God; ... all natural causes are not *true* causes but only *occasional* causes”

It seems simple enough. There is no natural causality. The only cause is Allah. Allah creates all causes and all effects. Man has will, but no power to enact that will. All power rests with Allah. If you are a Muslim and this is new to you, it shouldn’t be.

لا حول ولا قوة إلا بالله

la ḥawla wa la quwwata illa billah

“There is no power or strength except with Allah.”¹²²

The English translation does not completely convey the full meaning of the phrase. For example, translating the word *hawla* as "power" is an over-

¹²⁰English translation of *Al-Fiqh Al-Akbar* by Shaykh Muhammad bin Yahya Ninowy

¹²¹Hamza Yusuf - *The Creed of Imam Tahawi*

¹²²From numerous hadith

simplification. The Hans Wehr Dictionary of Modern Written Arabic shows the linguistic verb root for *hawla* as h-w-l, and it depicts all manner of change, transformation and motion. Here are some literal translations of *la hawla wa la quwwata illa billah* that incorporate the concept of change and transformation:¹²³

- There is neither change nor power except through God.
- There is no transformation or strength except through God.
- There is neither progress nor might except through God.

It is for this reason that this doctrine of “occasionalism” or divine causality is implicit in the term *Tawheed* or what we refer to when we say “*Islamic monotheism*” (as distinguished from non-occasionalist accounts of monotheism).

The relationship between the theologico-philosophical theory of Atomism and this doctrine of Occasionalism can best be expressed by understanding the occasionalism as the “what” and the atomism as the “how”. Atomism will be discussed later.

Al-Ghazali (1058-1111)

This theological doctrine entered the realm of philosophy with Imam al-Ghazali's *Incoherence of the Philosophers (Tahafut al-Falasifah)* in which he used it to break apart Aristotelian and Neoplatonist metaphysics. I've discussed the *Incoherence* earlier including al-Ghazali's real goals and intentions when writing it.

He taught himself philosophy over the course of 2-3 years before he wrote the work *The Aims of the Philosophers (Maqasid al-Falasifah)* which was to be a setup for the *Incoherence*. In it, he lays out in detail the beliefs of the philosophers (i.e., Neoplatonism).

One overriding theme in al-Ghazali's works in philosophical discourse is that he aims to make this usually indecipherable material easily understood by the layman. It's not so much the philosophers that al-Ghazali worries about but the common people who might be swayed by eloquent sounding arguments they do not understand. Those enamored of philosophy tended to pride themselves on this sort of thing. This is a trend which is not limited to Islamic civilization. Even in Western civilization philosophy has a reputation for being convoluted sophistry and at odds with science, even though science is a type of philosophy. Contrast al-Ghazali here with, say, Immanuel Kant and his *Critique of Pure Reason* which is notorious in this regard.

This was not necessarily due to any personal preoccupation of al-Ghazali but rather with the general attitude of the Islamic theological orthodoxy. They favored empiricism,

¹²³Wikipedia

demonstrative proofs, simple and easy logic. Progress out in the field, pragmatic applications, rather than disputation for the sake of disputation which al-Ghazali describes very harshly. He in fact says he reserves his most harshest discourse for the latter and by harsh it's apparent he doesn't mean impolite but rather most potent. And nowhere is this more evident than in the *Incoherence*.

Imam al-Ash'ari did not rely so much on logic (syllogisms) in his works. The use of formal logic by the orthodox theologians was not yet common. This changed with Imam al-Ghazali. This is also why he derived his use of syllogisms from the Qur'an as mentioned earlier. In theological dispute, he had to establish his source as the absolute authority of the Qur'an for those who would doubt him, not to mention he had to restate the basic ideas of formal logic in simpler terms. How this would make theological disputes easier is clear. Many of the heretics hardly cared about logic and relied on persuasive, not demonstrative, arguments. It would be easy then to use logic to point out their errors. Al-Ghazali went above and beyond this, however, in his dismantling of Aristotle's most able defenders and commentators amongst the Peripatetics.

He justifies his use of (deductive/syllogistic) logic as Qur'anically sanctioned and encouraged:

I certainly did not claim that I used this rule to ascertain religious knowledge alone. I also use this method of measurement for arithmetic, geometry, the natural sciences, jurisprudence, theological discourse, and all knowledge which is true but founded on authority. Thanks to these rules, I may distinguish the true from the false. Why should this not be so, since this is the Just Balance which is spoken of alongside the Scripture and the Qur'an in the words: "Indeed, We sent Our Messengers with the clear signs, and We sent down with them the Book and the Balance."¹²⁴

Problem of Induction

Al-Ghazali wrote frequently of his criticisms of induction (*istiqra'*) or more appropriately, the improper use of induction (*al-istiqra' al-naqis*) and its inherent uncertainty (not resulting in necessary knowledge or conclusions).

In *Al-Qistas Al-Mustaqim*, which was written long after the *Incoherence*, he writes:

This is also like the man who examines the animals and observes them eating by moving the lower jaw. He states that all animals eat thus, but he has not examined the crocodile, which moves its upper jaw. It is possible that a thousand people can be subsumed under one judgment but that one may differ. Induction, therefore, cannot provide a certain conclusion.

¹²⁴*Al-Qistas Al-Mustaqim*

[...]

...induction would be true if the examination (of the cases) were exhaustive so that one could not imagine any case that could form an exception. But if the examination were not conclusive, that is, if it did not become either denial or affirmation, one could imagine a case which formed an exception. An exhaustive and conclusive examination is not easy to achieve. [...] How many ideas we have that are not present now and cannot, therefore, be grasped but that we learnt later of. Hence it may happen that there is another case which forms an exception, of which we are not presently informed and of which we may not indeed learn during our lifetimes.

He also criticizes the use of “extended categories” which go hand in hand with imperfect induction (*al-istiqrā’ al-naqis*).

He mentions induction in his *Maqasid al-Falasifah*:

Dependence on induction is sound in matters of *fiqh*, but not in things which require demonstration (logical proof). In matters of *fiqh*, the more induction is based on exact investigation and the closer its approach to completeness the more certain it is to put opinion out of court.¹²⁵

You can use deduction to arrive at particulars from universals (All humans are mammals, John is a human, therefore John is a mammal), but there's no logically consistent way to go in the opposite direction (John is a human, John is a mammal, therefore all humans are mammals). It's used a lot in science, but along with a very rigorous methodology of theory testing and falsification via experimentation, replicability of experimentation, and the predictability of the theory.

The real problem arises when it's not a part of an ongoing process but rather used in a definitive manner. For instance, anthropomorphists might say all observed agents have a body, God is an agent, therefore God has a body. They do not take into account the possibility that agents which are not bodies might exist. Al-Ghazali takes issue with the use of induction and analogical reasoning in theology, but not the legal sciences or the other speculative sciences (including the natural/physical sciences insofar as the conclusions are tested and are correct). Indeed *qiyas*, or analogical reasoning, is considered one of the *usul* (principles or sources) of *fiqh* (jurisprudence).

¹²⁵This version was an English translation of a Hebrew commentary. For some reason the Hebrew commentary interpreted this to mean that induction was enough to satisfy the ordinary masses but not the elite. This completely misses the mark of how induction is viewed in Islam. The use of it by the “elite” (scholars) is enough to satisfy the common man, but it *is* used by the scholars (of many of the sciences). The Hebrew commentary does not seem to distinguish the natural sciences as an elite subject of study.

This is an important point to note. *Istiqra'*, traditionally translated as "induction", is literally translated as "enumeration". Its use, as mentioned, is speculative. *Kalam* is traditionally translated by Western specialists (often of the old Orientalist persuasion) as "speculative theology" and it is this which al-Ghazali targeted in his *Incoherence of the Philosophers*. *Kalam* as a dialectic (a better definition now) is a bit of a different idea, for the orthodox theologians themselves engaged in this (and al-Ghazali himself refers to it as theological discourse). It was the speculative theology of groups like the Mu'tazilah and others unduly influenced by Neoplatonism and Aristotelianism as well as that of the various flavors of anthropomorphists which al-Ghazali honed in on as the focus or target of his philosophical polemics.

The problem of induction is one that the Greeks were obviously familiar with, so much so that they neglected inductive methodology altogether in favor of heavy use of syllogisms and deductive reasoning. Likewise, the Islamic peripatetics were familiar with all this even as they were heavy proponents of inductive empirical methodology, as all the Muslims were. But they never came up with a proper logical defense of their use of induction.

The problem of induction is amplified by the fact that there's a problem with (not of) deduction. As you might have noticed by now, deduction more or less involves definitions, names, and attributes. It does not really contribute new knowledge in the sense one might typically think, though we use that terminology. The knowledge we gain via deduction is more aptly called a better understanding of things. It's a way of reasoning, a way of applying what we already know to new situations. Most of the "new" knowledge we concern ourselves with is gained through induction so if induction is problematic, then much of what we typically call knowledge is built on a shaky foundation.

To rehash, knowledge gained empirically, from our senses, carries with it a degree of certainty and is considered necessary.

Knowledge gained deductively is also necessarily true if the premises are true.

Knowledge gained inductively is not necessarily true and doesn't carry the same degree of certainty of either sensory input or deduction. In other words, it's more like speculation than knowledge. It's an assumption that the particular observed phenomenon will continue to hold universally. It is an assumption that is, in fact, based on an even bigger assumption. That assumption is causality (the relationship between cause and effect) and the uniformity of nature.

Here's a much better statement of the differences from the *Stanford Encyclopedia of*

Philosophy:¹²⁶

Although inductive inference is not easily characterized, we do have a clear mark of induction. Inductive inferences are contingent, deductive inferences are necessary. Deductive inference can never support contingent judgments such as meteorological forecasts, nor can deduction alone explain the breakdown of one's car, discover the genotype of a new virus, or reconstruct fourteenth century trade routes. Inductive inference can do these things more or less successfully because, in Peirce's phrase, inductions are *ampliative*. Induction can amplify and generalize our experience, broaden and deepen our empirical knowledge. Deduction on the other hand is *explicative*. Deduction orders and rearranges our knowledge without adding to its content.

Of course, the contingent power of induction brings with it the risk of error. Even the best inductive methods applied to all available evidence may get it wrong; good inductions may lead from true premises to false conclusions. (A competent but erroneous diagnosis of a rare disease, a sound but false forecast of summer sunshine in the desert.)

I feel I should make it clear that there isn't a problem with induction in and of itself in Islamic epistemology. Induction has its uses and its place, but that place is not in theology (or for that matter, metaphysics / ontology). Induction can also be used responsibly (scientific induction, a term used by Muslim theologians and philosophers) or irresponsibly (imperfect induction). We do not seek to justify induction as a "reasoning" in the sense of deduction like later Western philosophers did, because that hardly makes any sense. When we say "inductive reasoning" or "knowledge gained from induction", for the time being (until I discuss Islamic epistemology) think of it as being meant in a colloquial sense, because obviously most conscious acts of thought, including the speculative or imaginative, can be seen as reasoning. One might even say induction is, at its best, "speculative reasoning" to better convey the intended meaning (although deduction can be and often is called speculation too in a sense, here in these few paragraphs I'm using it to refer to only induction to illustrate a point; please keep this in mind). Although calling it a "speculative inference" would be even better. Rather than deduce something, you infer it instead. Induction often results in imperfect knowledge, so if you could justify induction as you do deduction you're also justifying all those wrong conclusions. Induction is not in need of that kind of justification, it is what it is. Justifying induction as pure reason (deductive) would, in fact, be quite dangerous. As al-Ghazali describes induction, it does not "provide a proof". It is the use of induction that is justified on pragmatic grounds, but not induction itself or the conclusions reached from it because they can vary, be right or wrong and are not necessary. And we're completely fine with that. We know induction is inherently unreliable and error prone due to its

¹²⁶Vickers, John, "The Problem of Induction", *The Stanford Encyclopedia of Philosophy (Fall 2010 Edition)*, Edward N. Zalta (ed.)

speculative nature thus rigorous testing and confirmation, falsification, etc are required. The act of speculation, for example, can be categorically justified or not. The speculations themselves arising from the act can not be justified categorically as “reason” (deductive). What the orthodox Imams did was show that not only were the metaphysical speculations of their opponents unjustified, but that inductive speculation itself was not a justified act in theology¹²⁷. Therefore the problem with induction is almost indirect in Islamic philosophy/theology (if it exists at all... the problem tends to rest with the use of induction, not induction in itself).

The knowledge of the physical sciences is composed of at least two parts. That which is deductive, which can be deduced from the first principle that is mathematics or as it's manifested in our mind, logic (two is more than one, the whole is greater than a part, the things equal to the same thing are equal to each other, etc). We gain a better understanding of the world from what we already know (mathematics, advances in which reduce to the basic mathematics we already knew). The inductive part isn't really knowledge or a means of gaining knowledge or understanding. We say it gives us knowledge, but this is not really “truth” or “true knowledge” until it makes the shift over to empirical/mathematical proof, which can be said to be the moment when we truly gain knowledge. Induction is thus always secondary to deduction. Mathematics is the root of everything. And the Islamic view is that logic or mathematics is *a priori*¹²⁸. Induction, therefore, is a process. In one sense, we can say it is a form of reasoning, but based around the senses. If we were to distinguish “sense reasoning”, based on the limited nature of our sensory input and how our brain processes it, from “logical reasoning” based on a more fundamental characteristic of how our brains work which allow us to understand basic mathematical concepts, then induction would be “sense reasoning” and is clearly limited and fallible inasmuch our senses are, both in scope (subjective, for we are but bodies bound by spacetime... both individually and collectively) and breadth. Our “logical reasoning”, however, operates on the fundamental constants and laws of the universe as they are manifested in the structure of our brains, something we don't fully understand yet but it's at least partially how we naturally understand basic mathematical concepts. It's also the reason why in the Islamic worldview, there is uncertainty in all human knowledge outside of the very basics (such as the impossibility of a number being both even and odd and other such absurdities in addition to what's mentioned earlier) which are considered intuitive or necessary. Even empirical corroboration in such a worldview does not necessarily correspond to the predictability of a theory, but to actual empirical corroboration with the senses or instruments which amplify the senses enough to constitute sufficient evidence; only then is it as certain

¹²⁷Technically they showed only deductive speculation is justified in the form of dialectic to defend theology from attacks, to make it more relevant to the people's understanding, and it had to be done in a rational manner proceeding deductively from the source texts.

¹²⁸As al-Ghazali says in his *Maqasid al-Falasifah*,

“It does not come from the senses, for the senses grasp only [...] particulars or a limited number of things, but this judgment is established in the intellect as a universal and it is impossible for the intellect ever to be separated from it.”

(inasmuch as we can be certain at all) as necessary knowledge. What we mean by “necessary knowledge” is that one cannot choose to know it or ignore it, it happens with or against one’s will (like seeing something) and by “certainty” we mean that once known, it cannot be denied in good conscience; like the existence of a thing that has been seen. For example, a scientific theory about a specific particle doesn’t necessarily¹²⁹ reach the certainty of “necessary knowledge” based on the effectiveness of the theory with regards to predictability, but only after that particle is actually observed and measured.

Deduction meanwhile is not necessary knowledge, because it is acquired. It’s a conscious act, unlike necessary knowledge (which often involves immediate perception). There is, however, certainty with sound deduction as well.¹²⁹

While I’m not going fully into Islamic epistemology just yet, a big difference is that uncertain knowledge is also recognized, categorized as such and used. This is a different form of skepticism than those who reject uncertain knowledge altogether. Thus, conclusions reached through induction can indeed be called knowledge if we’re qualifying them by degrees of certainty which Islamic epistemology allows. The “all or nothing” approach of other epistemologies, including Plato’s famous definition which says that a value judgment of truth is implicit in knowledge, seems counterintuitive from a scientific standpoint, though that’s because such worldviews were never scientific worldviews to begin with.

The SEP on the two levels of the problem of induction,

Two sides or facets of the problem of induction should be distinguished: The *epistemological* problem is to find a method for distinguishing good or reliable inductive habits from bad or unreliable habits. The second and deeper problem is *metaphysical*.

The Islamic “problem” of induction is thus epistemological. We don’t have a metaphysical problem with it due to occasionalism.

This is why the Islamic contribution to scientific methodology was an inductive *experimental* method. “Scientific induction” grounds inductive speculation (or speculative reasoning) in empiricism and mathematics, specifically as manifested in the form of controlled and repeated experiments that test these hypotheses and the predictions of theories.

¹²⁹What I mean by necessarily here is that a theory can reach the same level of certainty as deductive knowledge via empirical corroboration. It becomes necessary knowledge and actually supersedes deductive knowledge. Likewise, a theory can reach that level of certainty through deduction as well, though it would have to be very well proven at all levels.

Problem of Causation

There's a great little excerpt on the subject of Imam al-Ghazali's views from *The Essence of Islamic Philosophy* by Mashhad Al-Allaf available at muslimphilosophy.com:

<http://www.muslimphilosophy.com/ma/works/ma-gz-ps.pdf>

Backup URL: <http://islamtheologyscience.files.wordpress.com/2011/05/ma-gz-ps.pdf>

I am not even going to bother repeating the full discussion, so if you haven't already, read that short PDF before continuing. There's no point in my rewriting a discussion which that author has already covered so well, so succinctly, and in such an easily understood manner.

As we can see, al-Ghazali's motivation was to defend the existence of miracles from Neoplatonist claims to the contrary. Though this is fully elaborated upon in chapter 17 of the *Incoherence*, he mentions it first in chapter 16:

(The Physical Sciences)

The sciences called by them 'physical' are many. We will mention some of them, so that it may be seen that the Sacred Law does not require a dispute over them, except on a few points which we have mentioned.

[...]

The Sacred Law is not necessarily opposed to any one of these sciences. However, we shall select from them four points on which we have to criticise the philosophers

(i) Their postulate that the connection observed to exist between causes and effects is a necessary connection, and that it is not possible or feasible to produce a cause which is not followed by its effect, or to bring into existence an effect independently of the cause.

The other 3 points concern their ideas regarding the soul. That they're self-subsisting, eternal things which cannot return to bodies. Their ideas about souls are also connected to their ideas about miracles.

Criticism of the philosophers on the first point is necessary, for on that criticism is to be built the affirmation of the miracles which mark a departure from the usual course of events — e.g., the Rod turning into a serpent; the revivification of the dead; and the splitting of the Moon. He who thinks that

the natural course of events is necessary and unchangeable calls all these miracles impossible. Thus, the philosophers interpret the Quranic references to the revivification of the dead, saying that it means the supersession of the Death arising-from-ignorance by the Life resulting-from-knowledge. Or, they interpret the Rod's devouring the magic of the magicians, by saying that it means the refutation of the doubts — of the disbelievers by the Divine proof which was manifested at the hands of Moses. As regards the splitting of the Moon, they often deny the fact, and assert that the transmission of the Tradition has not been continuous and trustworthy.

They (the Philosophers) actually do admit miracles to a very limited extent. Al-Ghazali mentions the three ways in which they do. Firstly, with regard to the faculty of imagination whereby one gains some knowledge of the future by catching a glimpse into the Preserved Tablet (*al-Lauh al-Mahfūz*),

Thereupon, the forms of particulars which will take place in the future are impressed upon it. This happens in waking life in the case of the prophets; and only in sleep in the case of all other men.

The next was with regards to the faculty of reason by which men can gain knowledge intuitively (greater than is normal). The third was with regard to the “practical faculty of the soul” by which something the soul imagines is reflected in reality. It’s sort of like the [problem of mental causation](#) but taken to the extent where the imagination of the soul (not of the mind) can have effects on the surrounding environment, insofar as the nature of the thing is receptive to it (it being the impressions that first appear in the soul which then impress upon reality). For instance, they believed Air is capable of receiving impressions of Hot, Cold, etc from the soul but wood cannot alter forms (as in the case of the rod turning into a serpent). It’s clear this was linked inexorably to their understanding of the nature of matter at the time (an understanding of wood and a lack of understanding of the nature of air, which we know today to be material like the wood).

I only mention this because it seems almost like an odd sort of metaphysics which combined realism with [idealism](#), which tended to characterize Islamic Neoplatonist thought (the latter aspect arising from Plato’s Forms). When viewed in terms of the subject-object or mind-body dichotomy, the power is placed with the subject and the mind, corresponding to their ideas of a passive God (or you could say the subject and the soul, with the mind being associated as another part of the body). The orthodoxy’s view of an active Creator and His Creating corresponds to the power being manifested with the object and body and limits the power of the human mind. This also naturally falls in line with their respective views of free will (the former affirming it in totality, the latter taking a more deterministic approach). Western intellectual thought has by and large followed the former. Even more curiously, they combine this with metaphysical [materialism](#) which is deterministic and re-emphasizes the material world. It’s not unlikely that some of their philosophical conundrums, including the problems with causation and

the uniformity of nature (as well as their debates over free will and existentialism), are rooted in this seemingly contradictory combination.

The Neoplatonists used the medium of the soul to unite the subjective reality of the mind with the objective reality of the external world, which in turn was dictated by their idea of God. Thus there was a sort of idealism present from the perspective of God (in objective reality) and another within our own mind (subjective reality). Combined with this was the traditional realism and empiricism of Islamic theology. The question is why did they go to the extent of limiting God to passive emanation when this setup could have just as easily lead to the orthodox view. This is a question I do not have the answer for as it lies outside of Islamic history (Neoplatonism traces its roots to Christianized Hellenic philosophy of the latter Roman period). Indeed, the philosophers themselves didn't logically or rationally justify their views, let alone their choosing of those views to begin with. Chalk it up to a blind adherence of the Neoplatonists and other foreign philosophies/theologies that came before them if anything. This Hellenic/Neoplatonist¹³⁰ influence is seen even in contemporary Western philosophy. As I said above, it's not unlikely that their philosophical problems with metaphysics arise from what outsiders perceive as the Christian equation of reality with the Christian idea of God removed from the equation.

For instance, the problem of induction is very significant in the West today. But why? From an Islamic worldview, induction in science has to work hand in hand with a healthy dose of skepticism (whether the legal sciences or the physical sciences). Induction is something we *do*. It's an epistemological issue. Granted, with the glaring hole left in the European worldview from the dismissal of the Christian God, causality and nature are now problems again (it's quite telling that Europe's intellectuals turned briefly to occasionalism, panentheism, and pantheism initially before slowly turning towards atheism). But even then that statement belies the real problem. Errors can propagate and become compounded. Theories which might contain errors are used as the foundation for other theories and so on. If one of the foundational theories is suddenly falsified, the entire structure can come crashing down like a house of cards. From an Islamic standpoint, this seems like no big deal. Back to the drawing board. But from a materialist standpoint, this is a very big deal because this house of cards was their entire worldview. The worldview can only function on the assumption that scientific advancement (knowledge of the material world) progresses linearly with a corresponding increase in certainty of scientific theories. This is problematic because despite the incredible advances in scientific instrumentation and technology, much of scientific theory is still theory. In fact, observation is itself mired in theory (confirmation holism), so the house of cards stands on even more tenuous foundations. This isn't a problem for the scientists, but it is a problem for the philosophers, the ethicists, the lawgivers, the jurists, the economists, the politicians, and so on. As such, an undue burden is placed on science to conform with and uphold prevailing trends in cultural thought. In fact, science is often given the responsibility of leading those trends. So these philosophical

¹³⁰This is quite different from the popularly understood and simplified Christian theology of today.

problems are big problems indeed. When people start designing morality and ethics around specific natural sciences, you're inventing human laws and morals through essentially induction. Which becomes a circular argument since the logic is that all humans should do such and such a thing because some humans do such and such a thing.¹³¹ Perhaps the most clever response as of late has been to abolish philosophy altogether so no one asks these questions anymore.¹³²

So, to summarize, the Islamic view of causation is of God as the primary and efficient cause of all effects. Our observing corresponds with His Creating. His Creating is constant, ongoing, and active. God creates the apparent cause and with it the effect. The cause *occasions* the effect. The faith in God to begin with entails a firm trust in God's rational and orderly creating, as evidenced by all the verses in the Qur'an imploring man to observe nature and look for His Signs. Some aspects of the creation, like the creation of the universe in time, we were not witness to. Other aspects, such as the continuous "reordering" of the universe (to be expounded upon later) we are witness to now. The laws of nature which seemingly govern the behavior of things are actually describing the Customary Way (*jary al-'ada*) of God's Creating. In other words, they do not govern behavior but rather describe behavior, that of God. While God may work in mysterious ways, these mysteries are for the most part open to inquiry from us and one of the ways in which we may do this is through science. It's not coincidence that the latter period of Islamic astronomers, especially the famous ones of the Maragha observatory of Persia from whose work Nicholas Copernicus borrowed a great deal (such as the Tusi couple and Urdu lemma) in developing his heliocentric model of the solar system, were associated with the Illuminationist (*ishraqi*) school of philosophy. In other words, mysticism. The SEP describes divine illumination as "the oldest and most influential alternative to naturalism in the areas of mind and knowledge."¹³³ It's worth noting that Illumination is specifically discounted as a means of knowledge in Islamic epistemology in no uncertain terms¹³⁴ yet there was a strong association between Sufi mysticism and science, especially among the most famous scientists. Many of the Islamic Peripatetics and Neoplatonists were also Sufis/mystics, right along with the orthodox. Al-Ghazali was perhaps one of the most famous Sufis of all time.

¹³¹Not that this is actually widespread in the West. For the most part, they follow an amalgam of Roman, Christian, and old secular philosophy that originally came out of the Muslim world. Some of the newer philosophical and cultural movements, however, are dependent on scientific theories.

¹³²It's interesting that some Western universities are rethinking their philosophy programs and philosophy in general has garnered a rather negative reputation in the culture, especially amongst scientists.

¹³³Pasnau, Robert, "[Divine Illumination](#)", *The Stanford Encyclopedia of Philosophy* (Summer 2011 Edition), Edward N. Zalta (ed.)

¹³⁴That is to say that while it may result in knowledge for the individual, even necessary knowledge, it does not constitute admissible proof or reason or evidence in itself, whether legal or scientific.

Looking back on al-Ghazali's key statement,

In our view, the connection between what are believed to be the cause and the effect is not necessary. Take any two things. *This* is not *That*; nor can *That* be *This*. [...] If one follows the other, it is because He has created them in that fashion, not because the connection in itself is necessary and indissoluble.

We can see that at least one other solution exists for the problem of causation. Pantheism (and all its offshoots, such as Idealism). With pantheism, the cause, the effect, and the power connecting them are all the same thing. A hard connection is thus postulated. Pantheism is traditionally thought of as anti-realist though it can come in all kinds of flavors. However, being that cause and effect are now connected as desired by the philosophers, such that for every cause A, effect B shall always proceed from it, and if this is all part of "the One", then this God is obviously of the passive sort described by the Neoplatonists (so not just the fact of causality, but the specific manner of it is preserved... in which certain causes always precede certain effects and there is never any change thus there is a uniformity in nature, a uniformity which can be trusted not to change because change is not possible). In fact, the pantheists of Islam, the Jahmiyyah, generally adhered to Neoplatonism. We can see how this was almost the missing ingredient from the metaphysics of the philosophers, but since they were Muslim, they could not go into pantheist territory (aside from heretical groups like the Jahmiyyah). Consequently, it was inevitable that they would be called out on this glaring flaw by the orthodoxy.

The problem of a circular argument for the justification of induction seems only a problem when one applies a non-pantheist critique to what can essentially be considered an originally pantheist justification. In a pantheistic view, induction can be justified circularly (by itself, as opposed to the occasionalist view of induction as I've already elaborated upon). Something can justify itself, because everything is God. So while in both occasionalist monotheism and pantheism, the matter of science or scientific induction can be seen as a means of greater understanding of God, the sort of logical justification (and one might infer, the view of induction) that Europeans have been grappling with is from a pantheist view.

So we have two ancient understandings of causality here. That of divine illumination (which attributes the uniformity of nature to God, thus inductive reasoning in natural philosophy is a way to understand God) and naturalism. History shows us that except for a handful of famous thinkers, the former dominated the latter until very recently. The former was also only properly manifested as either pantheism or occasionalism, the latter of which appeared with Islam although according to Islamic theology, it's the standard view of the original Abrahamic monotheistic faiths (like Judaism) before they

became corrupted or influenced by foreign theological systems.¹³⁵ There is overlap, particularly in European history where Christians viewed causality from a naturalist perspective while attributing responsibility to God. There are logical problems inherent in this sort of view. Upon closer inspection, we can see that atheistic materialistic naturalism, in its most logical sense, is functionally equivalent to pantheism. They are both describing the same thing. As I'll mention again later, if everything is God, then divide by God. However, the logic in this setup was provided by the idea of God, removing God removes the logical consistency. This leads us to perhaps one of the best definitions of the concept of God from a scientific standpoint.

People have ideas about the power or force which is responsible for making things the way they are and maintaining them in that manner (essentially the uniformity of nature, the basis for causality). These are,

- That we are a part of this power or force.
 - And it does not possess Life/Will.
 - And it is split into components (e.g, the fundamental forces/laws of nature in an Idealism-type worldview where “it” is our mind or subjective reality and objective reality is deemed inaccessible)
 - And it is not split into components (e.g, Neoplatonist pantheism, Buddhism, Stoicism or Stoic naturalism, etc)
 - And it possesses Life/Will.
 - And it is split into components (e.g, Polytheist flavors of Hinduism)
 - And it is not split into components (e.g, Pantheism, also the Idealism-type worldview if the “it” corresponding to our mind is taken to represent a sort of deity of our subjective reality since we do possess Life/Will)
- That we are not a part of this power or force.
 - And it does not possess Life/Will.
 - And it is split into components (e.g, fundamental forces/laws of nature in a naturalism-type worldview)
 - And it is not split into components (e.g, Deism, Neoplatonism taken to their natural and logical extension¹³⁶)
 - And it possesses Life/Will.
 - And it is split into components (e.g, Polytheism like Greek/Roman/ Nordic)
 - And it is not split into components (e.g, Islamic Occasionalism, Monotheism including Deist/Neoplatonist variety as affirmed by their adherents)

¹³⁵Muslims believe Islam is the same theology revealed by Allah to all the prophets from Adam and Noah to Moses, Jesus, (as) and Muhammad (saw).

¹³⁶We refer not to the beliefs of the adherents of these philosophies or theologies but to these ideas taken to their logical extension.

That was a quick attempt at metaphysical classification. It is not about epistemology, but rather metaphysics (since, as we'll see, people mix and match epistemology and general metaphysics). I'll go further into these ideas and their implications later on. The "we are a part of it" corresponds very loosely with general anti-realism and "we are not a part of it" with realism.

The reason I made "that we are not a part of it" the primary classification (instead of Life/Will) is because there is no problem with causality/induction in the "we are a part of it" classification. Occasionalism is the only complete solution to the problem of causation from the monotheist / realist camp (or those who believe "that we are not a part of it" from the above list). Islamic monotheism or *tawheed* is the most powerful conception of God. It seems the occasionalist God would be the most wide encompassing notion of God short of pantheism, thus it might not appear as "powerful" as the latter. However there is a huge difference in just that much separation. Once the creation and the Creator are postulated to be one and the same, the Creator inherits all the flaws of the creation. Further, this Creator lacks an active Will and the relevant Power. It's a passive entity perhaps even split into components where one doesn't know what the other is up to. The occasionalist God is all about active Willful and Powerful creating and inherits none of the flaws of the creation (in fact, the flaws are seen as a Willful choice in His design).

And, it must be stressed, it's straight from the Qur'an, the Prophet (saw), the Companions, the Successors, and the other pious predecessors. It's not a solution that al-Ghazali or al-Ash'ari came up with. They learned it from others. Non-Muslims would have no choice but to attribute the origin of this doctrine to Muhammad (saw) and no other.

Occasionalism in Western Thought

The doctrine of occasionalism did emerge in Europe a while later and had a profound impact on the development of Western philosophy. I'll only cover some of the big names so readers know who to look into.

Perhaps the earliest occasionalist voice in Christian Europe was Nicholas of Autrecourt (ca. 14th century). He was influenced by the writings of al-Ghazali.^{137 138}

Descartes (1596-1650)

¹³⁷Wolfson, Harry, 1969, "Nicolaus of Autrecourt and Ghazali's Argument Against Causality", *Speculum*, 44: 234–38.

¹³⁸Lee, Sukjae, "Occasionalism", *The Stanford Encyclopedia of Philosophy (Winter 2008 Edition)*, Edward N. Zalta (ed.)

Many have drawn comparisons between Rene Descartes and al-Ghazali. They were both philosophical skeptics. I don't know of any who actually draw a causal relationship between the work of al-Ghazali and Descartes, though considering the remarkable similarity in some of their works, it cannot be ruled out. The English philosopher George Henry Lewes remarked about al-Ghazali's *The Revival of the Religious Sciences*,

It bears so remarkable a resemblance to the *Discourse on Method* of Descartes, that had any translation of it existed in the days of Descartes, every one would have cried out against the plagiarism.¹³⁹

Though Descartes' own occasionalism is under some question, since he mostly concerned himself with doubt in mind-body causation (and body-body causation to a lesser extent), many who were influenced by his work clearly were occasionalists. In this manner, Descartes dealt with similar problems as al-Ghazali and came to the same general idea of a solution, irrespective of whatever specific metaphysical form it took (as some pantheists, such as Spinoza, were also influenced by him).¹⁴⁰

Nicolas Malebranche (1638-1715)

Malebranche is perhaps the most famous Western occasionalist. He was a Catholic priest and philosopher. During his studies he was influenced by some Cartesian teachers and became enamored of Descartes' work. He subsequently attempted to unify the theological views of St. Augustine with the philosophy of Descartes. Consequently, his occasionalism perhaps most resembles the Islamic out of the later Western philosophers. His work had a profound impact on later skeptics, occasionalists, and empiricists.

George Berkeley (1685-1753)

Berkeley was another Roman Catholic philosopher. He's most remembered in the West for his empiricism and skepticism. He too was an occasionalist although he combined it with a form of Idealism (hence dubbed "subjective idealism") and was called the "father of Idealism" by Schopenhauer.

He believed in a sort of immaterialism, he denied that there was a material world and advocated the idea that everything was composed of ideas. Since he believed there was no way for ideas to cause one another and that we could not control our sense perception, he deduced these to be evidence of God impressing these ideas in our mind.

¹³⁹Lewes, George Henry (1867), *The History of Philosophy from Thales to Comte, Vol. 2: Modern Philosophy*, London: Longmans, Green, and Co., p. 49

¹⁴⁰Najm, Sami M., "The Place and Function of Doubt in the Philosophies of Descartes and Al-Ghazālī", *Philosophy East and West* Vol. 16, No. 3/4 (Jul. - Oct., 1966), pp. 133-141

So, effectively, God is responsible for all causality.

Berkeley's mystic idealism (as Kant aptly christened it) claimed that nothing separated man and God (except materialist misconceptions, of course), since nature or matter did not exist as a reality independent of consciousness. The revelation of God was directly accessible to man, according to this doctrine; it was the sense-perceived world, the world of man's sensations, which came to him from on high for him to decipher and so grasp the divine purpose.¹⁴¹

He was therefore the counterbalance to the materialistic atheism and Deism that prevailed in his day among the scientists and mathematicians (like Isaac Newton, who was a major Deistic Monotheist of the time). In fact, he wielded skepticism in quite a few philosophical polemics against them in defense of his theology, not unlike al-Ghazali did in his day. He wrote a book (*The Analyst: A Discourse Addressed to an Infidel Mathematician*) in which he attacked Newton's fledgling mathematics of calculus. The attacks were actually quite sound for the time because calculus' foundations would not become shored up for another 100 years.

His theology was attacked as amounting to solipsism which is the philosophical idea that one can be sure only that one's own mind exists (and questions the existence of other finite minds). Berkeley's proof for God could not be extended to the other finite minds we perceive belonging to other people.

Berkeley's reasoning is that from an occasionalist view, material existence, possessing no causal power in and of itself, essentially becomes redundant. So why should God bother?

This is not a surprising conclusion for a non-Islamic occasionalist. This has been used in a critical manner against Islamic theology, so the Islamic occasionalist's response follows,

Berkeley asserts that there are only spirits and ideas. That spirits produce ideas which are passive beings which can be perceived. The logical extension of this is that even we are not real "minds" but are ourselves "ideas" in what must be called "God's mind" (pantheism). Right off the bat we have a huge problem.

Secondly, to even posit that God has a "mind" in which exist "ideas" is to anthropomorphize God to an unacceptable extent in Islamic theology. By what logical justification is such a parallel drawn? Is there any evidence, scriptural, or otherwise to indicate that God functions like us, who are biological beings? From Islamic scripture, certainly not. From the Islamic viewpoint, all anthropomorphic descriptions of God in Scripture are functional approximations by which man can better understand his Creator

¹⁴¹Oizerman T.I. The Main Trends in Philosophy. A Theoretical Analysis of the History of Philosophy. Moscow, 1988, p. 78

and establish a personal relationship with Him. When Scripture speaks of God's Hands, we affirm that God has Hands but they are not like our Hands and leave it there (some go into additional speculation, considering it a metaphor for something though this is not the orthodox position). We can go further and say that our existence itself, with all the laws of nature combining in our biological composition, is meant to functionally approximate some of God's Attributes, such as life, will, mercy, love, justice, etc. Yet we cannot assert that God Himself is a being made of components. Ironically, even the Deist Isaac Newton affirmed the Oneness of God (rejecting the Christian trinity), yet Berkeley's anthropomorphization of God can result in only either reducing God to a mind with no real power (thus positing an anti-realist pantheism of sorts), or dividing God into multiple eternal components (God as distinct from God's mind) like the Neoplatonists of old and thus failing to even affirm His Oneness to the extent of the Deists. So does Berkeley offer any demonstrably provable definition of what precisely is the nature of God's mind or an idea in God's mind?¹⁴² Are God's "Ideas" *real* things? Then how can they be equated to our ideas insofar as they're even referred to by the word "idea"? Is this not inductive reasoning? In Islamic occasionalism, God's creative capacity is not expressed in human terms (ideas in a mind, how we literally define human creativity), but rather as pure creating (He is, after all, the Creator).

Thirdly, if a Berkeleyan occasionalist continues to affirm the real existence of our minds in spite of the above, then by Islamic standards, it is at least still monotheism. But why prefer a logically untenable position then? Why should God bother creating the material world at all? That is a question for God, but from our perspective, that is clearly the more logically consistent choice. Much of religion, both of Christianity and Islam, revolve around our relationship with other "minds" as a medium for our relationship with God. Why should God then provide us a reality in which we cannot even accept the existence of other minds? From a theological standpoint, it makes far less sense for the God of Jesus (as) or Muhammad (saw) to give us a reality in which we have no way of knowing either Jesus (as) or Muhammad (saw). The Berkeleyan occasionalist is incapable of logically justifying their own answer to the question.

The Berkeleyan view that from the perspective of each and every person there only exists their own mind and (separately) God, is by the Islamic standard, only adequate or effective at best but most definitely not a demonstrably provable position. Many of our mystics have said similar things, but they were using such words only in an adequate or effective context since the strength of the personal relationship between man and his Creator can reach such a station where the material world is transcended (not literally) and no longer matters. Matter does not *matter*. But its existence cannot be rejected purely on the basis of human reasoning. How can an empiricist resort to such reasoning? A Berkeleyan Christian occasionalist might ask "show me proof the world is real" and for that we have the Qur'an (or even the Bible which doesn't deny material reality, thus they are sufficient proof for a Christian or Muslim who has already accepted their authority), but for our question "show us proof the world isn't real", they have no

¹⁴²As we'll note in the next section, Hume echoes these issues with Berkeley's occasionalism

response.

Hence, the question of matter's relevance is a problem for the non-occasionalist or the philosopher but not a problem for the occasionalist. In fact, it is the very point raised by the occasionalist so for us it is not a problem but rather the actual point. The best answer then to "What's the point of everything else?" is "*Exactly.*" A believer understands while a philosopher will be stuck on the literal wording. In this case, it seems Berkeley's philosopher side was distinct from his believer side, whereas the latter asserted something akin to what some Muslims might say, albeit not literally, the former was getting hung up on the literal wording and was consequently forced by his own reason (not reason in general, but his own reason, the subject of much criticism), in the absence of a guiding Scripture¹⁴³, into adopting a position that perhaps he might not have set out to prove. Berkeley's theology smacks of the speculative/*inductive* theology I mentioned earlier or theology derived from philosophy when the goal of any theologian is to go in the opposite direction.

The Islamic position on Berkeley's theology must be one of some understanding. There have been more than a few Muslims who have strayed into pantheism in spite of the Qur'an's more overt guidance on occasionalist theology. Lacking this, Berkeley's positions are quite rational and understandable in their own context of Trinitarian Christianity. It's much easier to rationalize the Trinity in an immaterial occasionalist reality without fully embracing the sort of Pantheist-Polytheist theology typical of Hinduism, even if such a philosophy seems to logically suggest the latter. If he had not delved so much into philosophy, perhaps he would've stayed closer to Malebranche's occasionalism.

Berkeley's impact upon Western philosophy was immense. With newer developments in physics in the 20th century, some new ideas evoke old ones,

A more attractive option, though slightly more remote from classical occasionalism, can perhaps be found in certain anti-realist interpretations of natural science. Though diverging from the letter of both occasionalism and Berkeleyanism, these anti-realist views are akin to them in spirit in their desire to uphold science as an empirical enterprise while avoiding the mechanistic materialism which threatens on a realistic interpretation of scientific theories.¹⁴⁴

David Hume (1711-1776)

David Hume was not an occasionalist, but he was a philosophical Skeptic and an

¹⁴³For the Bible offers little help to the occasionalist, that much is certain. The Catholic Church wasn't a fan of the doctrine either.

¹⁴⁴Hasker, William (1998), Routledge Encyclopedia of Philosophy.

empiricist. He accepted Malebranche and Berkeley's skepticism of causality,

...the influence of Malebranche was considerable, and is still felt today through Hume, many of whose sceptical arguments concerning causation derive from Malebranche.¹⁴⁵

Hume was more forthcoming in acknowledging his debt to Malebranche in his conclusions about causality. His arguments denying that our idea of body affords us any notion of causal power and his insistence that all that experience reveals is a constant conjunction between events seem to come right out of Malebranche's *Recherche*. Both Hume and Malebranche stress the centrality of the concept of necessary connection to our understanding of causation, and both deny that such necessity can be discovered (by reason or experience) between any things in nature. The difference is that Malebranche held that we can perceive a necessary connection between the will of God and any event willed by God, while Hume rejected any such claim.¹⁴⁶

Hume was also the most famous philosopher in the West to elucidate the problem of induction. I assume most who are reading this are already somewhat familiar with Hume, his philosophy, and his impact. If not, read the Wikipedia and SEP articles on him. The French philosopher, Ernest Renan said of al-Ghazali's statements on causation,¹⁴⁷

“Hume n'a rien dit de plus.”

[English: “Hume said nothing more.”]

Hume so deftly applied his skepticism to everything that it had a similar impact to al-Ghazali in that some people mistakenly thought he was out to refute both religion and science for other no reason than to simply get a rise out of everyone. Reading his works obviously paints a different picture. He was perhaps the first (or at least the first most prominent) atheist or agnostic critic of causality.

Reading his work, the influence of Berkeley is apparent.

For Hume, all the materials of thinking — *perceptions* — are derived either from *sensation* (“outward sentiment”) or from *reflection* (“inward sentiment”) (EHU, 19). He divides perceptions into two categories, distinguished by their different degrees of force and vivacity. Our “more feeble” perceptions, *ideas*, are ultimately derived from our livelier *impressions* (EHU, Section II; T, I.i.1-

¹⁴⁵Hasker, William (1998), Routledge.

¹⁴⁶Nadler, Steven (1998), Routledge.

¹⁴⁷Renan, Ernest (1852), *Averroès et l'averroïsme*, p.74

2).

[...]

Although we permute and combine ideas in the imagination to form complex ideas of things we haven't experienced, Hume is adamant that our creative powers extend no farther than "the materials afforded us by the senses and experience." *Complex ideas* are composed of *simple ideas*, which are fainter copies of the simple impressions from which they are ultimately derived, to which they correspond and exactly resemble. Hume offers this "general proposition" as his "first principle...in the science of human nature" (T, 7). Usually called the "Copy Principle," Hume's distinctive brand of empiricism is often identified with his commitment to it.¹⁴⁸

He reduces Berkeley's Idealism into a kind of naturalism where ideas are distilled down to the sense perceptions which precede them.

Similarly to al-Ghazali, Hume sets out to refute metaphysical theories he finds incoherent. However, where al-Ghazali cites the first principle of *a priori* logic (as mentioned earlier, "First principles are judgments which are made necessary by the very nature of the mind as pure intelligence"¹⁴⁹ e.g., one thing comes after another, two things are more than one, a whole is greater than its part, etc which are derived from our basic ideas of space and time as our brain experiences them, even whilst devoid of any sensory faculty), Hume settles on his notion of sense perceptions,

Hume begins both the *Treatise* and the *Enquiry* with an account of impressions and ideas because he thinks that all contentful philosophical questions can be asked and answered in those terms. Trying to go *beyond* perceptions, as metaphysics must, inevitably involves going beyond anything that can have cognitive content. No wonder the "hypotheses" that purport to give us the "ultimate original principles" that constitute traditional metaphysics turn out to be incoherent.¹⁵⁰

The problem with Hume's view is apparent to anyone who's lived to see the advent of the computer. If Hume's argument can be likened to the claim that everything a computer "knows", whether data or what to do with the data, is programmed into it in the same manner (operating systems, programs, and data alike are stored as software), and the assertion is made that the computer cannot go beyond software (stored data) written in programming languages, the person is clearly forgetting that the software itself is written reflecting the physical makeup of the computer and how its CPU functions.

¹⁴⁸Morris, William Edward, "David Hume", *The Stanford Encyclopedia of Philosophy (Fall 2010 Edition)*, Edward N. Zalta (ed.)

¹⁴⁹Al-Ghazali, *Maqasid al-Falasifah*

¹⁵⁰Morris (2010), SEP

It processes information in bits, in binary digits, 1s and 0s. What al-Ghazali or anyone with a similar idea of first principles is saying is no different. The very nature of ideas and perceptions themselves, including how we process them, must be reflecting “the nature of the mind”; the physical nature of the brain (as it exists in space and time). In other words, the uniformity of nature is reflected in the very makeup of our brain and consequently in how it functions and processes those sense perceptions that Hume speaks of. It’s surprising that Hume argues about not going beyond perceptions when we don’t even need perceptions to begin with. Our rational thought alone reflects the basic laws of the universe because the object generating those is built within those laws. As our eyes view things in that uniform manner we’ve all grown accustomed to, and our ears hear, and our noses smell, etc, our brains process and manipulate these sense perceptions according to the true essence of that very same uniformity (even more objective than sensory perception).

The brain can be thought of as the sixth sensory organ or perceiving organ. Its acts of perception correlate to thoughts. As the Ash’arites point out, the external world impresses upon the sensory organs, such as the eyes, and these perceptions leading to impressions are what correspond to Hume’s notion of ideas. The idea that all we have are impressions of the external world is nothing new and was typical of both the Stoics and the Sceptics of both the Greek and Roman traditions though they differed over how much these impressions corresponded to reality and how much knowledge could be gained from them. The Stoics affirmed the comprehensibility of the impressions, their correspondence to reality, and the knowledge that could be gained from them,

The *kataleptic phantasia* is that which is impressed by an object which exists, which is a copy of that object and can be produced by no other object.¹⁵¹

An idea which bears more than a passing resemblance to Hume’s Copy Principle. Whereas the Sceptics believed in *acatalepsy*, or the idea that the degree of conformity with reality of impressions could never be known (some often tended to come down on the side of no conformity), the Stoics insisted that impressions could be comprehensive (*kataleptic*), a more or less complete impression, and thus truth.

The word for impressions was *phantasiai* and they are caused by *aisthesiai* or perceptions. Various groups applied them to the soul (such as the Neoplatonists, some of the Stoics, etc), the mind (including Hume and other such naturalist-leaning philosophers), both or some intermediary. They are, however, all referring to the same thing which in our contemporary parlance is simply called the mind.

The manner in which the brain orders these perceptions is according to rules it knows by virtue of its function which is dependent upon its structure. These rules it applies universally. Such as the very idea that, as al-Ghazali said, *this* is not *that*; and *that* is not *this*. As mentioned earlier, al-Ghazali stated that these rules are not arrived

¹⁵¹George Henry Lewes, (1880), The history of philosophy: from Thales to Comte, page 360

at by way of particulars (sensory perception). Thus there are almost two perceived uniformities of nature. The first is what Hume and the other British Empiricists spoke of when they discussed induction. The second, which it seems they did not focus on, is that fundamental uniformity of nature that is self-evident to the mind by virtue of its structure and function and which forms the basis for logical thought. The two appear to correlate for the uniformity that is perceived by the senses is the same uniformity the brain is built on, however the senses only gain an imprecise and subjectified view of that uniformity (impressions) whereas the brain is functioning on it in a pure capacity ("pure intelligence"). The brain's "perception" of this uniformity is not so much a perception or an impression, but rather the literal manifestation of that uniformity; a more pure form of experience. It is the Just Balance al-Ghazali speaks of, the measuring stick or scale.

It would seem to the Muslim observer that Hume-ian Empiricists were merely parroting the empiricism of those that came before them because al-Ghazali uses the uniformity directly perceived by the brain, independent of sensory faculty (one could feed the brain gibberish and it would manipulate the gibberish according to the same order or pattern) as the first principles of logic by which to criticize the conclusions about uniformity in sensory information. It's only by virtue of such logic that induction can even be criticized but Hume seems to completely miss that mark. He attributes the mind's relation of ideas and perceptions in a specific manner to his idea of "belief". He doesn't inquire further into the uniformity of the manner with which the mind uses ideas. That is a uniformity unto itself and is manifested in every possible thought or mental function, thus being a true "universal", or an *a priori* understanding of the idea of causality. Hume considers reasoning to be "relations of ideas or matters of fact" and insists our causal inferences are not due to such reasoning.¹⁵² And again, he stops his inquiry before addressing the matter of how the "relating" of what he calls ideas or matters of fact happens in a uniform, universally applicable manner. Thus the notion of cause and effect itself is not born out of custom after having habitually observed "natural causality" at work, but it's a *a priori* and similar to the knowledge that any developed human brain would have (such as the whole being greater than a part, two being more than one, etc). It's because of its *a priori* nature that "natural causality" can even be identified and recognized as causality. Causality was already a part of our brain's language of reasoning. It's partly a function of our brains experiencing time and partly a function of how our brains experience space, meaning our literal neuronal wiring. Simply conceiving of time doesn't automatically lead one to a notion of a cause or an effect or any sort of sentient reasoning process, but any sort of brain activity (carried on neurons, which exist in space) does. Were a mind to be disconnected from all sensory perception, it would still be able to think, and it would still think in linear fashion and track the progression and branching of thoughts such that "**if this then that**". It would still perceive time for it would be able to distinguish the present thought or act of thinking from memories of past thoughts. Removing experience completely from the life of a mind means no life at all. In this sense, there is no such thing as a *a priori* reasoning, because without any *a posteriori* information, the *a priori* reasoning cannot function at all. But *a priori* reasoning (and what I am referring to is the

¹⁵²Morris (2010), SEP

most bare, basic relating of “ideas” or “matter of facts”) is not a result of the *a posteriori* information, it is just naturally what the brain does by virtue of its configuration. In effect, it is a process by which the brain orders the data it receives (whether through sensory input or some junk data in this fictitious scenario) into some form of language. It doesn't really deliver new knowledge so much as organize the data received into coherent and intelligible (to the brain, for further manipulation) logical language. As I said, even feeding a brain gibberish would result in manipulating and relating these gibberish ideas and matters of fact in the same manner as it would with coherent sensory input (or at least attempting to). The brain without sensory input (assuming a complete blank of information from as far back as fetal life) is like a computer without data. It will just not do anything. But when it is given data, it will always process it in the same way, and the nature of this processing is due to its construction. Perhaps it is, as I said earlier, that the distinction between *a priori* and *a posteriori* is not a tenable one when we are discussing the most basic functions of the mind. For even *a priori* reasoning comes out of a more pure form of *a posteriori* experience and that experience is not from the sensory organs, but from the brain existing (howsoever one may choose to believe it exists) and in the manner that it exists (its configuration). This is all understood in the Ash'arite distinction between subject and object, namely that the subject, or the mind, is a part of nature, the same nature which is the object. It's also existed in some form within Stoicism at least. One has to marvel at how even as late as the 18th century Europeans still had not caught up philosophically to the Romans in some aspects.

Acting as a Skeptic poking around in the dark, Hume tries to deny the Self or Mind's rational aspect and reduces it to a bundle of sense perceptions, not taking into account at all the fact that the brain, the “subject” he is ignoring, uses these perceptions in a uniform manner and that there is a discrepancy between the uniformity of nature as understood by the brain and as perceived by the senses. That discrepancy is the entire basis for the skepticism of natural causality and the problem of induction to begin with! In other words, our brain knows that there must be causality (because it is a natural system based in space and time and has a “pure” impression of its own of the fundamental laws of the universe which it understands in the distinctly human language of cause and effect) and upon deeper speculation on the input it receives from the sensory organs, it concludes the natural causality which first asserts itself upon a cursory glance at sensory input is not sufficient to explain what's being observed. This is how the Islamic theologians critiqued natural causality. It's more a skepticism of sensory perception and its misinterpretation than causality! The brain says there is causality (for it has to say this), it sees order everywhere in its sensory input as evidence of causality, but it reflects on the sensory input with some skepticism and concludes there is more to causality than meets the eye, literally.

What this difference all comes down to is Hume's denial of the Self or the subject. This is what removed the occasionalism from the idealism of Berkeley which naturally led to the Idealism of Kant. What I am specifically referring to is Hume's notion of everything being

reducible to sense perceptions. His denial of causality, while it parrots the words of al-Ghazali, is truly rooted in a different worldview, one which is skeptical of the Self.

This is how I understand Hume's mindset. Think of our sensory input as acting like a camera. Our perceptions are ordered into "instants" or "frames", there's a bundle of sense perceptions from the five senses for each frame. Compare two photographs; from Hume's point of view, there's no way to show that one picture leads to another. They're two totally separate frames. In a series of two frames taken moments apart, one resembles partially the other. From the minor differences we establish a relation, and through our experiences, we build up Hume's notion of habitual or customary causality (whereas the Muslims believe only natural causality, the sort specifically related to sense perception, is so habitually imagined). Everything is focused on the perceptions. Not the object, and not the subject. Just these snapshots. Meanwhile, the occasionalist's skepticism of natural causality is rooted in attempting to relate a necessary connection between events that are termed causes and effects. Hume's view is incorporated into the occasionalist's view, but whereas Hume is limited only to his view, the occasionalist has a more developed notion of subject, object, and their overlap. Berkeley was one of the first to deviate from traditional occasionalism by essentially denying the object and only affirming the subject (the Self) and God. Hume can be seen as sort of the link between Berkeley and Kant.

Viewing causation in this fashion results in denying all causation, including divine causation. For Hume, there's no way to connect two bundles (snapshots or instants) of sense perception. There is no necessary connection, even divine. Thus, no God. What Kant merely did was intervene and reaffirm the subject (Self). There is an undercurrent of anti-realism implicit in Hume's philosophy and all this shows how lacking it is when contrasted with the advantages offered by a properly realist worldview, especially when speaking of empiricism.

If reality is simply sense data stored as frames that are played back by the mind at a certain framerate (like a video camera), then there's no inherent reason to believe in causality on the basis of one thing simply coming after another since they could just as easily be played in reverse or random order (so long as one ignores the fact that the subject is real and stores this data in a certain specific manner owing to its physical configuration).

If, however, we view the subject as real, as the mind being represented or manifested as a physical entity, the brain (an object), then how the mind relates between ideas and sense perceptions is decidedly more complex. There have been some phenomenal new developments in neuroscience, computational neuroscience, computer science, artificial intelligence, linguistics, neurolinguistics, and other related fields that have barely begun to explore how the brain works. At the very least, however, we know for certain that the brain does not process data and input in only a linear, temporal sense, but also a spatial sense. The neurons and the various parts of the brain they make up also operate

in parallel. In light of experimental developments by scientists such as manipulating living neurons to form logic gates and theoretical developments that can model the brain as a computational logic device, it is no longer possible for any intellectually honest philosophy to deny the Self, to deny the subject and its impact upon the reasoning process as manifested in the breakdown of the relation between the traditional understanding of *a priori* and *a posteriori* when we speak of how the brain functions (logically) by virtue of its physical configuration, distinct from all sense experience. Moreover, the traditional naturalist would have to place an even bigger emphasis on this since they attribute it all to nature's own eons-long evolutionary experiments; the brain is built upon the essence of the uniformity of nature. Hume's skepticism has not withstood the test of time.

Turning back to him, we can see that his view of the Self has some pretty far reaching consequences. The least of which is the paradoxical view towards logic and his use thereof. Hume says induction cannot be logically justified. But the logical basis to justify this analysis does not exist in his worldview. Conversely, the logical basis to criticize and refute his own analysis is provided by his worldview. That is his reductionist idea of definition.

This account of definition is a device for precisely determining the cognitive content of words and ideas. Hume uses a simple series of tests to determine cognitive content. Begin with a term. Ask what idea is annexed to it. If there is no such idea, then the term has no cognitive content, however prominently it figures in philosophy or theology. If there is an idea annexed to the term, and it is complex, break it up into the simple ideas that compose it. Then trace the simple ideas back to their original impressions: "These impressions are all strong and sensible. They admit not of ambiguity. They are not only placed in a full light themselves, but may throw light on their correspondent ideas, which lie in obscurity" (EHU, 62).

If the process fails at any point, the idea in question lacks cognitive content. When carried through successfully, however, the theory yields a "just definition" — a precise account of the troublesome idea or term. So, whenever we are suspicious that a "philosophical term is employed without any meaning or idea (as is too frequent), we need but enquire, *from what impression is that supposed idea derived?* And if it be impossible to assign any, this will serve to confirm our suspicion. By bringing ideas into so clear a light we may reasonably hope to remove all dispute, which may arise, concerning their nature and reality" (EHU, 22; *Abstract*, T, 648-9).¹⁵³

If the path to objectivity (regardless of whether or not it can truly be achieved in the end) in his worldview ends at sense perceptions, then the perceptions themselves should take priority over the subsequent impressions, simple ideas, and lastly complex ideas.

¹⁵³Morris (2010), SEP

For no reason other than their proximity to the object in the chain of transmission of sense data from the object to "the subject" (put in quotes for Hume's benefit). How then can he use a complex of complex ideas (logic as its indirectly derived from ideas derived from impressions derived from perceptions) to be skeptical of inductive reasoning and natural causality, which are (by his view) simpler ideas and simpler logic, closer to the impressions from sense perceptions? Should not induction take precedence over deduction? Hume's reductionism can be turned on his own arguments to show that Sense simply does not appeal to his senses, yet he invokes it nonetheless.

The 20th century naturalist philosopher, W.V. Quine, made an attack on reductionism in his *Two Dogmas of Empiricism*,¹⁵⁴

In order to prove that all meaningful statements can be translated into a sense-datum language, a reductionist would surely have to confront "the task of specifying a sense-datum language and showing how to translate the rest of significant discourse, statement by statement, into it." To illustrate the difficulty of doing so, Quine describes Rudolf Carnap's attempt in his book *Der logische Aufbau der Welt*.

Quine first observes that Carnap's starting point was not the strictest possible, as his "sense-datum language" included not only sense-events but also "the notations of logic, up through higher set theory... Empiricists there are who would boggle at such prodigality."

[...]

The difficulty that Carnap encountered shows that reductionism is, at best, unproven and very difficult to prove. Until a reductionist can produce an acceptable proof, Quine maintains that reductionism is another "metaphysical article of faith".

This can easily be applied to Hume who makes no such attempt at justifying his own logical discourse in a sense-datum language. When you have denied the subject/Self, you have denied the common basis for logic and its use and have to offer up a new justification.

The Case for Occasionalism

The occasionalism that Hume is familiar with is that of Berkeley and probably to a lesser extent, Malebranche. As I mention earlier, many people will insist that Hume denies divine causation on the same basis as he does natural causation.¹⁵⁵

¹⁵⁴http://en.wikipedia.org/wiki/Two_Dogmas_of_Empiricism (Retrieved 5/17/11)

¹⁵⁵Hasker, William (1998), Routledge.

Except that's not actually the manner in which he did so. What I explained previously was my understanding of his mindset, what his thought process was probably like, the logical extension of his philosophy. What he actually did, however, was quite incoherent. Or rather, it should be said that what people have interpreted from his words as an allegedly logical denial of divine causation is incoherent since it is apparent he makes no such attempt of his own. He makes a denial but it is not a logical argument. If from this point on I conflate Hume with what some attribute to him, I only do so for simplicity's sake, so forgive me and allow me that.

First, let's remember that causing something is in itself not an action. It's a label made by our minds which attributes a necessary connection between one event and another. It's sort of like a property or an attribute of an action. This is what al-Ghazali denied so long ago and which all subsequent occasionalists have denied. This mental attribution of a necessary connection between two events; an imagining if you will (to use Hume's terminology). As the Islamic occasionalists saw it, the two events were real and actually happened, but one event could not be called the cause of another. It could not be said that the event happening necessitated (meaning, it absolutely had to entail) the other event. It was probable, perhaps highly so, but this is inductive reasoning, not necessary knowledge and there isn't certainty in it.

Hume's denial of causality was a parroting of the occasionalists who came before him. Thus he denies, for example, that a billiard ball striking another is truly the cause of the second one moving. This is the actual written basis of his denial, not what I said about being unable to connect one perception to the next in causal fashion. That's what he should have said. What he's actually done is observe particular cases of events which the mind terms cause and effect, in this case a billiard ball striking another, but also we can include the whole wealth of experience he's accumulated in his lifetime... and then after having made the appropriate denial of apparent natural causality, he inductively applies that to all cases, including as yet unseen ones. Even those which theoretically cannot be seen. Everywhere in the universe, or beyond the universe, all events must be similar to the physical bodies interacting in front of him. Applying this to the notion of the divine is a clear and unjustified use of induction (to say nothing of the material universe itself if we take into account a modern understanding of quantum physics and how the uniformity of nature drastically changes at certain levels and places). He therefore has no basis by which to deny divine causation which, by almost any definition of God or the divine, would be nothing at all like the case of physical bodies interacting with one another. He especially misses the point that the occasionalist skepticism of causality is actually undermining the entire notion of causality as it is used in a naturalist sense, not the very notion of necessary connection between events. He conversely admits, as the occasionalists do, that the very notions of cause and effect are merely imaginations of the mind. Thus, God isn't actually *causing* anything in the sense of physical bodies striking each other, since causing is not an act in itself, it's a description or an attribution of necessary responsibility to an act. That act is God's *creating*, and His creation

corresponds to our observing, which our mind then interprets as God *causing*. Within the idea of or definition of “the Creator” is implicit the idea that the Creator’s creating necessitates the creation having been created (i.e, the thing being created comes into existence). It cannot be that the Creator creates something and that thing fails to come into existence. Nor can it be that something brings itself into existence. However, should one choose to protest on those grounds, we can take that into account too (I’ll deal with that later). Even if things could bring themselves into creation, this doesn’t mean that when God creates, that a necessary connection does not exist between His act of creating and the coming into existence of the thing being created. In short, when God does something, that something necessarily happens. Divine creation is necessary causation by definition.

The only thing the occasionalists’ protest against causation has done is refute the idea that perceived natural causation entails necessary connection or that such causation is necessary. This is the same issue that Hume has regurgitated from the occasionalists. This protest does not address necessary connection in itself, only the attribution of necessary connection to observed events. This argument has no effect on divine causation. Hume cannot use this on divine causation.

In order to refute divine causation, he has to refute the possibility of divine creation (the idea of a Creator) and this is something he makes no attempt at.

At this point, no more needs to be said about Hume and his ideas regarding divine causation. Whether our knowledge of causation is *a priori* or *a posteriori* makes no difference. We have an idea of necessary connection between events, it does not exist in nature between the events we perceive, but we posit that it exists for an omnipotent eternal Creator and between that Creator’s acts such as creating and the results of those acts (creation). Anyone who attributes to Hume a negation of divine causation on the same grounds with which skeptics question natural causality engages in two fallacies. First he takes the reductionist approach to determine that if only *a posteriori* information is available on causation, that causation is an imagined way of describing natural events only. Secondly, he inductively reasons that this applies to all possible events, including non-natural events such as a divine Creator doing something and all events in the universe (Hume did not know of modern physics but no one has that excuse now). He then concludes that the same issue which exists with natural causation, that no necessary connection exists between natural events, must also exist with the idea of divine causation when such a thing is a flat contradiction of the definition of the divine and Creator.

What I will argue from this point on is that Hume in his attempt to lay forth the Skeptics’ argument and question occasionalism actually makes the case *for* occasionalism (because the Skeptics in question were occasionalists). What it comes down to is an occasionalist saying “and that’s why I believe in God”, and Hume saying “and that’s why I don’t”.

In fact, in his exploration of the human notion of causality, he further repeats standard theist/occasionalist philosophy and quite a lot of it before he attempts to reduce it to “causation is an imagination resulting from *a posteriori* information only”, the first of the fallacies I pointed above. This is something that Hume actually does. Why such reductionism is a fallacy is evident enough as I’ve already pointed out because in denying the *a prioricity* of logic and emphasizing the primacy of *a posteriori* perceptions he has no basis by which to make such arguments that criticize the latter using the former. After all, the knowledge closest to the truth must lie in the series of impressions and perceptions, should it not? Then why use logic to skeptically question inductive conclusions in the first place? Wouldn’t all logic itself be justified inductively and thus beg the question? In fact, he has no need to even bother with inductive reasoning, he has analogical reasoning for which he is unable to offer any coherent skeptical response. He reasons from particulars to particulars. It’s as Quine said, there is no requisite explanatory sense-datum language offered.

Let’s not rest on that alone. Hume actually shoots himself in the foot in attempting to do this. He posits that the idea of necessary causation is linked to our concept of “power” which comes from our idea of “will”, which we observe for ourselves in our own thoughts. We have a feeling of volition and that which we will to perform or do feels as if it becomes necessary so we feel responsible for the resulting event and feel as though we caused it. He links power to causation.

Then he says that, of course, this is an illusion because when we enact our will with power we meet resistance and often times do not wind up causing what we intended to. However, even if suddenly limited to only our own thoughts and no motor or sensory connection to our bodies, we would perceive our will and power based on our ability to enact thoughts themselves. We know that each thought, each imagining, is a result of our conscious will and power, that we have caused each thought. So recognition of causation need not be connected to any *a posteriori* information, although we must recognize that the brain would need some input, some data or impressions to manipulate into language. It might be possible for the brain to think without any data to begin with, perhaps the brain would come with some sort of thought data or natural language that would still exist to the conscious mind were there no other information to drown it out. But this we do not know. We do know, however, if the brain has sufficient data with which to function, even if said data were gibberish, the basic *a priori* function would include not just basic logic (the operation of which upon data would include causal recognition as I’ve mentioned previously) but also recognition of our Self and our will to think and enact thoughts (cognition) due to our consciousness. This latter is Hume’s very traditional understanding of causality, taken from the occasionalists.

Hume knows this and he addresses it,

Shall we then assert, that we are conscious of a power or energy in our own

minds, when, by an act or command of our will, we raise up a new idea, fix the mind to the contemplation of it, turn it on all sides, and at last dismiss it for some other idea, when we think that we have surveyed it with sufficient accuracy? I believe the same arguments will prove, that even this command of the will gives us no real idea of force or energy.¹⁵⁶

Let us ignore that he's moved from recognition of causality and power in that context to actual force or energy. We've perceived we have the ability to enact our will in a necessary fashion, that is power enough for causality.

We only feel the event, namely, the existence of an idea, consequent to a command of the will: But the manner, in which this operation is performed, the power by which it is produced, is entirely beyond our comprehension.

Now, whether or not we truly have this power hardly matters to the issue of causation. The point is we think we do, and this is *a priori*, thus our understanding of causation isn't necessarily dependent on *a posteriori* knowledge. An occasionalist would have no issue with acknowledging that God is the primary and efficient cause even of our thoughts as far as our corporeal minds go. But we are conscious, we recognize we have will. From our will comes knowledge of our selves, of power, of causation. In that order. As per Hume's reductionist definition anyway. This is the natural setup for an occasionalist argument for God which he is parroting.

In fact, he comes right out and says it in this work (*An Enquiry Concerning Human Understanding*),

Volition is surely an act of the mind, with which we are sufficiently acquainted. Reflect upon it. Consider it on all sides. Do you find anything in it like this creative power, by which it raises from nothing a new idea, and with a kind of Fiat, imitates the omnipotence of its Maker, if I may be allowed so to speak, who called forth into existence all the various scenes of nature?

He continues, trying to assert that our recognition of power is only *a posteriori*,

So far from being conscious of this energy in the will, it requires as certain experience as that of which we are possessed, to convince us that such extraordinary effects do ever result from a simple act of volition.

But he's already defeated his own argument with his earlier statement,

We only feel the event, namely, the existence of an idea, consequent to a command of the will...

¹⁵⁶Hume, David - *An Enquiry Concerning Human Understanding*

At this point, no matter Hume's arguments, he's admitted we have the *a priori* information from which we can deduce, also *a priorily*, that events exist and one event can be attributed with responsibility for the other in the form of a necessary connection. He's completely distracting himself with this occasionalist talk of power. Nobody will say they do not feel that they are the true cause of their thoughts simply because they do not know how the brain works.

What Hume is parroting here is the "No Knowledge" argument of Cartesian occasionalists like Malebranche.¹⁵⁷

Malebranche presents his version of the argument in numerous places, including the following passage from the *Elucidations*, where he denies that our minds are true causes, based on our lack of knowledge of the intended effects:

But I deny that my will is the true cause of my arm's movement, of my mind's ideas, and of other things accompanying my volitions, for I see no relation whatever between such different things. I even see clearly that there can be no relation between the volition I have to move my arm and the agitation of the animal spirits, i.e., of certain tiny bodies whose motion and figure I do not know and which choose certain nerve canals from a million others I do not know in order to cause in me the motion I desire through an infinity of movements I do not desire. (*OCM III 226/Search 669*)

Though not explicitly stated, many commentators have read Malebranche as endorsing, in places such as this passage, the claim that the agent must know *how* to bring about the effect in order to be its cause.

The only thing the occasionalists are denying is that our minds are true causes, but they do not deny obviously that our minds know the idea of causality.

This extension of will to power and power to force or energy is fine in demonstrating that our minds do not possess true power, but we only need the appearance of power based off of our ability to enact our will, even in the form of simple ideas, to start recognizing causality and asking these questions.

Furthermore, all this talk of knowledge is simply a positive side of the occasionalist argument. First we know that causal relationships exist, *a priorily*, though it makes no difference if it's *a posteriori* knowledge. Second we realize that the apparent causes we observe in nature (*a posteriorily*) cannot be the true causes for no necessary connections exist between these events. Then God is posited as the the cause. The

¹⁵⁷Lee, Sukjae, "Occasionalism", *The Stanford Encyclopedia of Philosophy (Winter 2008 Edition)*, Edward N. Zalta (ed.)

reasoning behind this in the occasionalists' argument (which I will go into detail later) is in associating true creative force or energy with a living being that has will and knowledge. Hence, occasionalists argue that by virtue of our own selves we know the Creator. We were so designed in order that we may recognize Him by His Signs (which is what the Qur'an literally says all over the place). Why the need for secrecy? Because this world is a test for faith and free will and all that, the standard Abrahamic narrative about this world being a proving grounds for the eternal hereafter. God revealing His presence overtly would only result in people publicly affirming God (who in their right mind wouldn't), but even Satan did that and he was able to sin in Paradise and coerce Adam and Eve to sin as well. Obviously, God intends for that to not happen again after this one example which was allowed for our benefit (so we can understand what and why rather than God placing mankind on earth without any explanation).

And it goes on, laying out the entire argument for why God, why this God and not that, etc. The only reason the arguments for knowledge and will with regards to causation even exist is because this is how occasionalists argued *for* a living God. Hume parrots these.

Let us now turn to Hume's final statements on the occasionalists' conclusion,

Thus, according to these philosophers, every thing is full of God. Not content with the principle, that nothing exists but by his will, that nothing possesses any power but by his concession: They rob nature, and all created beings, of every power, in order to render their dependence on the Deity still more sensible and immediate. They consider not that, by this theory, they diminish, instead of magnifying, the grandeur of those attributes, which they affect so much to celebrate. It argues surely more power in the Deity to delegate a certain degree of power to inferior creatures than to produce every thing by his own immediate volition. It argues more wisdom to contrive at first the fabric of the world with such perfect foresight that, of itself, and by its proper operation, it may serve all the purposes of providence, than if the great Creator were obliged every moment to adjust its parts, and animate by his breath all the wheels of that stupendous machine.

But if we would have a more philosophical confutation of this theory, perhaps the two following reflections may suffice.

First, it seems to me that this theory of the universal energy and operation of the Supreme Being is too bold ever to carry conviction with it to a man, sufficiently apprized of the weakness of human reason, and the narrow limits to which it is confined in all its operations. Though the chain of arguments which conduct to it were ever so logical, there must arise a strong suspicion, if not an absolute assurance, that it has carried us quite beyond the reach of our faculties, when it leads to conclusions so extraordinary, and so remote

from common life and experience. We are got into fairy land, long ere we have reached the last steps of our theory; and there we have no reason to trust our common methods of argument, or to think that our usual analogies and probabilities have any authority. Our line is too short to fathom such immense abysses. And however we may flatter ourselves that we are guided, in every step which we take, by a kind of verisimilitude and experience, we may be assured that this fancied experience has no authority when we thus apply it to subjects that lie entirely out of the sphere of experience. But on this we shall have occasion to touch afterwards. *

* To have recourse to the veracity of the Supreme Being, in order to prove the veracity of our senses, is surely making a very unexpected circuit. If his veracity were at all concerned in this matter, our senses would be entirely infallible; because it is not possible that he can ever deceive. Not to mention, that, if the external world be once called in question, we shall be at a loss to find arguments, by which we may prove the existence of that Being or any of his attributes.

Secondly, I cannot perceive any force in the arguments on which this theory is founded. We are ignorant, it is true, of the manner in which bodies operate on each other: Their force or energy is entirely incomprehensible: But are we not equally ignorant of the manner or force by which a mind, even the supreme mind, operates either on itself or on body? Whence, I beseech you, do we acquire any idea of it? We have no sentiment or consciousness of this power in ourselves. We have no idea of the Supreme Being but what we learn from reflection on our own faculties. Were our ignorance, therefore, a good reason for rejecting anything, we should be led into that principle of denying all energy in the Supreme Being as much as in the grossest matter. We surely comprehend as little the operations of one as of the other. Is it more difficult to conceive that motion may arise from impulse than that it may arise from volition? All we know is our profound ignorance in both cases. *

* I need not examine at length the *vis inertiae* which is so much talked of in the new philosophy, and which is ascribed to matter. We find by experience, that a body at rest or in motion continues for ever in its present state, till put from it by some new cause; and that a body impelled takes as much motion from the impelling body as it acquires itself. These are facts. When we call this a *vis inertiae*, we only mark these facts, without pretending to

have any idea of the inert power; in the same manner as, when we talk of gravity, we mean certain effects, without comprehending that active power. It was never the meaning of Sir Isaac Newton to rob second causes of all force or energy; though some of his followers have endeavoured to establish that theory upon his authority. On the contrary, that great philosopher had recourse to an ethereal active fluid to explain his universal attraction; though he was so cautious and modest as to allow, that it was a mere hypothesis, not to be insisted on, without more experiments. I must confess, that there is something in the fate of opinions a little extraordinary. Descartes insinuated that doctrine of the universal and sole efficacy of the Deity, without insisting on it. Malebranche and other Cartesians made it the foundation of all their philosophy. It had, however, no authority in England. Locke, Clarke, and Cudworth, never so much as take notice of it, but suppose all along, that matter has a real, though subordinate and derived power. By what means has it become so prevalent among our modern metaphysicians?

What we are looking for here is what those critics of occasionalism insist is Hume's logical refutation of occasionalism. But no such logical argument exists. Hume merely acknowledges he's in over his head in discussions about God but cannot bring himself to overcome his skepticism to accept the God of Descartes, Malebranche and Berkeley.

Some final remarks on his statements:

They rob nature, and all created beings, of every power, in order to render their dependence on the Deity still more sensible and immediate. They consider not that, by this theory, they diminish, instead of magnifying, the grandeur of those attributes, which they affect so much to celebrate. It argues surely more power in the Deity to delegate a certain degree of power to inferior creatures than to produce every thing by his own immediate volition. It argues more wisdom to contrive at first the fabric of the world with such perfect foresight that, of itself, and by its proper operation, it may serve all the purposes of providence, than if the great Creator were obliged every moment to adjust its parts, and animate by his breath all the wheels of that stupendous machine.

This is now theology and not philosophy. And it is rather easily logically refuted. Any God who assigned creative capacity to something else is diminishing from Himself and His monopoly on creative power. It's just as reasonable to assert the opposite of what Hume says, if not more so. Hume's assertion then amounts to "why has God not given me power? surely He would be greater if He had..." which amounts to the argument, "God has not done this. Does this express an inability on the part of God? Would He not be greater then if He did this?", all of this is mere conjecture and subjective opinion at best. At worst it expresses the author's selfish and egoist desire for power and for God's Will to conform with their own will. "Why doesn't God do what I want, surely that would be

most great!"¹⁵⁸ All of which indirectly confirms the occasionalist narrative that man has the free will to believe or disbelieve, which implies a certain amount of capacity in man. In other words, right after Hume just gets done telling us we have no such capacity (of choice; free will), he exercises this choice. A choice that the occasionalist narrative says he and everyone else has. According to the occasionalist, the only thing with regards to which we have any creative capacity is our will, the freedom to choose to believe in God or not, and to what extent this free will continues beyond that, we cannot be certain (as even modern science shows us all the deterministic forces seemingly acting upon us at every moment). In short, man has will, but not power.

In addition, he's applying human ideas to God. God is supposed to be the eternal Creator who exists outside time and space. Could we really predicate something like obligation on God? By doing so, we once again limit God. Islamic theology says that cannot be the case. God is not obliged to do anything He doesn't want to do. Whatever God does, He does so out of His Will. Being so meticulous as to keep this universe and who knows how many other worlds running would be of no difficulty because God is omnipotent. This sort of reasoning can go on, but the basic flaw is automatically assuming human limitations (difficulty, resistance) of God. Such a limited God is not the God of Islamic monotheism or occasionalism.

First, it seems to me that this theory of the universal energy and operation of the Supreme Being is too bold ever to carry conviction with it to a man, sufficiently apprized of the weakness of human reason, and the narrow limits to which it is confined in all its operations. Though the chain of arguments which conduct to it were ever so logical, there must arise a strong suspicion, if not an absolute assurance, that it has carried us quite beyond the reach of our faculties, when it leads to conclusions so extraordinary, and so remote from common life and experience.

And this is the essence of Hume's dissatisfaction with occasionalism. It just doesn't appeal to him. It's not for any logical reason for he actually affirms the logical merit of occasionalism. He is skeptical of the human ability to reason (as we've already discussed) so he doubts such grand conclusions such as the existence of God, which might be the grandest, from our everyday experiences.

And that's a perfectly fine conclusion to make. Even amongst the Islamic orthodoxy, only the Maturidis believe that man has the responsibility to figure out the existence of the Creator for themselves, independent of Scriptural evidence. The Ash'arites believe there is no responsibility for belief on that person who has not been reached by revelation.

The self-styled skeptic might ask, so why didn't Hume turn to Islam? There could be a million and one reasons for that, owing to the circumstances of the time. The two

¹⁵⁸This is antithetical to the very essence of Islam which is about submission to Allah, the voluntary surrendering of our will to His Will.

biggest are lack of knowledge of Islam in its true theological form and history, though he was of course familiar with the religion in an at least an orientalist's fashion. He must have additionally been at least familiar with Islamic occasionalism for the European occasionalists no doubt mention them. He likely just lumped them all in with Berkeley, whose form of occasionalism left much to be desired as it has been shown.¹⁵⁹ And of course, Europe's fling with occasionalism was brief as it was so alien to Christianity and not supported by Christian scripture or doctrine.

The biggest reason for why any such a brilliant thinker or philosopher doesn't convert (and this applies to all and is my reason for touching on this subject) is because philosophy at the end of the day hardly matters at all in such matters. We've all grown up in a culture and regardless of our belief, theology, or philosophy, we will be inclined to our culture. The way we dress, the way we talk, our matters of concern, our outlook on society, the shared history, the ethnic/familial/tribal kinship, etc. Islamic culture is vastly different from European culture. Had Europe been the home of the Muslim world instead of the Middle East, would Hume have accepted the prevailing trend of Islamic occasionalism? It's impossible to guess, but as I've said, there is much greater scriptural, cultural, and theological support for occasionalism within Islam which is an occasionalist religion from the ground up; straight from revelation. As opposed to the Europeans for whom occasionalism was more philosophy than theology since they got it second hand.

Some of what Hume says, however, indicates it's most definitely not a remote possibility,

But are we not equally ignorant of the manner or force by which a mind, even the supreme mind, operates either on itself or on body? Whence, I beseech you, do we acquire any idea of it? We have no sentiment or consciousness of this power in ourselves. We have no idea of the Supreme Being but what we learn from reflection on our own faculties.

As I said, perhaps even al-Ghazali, having been an Ash'arite, might have acknowledged the soundness of his logic here (in the context of his circumstances as a non-Muslim philosopher in Europe). Muslims have the Qur'an (and how it acts as evidence for God, I'll discuss later on). Hume did not. Although the attribution of "mind" to God (in the sense of a limiting factor) is once again an unacceptable anthropomorphization by Islamic theology.

Further, one could argue that we do have some idea now. It relates to the Ash'arite conception of atomism, the "how" behind occasionalism. It explains not just how we observe, but how God creates. And atomism is older than Islam so here it's Hume's own faculty that falls short though we could hardly have expected him to attempt to explain

¹⁵⁹In fact, Hume says about Berkeley,

"...indeed most of the writings of that very ingenious author form the best lessons of scepticism which are to be found either among the ancient or modern philosophers..."

occasionalism without first professing belief in it.

If his veracity were at all concerned in this matter, our senses would be entirely infallible; because it is not possible that he can ever deceive.

Again, this isn't the case at all. This is once again the subject of theology. God has created man with the ability to err. The Qur'an is quite clear that we can trust our senses as a means to objective truth but due to humans' near propensity for error, human knowledge is rarely ever certain. But it's certain enough that we will be held to account for how we used it. God's veiling of mankind from the world of the unseen (Himself, the Heavens, angels, etc) is not deception but a part of the test of faith in the Abrahamic narrative, which Hume should have no doubt been familiar with. Deception implies some malevolent intent where there is none.

Not to mention, that, if the external world be once called in question, we shall be at a loss to find arguments, by which we may prove the existence of that Being or any of his attributes.

Once again, the Qur'an is the Islamic theological answer to that. I shall discuss that more in the later sections on Islamic epistemology and sources of knowledge.

...we only mark these facts, without pretending to have any idea of the inert power; in the same manner as, when we talk of gravity, we mean certain effects, without comprehending that active power. It was never the meaning of Sir Isaac Newton to rob second causes of all force or energy; though some of his followers have endeavoured to establish that theory upon his authority. On the contrary, that great philosopher had recourse to an ethereal active fluid to explain his universal attraction; though he was so cautious and modest as to allow, that it was a mere hypothesis, not to be insisted on, without more experiments.

[...]

...By what means has it become so prevalent among our modern metaphysicians?

His comments here are of particular interest. What he's trying to insist is that science is describing laws of nature, but not the power behind those laws and indeed makes no attempt to. He's implying it is beyond us whether the power exists in things themselves or rests with God. He then asks, rhetorically, how have some so readily accepted occasionalism in his time since it had no previous history to speak of in Britain (Descartes and Malebranche were both French). It's likely he's referring to Berkeley. Quite a few other "semi-occasionalists" also were around at the time who started with occasionalism then endowed man with the power to bring about some events (such as

Thomas Reid and his idea of moral liberty).

What it all comes down to is our understanding and beliefs about the power or force behind the uniformity of nature (as per the metaphysical classification list earlier).

[The following was added in a revision. If any trouble is encountered understanding it, it will be easier to understand after having read through the rest of the document.]

I felt it necessary to add a more direct address of some of Hume's stated issues with divine causality. For its own sake, even if it isn't necessary in the lengthier address above.

In Hume's *Dialogues Concerning Natural Religion* he has two fictional characters debate over the argument from design. The argument from design can vary drastically, from the Intelligent Design of current Christians all the way to Occasionalism which is a more pure essence of the argument (where the design means the existence of any order at all). The occasionalist argument for God is not actually the argument from design (insofar as existence itself is a design, and "argument from existence" is a more apt description), but it encompasses it (and is often used as a shortcut against Sophist opponents who take on extremely skeptical, solipsist, anti-causality or anti-realist viewpoints). The character Cleanthes defends the argument from design while Philo attacks it.

In this work Hume belies his true views of atheism (and that it is possible he might have been an Agnostic or an agnostic atheist, *not* a gnostic atheist at least at the time of writing this work) since Philo, presumably representing Hume's own views of rational atheism at the time, actually agrees with Cleanthes' basic premise as inevitable (indicating atheism isn't rationally possible) but not his rationale at arriving at his final view of an omnipotent, omniscient, perfect Creator.

A brief summary from [SparkNotes](#),

Cleanthes is an empirical theist; that is, he believes that it is possible to come to an understanding of God's existence and nature by inferring it from the natural world. In other words, he thinks that by looking at the world, we can gather evidence that will allow us to justifiably draw conclusions about what God is really like. He is the only one who clearly and adamantly believes in the possibility of natural religion (that is, in the possibility of grounding religious belief in reason).

Demea, the traditional, orthodox Christian seems to be ambivalent toward the idea of reason-based faith. He is not wholly against the idea, but he is not wholly comfortable with it either. Furthermore, he is convinced that if there is any possible ground for faith in reason, it is not through the sort of empirical

reasoning that Cleanthes urges. Instead, any rational grounding for faith is going to come from the certain and stable a priori arguments that use pure reason to come to indubitable conclusions. He seems to truly sympathize with fideism, which asserts that religious belief cannot be grounded in reason, but must be grounded in pure and irrational faith.

Philo is the only character who shows no tendency toward natural religion. Philo, introduced to us by Pamphilus as a philosophical skeptic, is adamant in his claim that reason cannot get us to an understanding of God's nature. It is Philo's arguments against Cleanthes' empirical theism that comprise the main theme of the Dialogues.¹⁶⁰

It ends with this (direct quote),

If the whole of Natural Theology, as some people seem to maintain, resolves itself into one simple, though somewhat ambiguous, at least undefined proposition, ***That the cause or causes of order in the universe probably bear some remote analogy to human intelligence***: If this proposition be not capable of extension, variation, or more particular explication: If it affords no inference that affects human life, or can be the source of any action or forbearance: And if the analogy, imperfect as it is, can be carried no further than to the human intelligence, and cannot be transferred, with any appearance of probability, to the other qualities of the mind; if this really be the case, what can the most inquisitive, contemplative, and religious man do more than give a plain, philosophical assent to the proposition, as often as it occurs, and believe that the arguments on which it is established exceed the objections which lie against it? Some astonishment, indeed, will naturally arise from the greatness of the object; some melancholy from its obscurity; some contempt of human reason, that it can give no solution more satisfactory with regard to so extraordinary and magnificent a question. But believe me, CLEANTHES, the most natural sentiment which a well-disposed mind will feel on this occasion, is a longing desire and expectation that Heaven would be pleased to dissipate, at least alleviate, this profound ignorance, by affording some more particular revelation to mankind, and making discoveries of the nature, attributes, and operations of the Divine object of our faith. A person, seasoned with a just sense of the imperfections of natural reason, will fly to revealed truth with the greatest avidity: While the haughty Dogmatist, persuaded that he can erect a complete system of Theology by the mere help of philosophy, disdains any further aid, and rejects this adventitious instructor. To be a philosophical Sceptic is, in a man of letters, the first and most essential step towards being a sound, believing Christian; a proposition which I would willingly recommend to the attention of PAMPHILUS: And I hope CLEANTHES will forgive me for interposing so far

¹⁶⁰ <http://www.sparknotes.com/philosophy/dialogues/section1.rhtml>

in the education and instruction of his pupil.

CLEANTHES and PHILO pursued not this conversation much further: and as nothing ever made greater impression on me, than all the reasonings of that day, so I confess, that, upon a serious review of the whole, I cannot but think, that PHILO's principles are more probable than DEMEA's; but that those of CLEANTHES approach still nearer to the truth.

Which basically amounts to the notion that from the order in the universe we can reason that it derives from a source simply analogous to human intelligence in some remote way, and no more.

The issues with this are clear and apparent for anyone possessed of sane and rational mind:

1. "Analogous to human 'intelligence'" is an ambiguous and blatantly incorrect phrase. That aspect of human mental experience to which analogy should be made is *will*. Will is the more honest and bare minimum analogous trait so it should have been more palatable to Hume who, being a strict empiricist, reveled in reductionism. Will also explains existence, not merely design. Existence precedes design or order.
2. Will *requires* intelligence. So Hume's conclusion is here; based on the premise of the true parallel of will.
3. Will and intelligence, according to all of humanity's experience and empirical knowledge, require *life*. That Hume already picked *intelligence*, which is predicated on a more fundamental premise of will, indicates that he must agree with the reasoning involved and predicating life of something where intelligence and will were already accepted is perfectly in line with Hume's reason. If anyone holding his viewpoint should object they must abandon the entirety of his work.
4. Intelligence implies knowledge. As Hume himself reasoned in earlier excerpts, the knowledge of the particulars must be predicated of the intelligence attributed with causal responsibility. It was in fact instrumental in his skepticism of the causal relationship even between our will and our thoughts. If this entity "analogous to human intelligence" is in fact responsible for the entire physical universe, then it would have knowledge of everything in it. This constitutes perfect knowledge, a direct consequence of using the "No Knowledge" argument which is derived, in reverse, from the theological axiom of the God of occasionalism's perfect knowledge, so this is an inescapable side effect of Hume's borrowing so much from occasionalists.

I could go on with the standard Islamic theological doctrine of Allah's attributes, which it

seems is what Hume really longed for,

...the most natural sentiment which a well-disposed mind will feel on this occasion, is a longing desire and expectation that Heaven would be pleased to dissipate, at least alleviate, this profound ignorance, by affording some more particular revelation to mankind, and making discoveries of the nature, attributes, and operations of the Divine object of our faith.

Though he had access to the Qur'an, it seems from his writings he made no deeper analysis of it beyond a superficial and literal glance at a translation. He certainly wasn't acquainted with the work of orthodox theologians. Unfortunate because so much of his work was derived from theirs.

Let's look at the objections stated by Philo in the narrative,

For aught we can know a priori, *matter may contain the source or spring of order originally within itself, as well as mind does*; and there is no more difficulty in conceiving that the several elements, form an internal unknown cause, may fall into the most exquisite arrangement, than to conceive that their ideas, in the great universal mind, from a like internal unknown cause, fall into that arrangement.

This is utterly refuted by Hume's own philosophy where he refuses to even acknowledge that our wills are responsible for the order in our minds. It seems the character of Philo wasn't as rigorous a skeptic as Hume himself was.

But let's put aside this contradiction for a moment. He's leaning here towards a Leibnizian notion of passive perception or will associated with elemental constitutive substances (for Leibniz, the monad). Leibniz will be discussed in detail much later. However even Leibniz, who expanded this idea into a fully fledged metaphysics, acknowledged the *requirement* of God to answer the question of existence. A question which hasn't even entered Hume's mind (and seriously undermines the position conferred to him by his admirers as this philosophical genius... next to the likes of Leibniz he seems more like a regurgitator than anything else). Furthermore Leibniz invoked God again to take responsibility for the order inherent in the configuration *between* substances, what he called a "pre-established harmony". Meaning, even if God were to give created substances even the semblance of independent existence, their *external* order (corresponding to the *internal* order of the bodies which they formed) required God to communicate to the substances their intended roles, behaviors, positions, etc. Leibniz, trying to avoid outright occasionalism, even said that his monad was "sealed off" from outside influence (upholding Hume's skepticism of natural causation) and that God had "encoded" or "programmed" the "pre-established harmony" into the entire creation by programming into the constitutive substances (monads in this case) the specific behaviors relevant to them and their role in the overall order.

Basically, order *anywhere* is a case for God('s involvement) *everywhere*.

Hume's metaphysics (or the lack thereof) are something out of the Dark Ages. Completely and inexcusably outdated by the 18th century.

And will any man tell me with a serious countenance that an orderly universe must arise from some thought and art like the human because we have experience of it? To ascertain this reasoning it were requisite that we had experience of the origin of worlds; and it is not sufficient, surely, that we have seen ships and cities arise from human art and contrivance

This is a relevant criticism of the Christian argument from design ("ID" or Intelligent Design as it is called) but inapplicable to occasionalism which asserts that any kind of order whatsoever is by design (even the order implied by certain things existing and other things not existing).

Secondly, you have no reason, on your theory, for ascribing perfection to the Deity, even in His finite capacity, or for supposing Him free from every error, mistake, or incoherences, in His undertakings ... At least, you must acknowledge that it is impossible for us to tell, from our limited views, whether this system contains any great faults or deserves any considerable praise if compared to other possible and even real systems.

Utterly fallacious reasoning. God being the "wellspring" of existence, being able to confer existence to anything, and therefore by necessity (according to Hume's own reason) possessed of knowledge enabling this means God must have perfect knowledge. Furthermore, with a belief in the real existence of the world and matter, which Hume with his anti-realist tendencies was always shying away from, the necessity of perfection becomes clearly apparent. What could will into existence a perfectly functioning atom with all the associated laws of physics and then do the same for *all other possibilities* (perfectly realizing all possibilities) and then *not* be perfect? The necessity of "technical" perfection is thus made clear. By technical I mean staying true to the strict definition of the word. The source of existence (the God of occasionalism) and *that* fundamental order (associated with existence versus non-existence) must necessarily be perfect.

The only room left for criticism is moral... in other words irrational and emotional. Hume would no doubt proclaim his own moral opinions superior to the Creator's (as Europeans tended to do in their confrontation of the Christian God) and this has absolutely no rational or objective foundation at all. In fact, objectively speaking one would be more likely to think that the Creator whose design is not necessarily knowable by humans would be given the benefit of the doubt over a mere human such as Hume, who isn't even known for originality.

It seems Hume's guilty conscience regarding his unoriginality comes through in his writings.

Philo's objection then is that it is unknown if we are the creation of *that* perfect Creator or some copycat or intermediary,

But were this world ever so perfect a production, it must still remain uncertain whether all the excellences of the work can justly be ascribed to the workman. If we survey a ship, what an exalted idea we must form of the ingenuity of the carpenter who framed so complicated, useful, and beautiful a machine? And what surprise must we feel when we find him a stupid mechanic who imitated others, and copies an art which, through a long succession of ages, after multiplied trials, mistakes, corrections, deliberations and controversies, had been gradually improving? Many worlds might have been botched and bungled, throughout an eternity, ere this system was struck out; much labour lost, many fruitless trials made, and a slow but continued improvement carried on during infinite ages in the art of world-making.

This is no different than asserting that one's parents cannot be their creator because they are stupid or ignorant. If we indulge Hume and consider that our universe was the product of some trial and error process by some extrauniversal entity, the order of existence necessitates that *that* entity was, in turn, created by the distinct and perfect Creator. The source of existence necessarily must be perfect. If you posit an imperfect creator you are not negating the notion of the Creator, you are only adding intermediaries playing no different a role than your own parents did in your creation. What Hume's missing here is any sort of theological guidance (since he has already rejected the Bible and the God of the Qur'an as a rehash of the former).

We have no data to establish any system of cosmogony (a theory about the origins of the universe). Our experience, so imperfect in itself and so limited both in extent and duration, can afford us no probable conjecture concerning the whole of things. But if we must needs fix on some hypothesis, by what rule, pray, ought we to determine our choice? Is there any other rule than the greater similarity of the objects compared? And does not a plant or an animal, which springs from vegetation or generation, bear a stronger resemblance to the world than does any artificial machine, which arises from reason and design?

This argument is dated. Science today has refuted it. The emergence of the "fine tuning" and "arbitrariness" problems have even revitalized Christian apologetics (which probably would be to Hume's dismay were he alive to have seen it). The universe is *perfectly* fine tuned for its current life-sustaining order and anything even remotely less than perfect would not have sufficed. These issues will be discussed in depth later on.

Hume also says,

the analogical reasoning employed in the argument does not provide a basis for any conclusion about the moral attributes of the designer of nature, even if one concludes that there is such a designer. The conception of a moral, just, good, deity does not follow from the comparison of natural and human effects. If the designer is supposed to be like the human designer, then we would have no reason to suppose that there is any special moral quality belonging to the author of nature. When one examines the product, i.e., nature, and observes all its unpleasant features, e.g., hurricanes, earthquakes, the wars of one part of nature upon another, can we conclude that the planning was that of a just and good intelligence?

A morally upright individual would recognize the signature features of moral attributes present throughout nature. It is only the limited and morally deficient mind, present to some degree in us all no doubt, which cannot see that within nature's behavior there is Love, there is Mercy, there is Justice, and so on and so forth. In fact, humans being a part of nature means all of our moral systems, our perfect moral ideals and aims, are reflecting the *nature* of nature (i.e, the order in nature) and are actually *nature's own ideals and aims*.

Hume is speculating from the wrong vantage point. You cannot take the axioms of the challenger and then use those in deducing the defender's viewpoint. That is bad logic. Once we decide to accept, even hypothetically, a designing Will, we would have to necessarily also hypothetically assume that the *human designer* is *supposed* to be like *The Designer*. And that humans, endowed with free will, do not regularly achieve this. Whereas the rest of nature apart from us lives in pretty much perfect harmony ("the circle of life", so to speak). Anyone who has ever been out and about in nature would know this (and it forms the foundation of most human spiritual traditions, including the ancient ones hailing from more chaotic times) and this is a concept that will be discussed in greater detail in later sections. But Hume, living in a morally bankrupt Great Britain of the 18th century often plagued by violence, understandably might have preferred to focus on the folly of a few individuals in his immediate neighborhood rather than the grand majestic nature of the rest of the planet. In those days there obviously was no Discovery Channel or National Geographic.

How Islamic Civilization Fell in the Sciences

We are brought to perhaps the most pressing question. How and why did Islamic civilization, a pioneer in science itself, begin to decline and fall behind after the 13th century?

In addition to this, if you haven't seen the BBC documentary I link in the introduction, I highly recommend doing so as it touches on this topic as well.

There are three major reasons. A fourth if you consider the general move away from religion since in the Muslim world, as has been shown so far and will be discussed further, religion was synonymous with science, empiricism, and scientific inquiry.

War: The Collapse of Old Islamic Civilization

The incident which perhaps best marks the end of the Islamic Golden Age was the Mongol sack of Baghdad in 1258.¹⁶¹

Baghdad was the biggest cultural and intellectual capital of the Muslim world outside of al-Andalus and likely more significant than even any Andalusian city since it attracted scholars from all over Asia, the Middle East, and Europe. It can rightly be said that Baghdad on the eve of its destruction was one of the, if not the, most important intellectual capitals in the world, its libraries rivaled by no other city on earth. When the Mongols finally got in, they slaughtered most of the inhabitants, by some estimates hundreds of thousands of individuals, and completely razed all the libraries. Most of the books were flung into the Tigris river which, it is said, ran black with all the ink.

Steven Dutch writes,

"Iraq in 1258 was very different from present day Iraq. Its agriculture was supported by canal networks thousands of years old. Baghdad was one of the most brilliant intellectual centers in the world. The Mongol destruction of Baghdad was a psychological blow from which Islam never recovered. Already Islam was turning inward, becoming more suspicious of conflicts between faith and reason and more conservative. With the sack of Baghdad, the intellectual flowering of Islam was snuffed out. Imagining the Athens of Pericles and Aristotle obliterated by a nuclear weapon begins to suggest the enormity of the blow. The Mongols filled in the irrigation canals and left Iraq too depopulated to restore them."

Baghdad as a city wouldn't recover for centuries. In fact, it never really has.

The Abbasid caliphate was finally and irrevocably destroyed. One can think of it as Arab civilization itself, as it was known from the period of the Prophet's (saw) city-state of Medina and on, having essentially come to an end.

¹⁶¹Matthew E. Falagas, Effie A. Zarkadoulia, George Samonis (2006). "Arab science in the golden age (750–1258 C.E.) and today", [*The FASEB Journal*](#) vol. 20, pp. 1581–1586

The Mamelukes had already been ruling autonomously in Egypt and finally halted the Mongol advance two years later at the Battle of Ayn Jalut. The Mamelukes were the famed “slave kings” the Abbasids had initially brought up from slaves from Slavic areas of Europe and Central Asia. The Abbasid royal family continued to nominally hold the office of Caliph whilst in Cairo until the Ottoman Turks defeated the Mamelukes and united the office of Caliph with the Ottoman Sultan, finally bringing real power to the caliphate once again.

In addition to the Mongols, there were the Crusades which had been ongoing throughout the 11th to 13th centuries. Though the Muslim world turned back the Europeans, it was nonetheless a source of constant consternation.

The Muslim world viewed the attack of the Mongols as a punishment from God for neglecting their faith and becoming overly indulgent in luxury and excess. The Abbasid empire and Arab civilization in general had already been on a decline before the Mongols arrived. Scholars like al-Ghazali had sought to re-energize the base by imploring everyone back to faith, including through Sufism, and to save them from being exploited by the various heretical or non-Muslim sects.

Muhammad (saw) had also prophesied in a well known hadith that one of the earlier signs of the coming Day of Judgment was a war with the Turkic-Mongolic tribes. The Muslim world almost unanimously identifies the Mongol invasion of the Muslim world with this prophesy.

The decline of the old Islamic civilization continued into the 14th and 15th centuries. The Reconquista, the Catholic reconquest of the Iberian peninsula from the Muslims, was accompanied by massive book burnings of all Arabic texts from the libraries, as well as slaughter or forced conversion of the Muslims and Jews living there at the time (the Spanish Inquisition). Al-Andalus, one of the bastions of philosophical thought which inspired Europe out of the Middle Ages, was wiped off the map.

Sunni civilization rose again but it wasn't the same.

Second Coming of Islam: A Shift in Focus

The Ottomans and the Mughals became the standard bearers of Sunni civilization after the fall of the Arabs and the conversion to Islam of much of the Central Asian peoples displaced into South Asia from the Mongol invasions. This was accompanied by a shift in focus away from traditional science to engineering, technology, and specifically military applications.

Having been born out of the destruction of the old empires, the Ottomans were from the very first a military empire. Utilizing the latest advances in military engineering and technology, these two empires, along with the Safavids of Persia, became known as the “gunpowder empires”. They were the first from the West (west of China at least) to implement gunpowder in systematic fashion with the widescale deployment of cannons. When the Turks conquered Constantinople, it was with the aid of cannons. The Ottoman Navy dominated the Mediterranean for centuries, rising to prominence with the defeat of the Venetian Navy in the first battles where cannons were utilized on ships.¹⁶²

The Ottoman era lasted until the 20th century. During the Ottoman period, piracy was a frequent problem for European nations in the Mediterranean, especially from the Barbary coast. The first United States action abroad was in Libya to battle the pirates. The leader of the US Marine force was given a Mameluke sword by the Ottoman ruler as a gift. The Mameluke sword has since become the officially adopted sword of the US Marine Corps to this day. Some of the most famous pirates became admirals in the Ottoman Navy, including a few Europeans who converted to Islam. Even the word “admiral” is from the Arabic word for commander (as in, “commander of the sea”). The Ottoman Empire entered a period of heavy modernization in the 19th century, including secularization. This was completed after it entered World War I on the side of Germany, was defeated, and the modern secular republic of Turkey was formed from what remained.

Meanwhile, one of the most significant technologies of the modern era came out of India. Tipu Sultan, the Muslim ruler of the Kingdom of Mysore, revolutionized rocketry and its use in warfare. He gave the British quite a hard time during their conquest of India. The British adapted his rockets for use in their own war against the US in 1812. The lyric in the US’ national anthem, “*and the rockets’ red glare*” is referring to the very same rockets. Subsequent British advances in rocketry heralded in a new age of “rocket science”, leading to the 20th century dominance of missile warfare as well as advances in engineering that led to modern aviation and eventually space exploration. The Ottomans also dabbled in aviation and rocketry.

The specific advances under the Ottomans and Mughals are still too numerous to get into for the purposes of this discussion. Theoretical science wasn’t completely neglected, but advances were now starting to come out of Europe rather than the Muslim world. Eventually they suffered for it. This combined with a long economic decline while Europe began colonizing the Americas meant the Ottoman dynasty would collapse mere decades before oil would be discovered under their former territory.

The areas in which the Ottomans and Mughals could not keep up was embracing the use of the printing press (for issues mentioned in the BBC documentary, the Arabic type being notoriously difficult to get right), the subsequent widespread availability of scientific education that afforded European nations, losing the economic contest to Europe,

¹⁶²As the old civilization in al-Andalus fell, the Ottomans rose. The Ottoman Sultan even sent his navy to evacuate Jews and Muslims from Spain during the Reconquista.

and eventually collapsing under the weight of an overburdened and quite complicated political bureaucracy that bore little resemblance to the streamlined and efficient *Shari'ah* model of the early Islamic period. Though they emerged onto the world scene with the potential to revitalize Islam, they inherited too much from the political systems of their forebears.

This brings us back to one of the very first sections in this work, regarding all the pre- and co-requisite social/economic/political factors necessary for a healthy scientific tradition. These factors just no longer existed. Civilizations tend to live on a life cycle. There are significant parallels in the decline and fall of Islamic civilization with what happened to the Romans, the Greeks, the Persians, the Mayans, etc. In fact, parallels exist even with the current dominance of Western, specifically American, civilization in the familiar symptoms of a population becoming lazy, distracted, indulgent in excess; where the Romans turned to hedonism (as the West does today, it seems), the Muslims turned to a combination of that and alternately extreme and sometimes deviant forms of spirituality... government bureaucracy, economic troubles, waging desperate wars for resources to stay afloat, neglecting classical science in favor of military applications, none of it would sound strange to anyone even today. As the Muslim world sees it, it was political Islam's time to go (reinforced by the hadith prophesying as much, referring to the conquest of the Muslim world by the Mongols and many other nations).

Paradigm Shift

Furthermore, Islamic science fell into the trap Ibn al-Haytham had warned about. They began treating scientific fields as they did religion, eventually engaging in a kind of *taqlid* in how they dared not challenge the opinions of the giants of Islamic science that came before them. Challenging Greeks or other civilizations' scientists and philosophers was one thing. Challenging the likes of your fellow Muslim scientists whom you idolized and looked up to was quite another. This is more relevant to the philosophy of science and will be discussed later under the section on Thomas Kuhn and his philosophy of paradigms.

The Case for Islamic Occasionalism

The occasionalist God in a realist ontology; this is the essence of *tawheed*, Islamic monotheism. The notion of a purely monotheistic all-powerful deity can only truly be described in such a manner. This is the Muslim understanding of the God of Abraham whom we call Allah.

I touched upon the case for occasionalism in the section on David Hume, showing how quite a few of his arguments were originally used by skeptics to actually make the case for occasionalism. Here I'll try to organize it in a more coherent manner.

The Arguments for God

There are two types of logical arguments for the existence of God that most people are already familiar with. The Ontological Argument and the Cosmological Argument.

The Ontological Argument

The ontological argument basically depends on a proof by definition. It makes existence a predicate of God's essence and says that since God is by definition that which is most conceivably perfect, then existence (which obviously makes something real and therefore more perfect) has to be a part of that, therefore God must exist.

Ontological arguments are arguments, for the conclusion that God exists, from premises which are supposed to derive from some source other than observation of the world—e.g., from reason alone. In other words, ontological arguments are arguments from nothing but analytic, *a priori* and necessary premises to the conclusion that God exists.¹⁶³

Islamic theologians haven't really concerned themselves with ontological arguments. They've been of greater interest in Christian Europe. Either way, they are interesting curiosities from the Islamic perspective. [The SEP has a great full length article on it.](#)

The Cosmological Argument

The cosmological argument is an argument that argues for the existence of God from specific facts about the world. The ideas usually present in the argument are the temporal origin of the world and the universe, the nature of contingency and necessity, the nature of existence, and causality (specifically the possibility of an infinite regress of events in a causal chain). The cosmological arguments are the type that argue for God as the "Unmoved Mover" or "Prime Mover" and the "First Cause" or "Uncaused Cause". The essence of the argument is focused around the question of "why there's something rather than nothing".

¹⁶³Oppy, Graham, "Ontological Arguments", *The Stanford Encyclopedia of Philosophy (Spring 2011 Edition)*, Edward N. Zalta (ed.)

The first forms of the argument that we have historical evidence of occur with the Greek philosophers Plato and Aristotle. Then the arguments were elaborated upon by Muslim philosophers and theologians from whence they entered the European discourse.

Although in Western philosophy the earliest formation of a version of the cosmological argument is found in Plato's *Laws*, 893–6, the classical argument is firmly rooted in Aristotle's *Physics* (VIII, 4–6) and *Metaphysics* (XII, 1–6). Islamic philosophy enriches the tradition, developing two types of arguments. The Arabic philosophers (*falasifa*) developed the atemporal argument from contingency, which is taken up by Thomas Aquinas (1225–74) in his *Summa Theologica* (I,q.2,a.3) and his *Summa Contra Gentiles* (I, 13). The *mutakallimūm*, theologians who used reason and argumentation to support their revealed Islamic beliefs, developed the temporal version of the argument from the impossibility of an infinite regress, known as the *kalām* argument. For example, al-Ghāzālī (1058-1111) argued that everything that begins to exist requires a cause of its beginning. The world is composed of temporal phenomena preceded by other temporally ordered phenomena. Since such a series of temporal phenomena cannot continue to infinity, the world must have had a beginning and a cause of its existence, namely, God (Craig 1979, part 1). This version of the argument enters the Christian tradition through Bonaventure (1221–74) in his *Sentences* (II Sent. D.1,p.1,a.1,q.2).¹⁶⁴

In colloquial use, the term “cosmological argument” is best reserved for the arguments of Plato and the latter day European philosophers. Perhaps the argument of Ibn Sina (from contingency) as well. The original “*kalam* cosmological argument” of al-Ghazali is a bit different from the form of it adopted by contemporary Christian philosophers.

I would like at this time to point out the two most relevant objections to the cosmological argument, whomever’s it may be,

The cosmological argument came under serious assault in the 18th century, first by David Hume and then by Immanuel Kant. Hume (1993) attacks both the view of causation presupposed in the argument (that causation is an objective, productive, necessary relation experienced as power that holds between two things) and the Causal Principle—every contingent being has a cause of its being—that lies at the heart of the argument. Kant contends that the cosmological argument, in identifying the necessary being, relies on the ontological argument, which in turn is suspect. We will return to these criticisms below.

Kant’s criticism is not a categorical one and thus isn’t relevant for discussion without

¹⁶⁴Reichenbach, Bruce, "Cosmological Argument", *The Stanford Encyclopedia of Philosophy* (Winter 2010 Edition), Edward N. Zalta (ed.)

a specific argument. His objection can also be carefully worked around by any decent argument. On top of that, Hume provides the arguments for identifying the “necessary cause” of the cosmological argument with the “necessary being” of the ontological argument, which was a consequence of where he got his arguments from.

I’ve already attacked the basis for Hume’s argument in the previous section. Hume has adopted the criticism of natural causality of the occasionalists. The purpose of this criticism of natural causality was to express the following ideas,

1. A necessary relation between certain events is perceived or imagined by our mind.
2. This necessary relationship is not causal. A causal relationship is indeed the imagined relationship by our mind which is described as “objective, productive, necessary relation experienced as power”. Though the relationship between events is not causal and cannot be defined as a “connection” or a “necessary connection”, the relation is most definitely real (as our brains are good at picking out patterns) and it is most definitely necessary inasmuch as there is certainty (and certainty can be seen, colloquially speaking, as a sign of or evidence of necessity). For instance, holding an apple several feet off the ground and releasing it, on this world, will always, with certainty (or in other words, necessarily), be accompanied by (or occasioned by or with) the event of the apple’s fall. This relation is *occasional*. All of our knowledge of nature through scientific endeavour is built on such occasional relations (due to our penchant for picking out patterns). Our very own minds are built on such relations.
3. Our certainty (and the necessity it suggests) in the occasional relationship is perceived both *a posteriorily* from our empirical sense data and also *a priorily* by the nature of our mind, or in other words, by the virtue of the experience of our brains as real objects with real configurations that are the seats of our subjective minds. This *a priori* reasoning can also be said to be a more pure and fundamental version of *a posteriori* experience as I previously discussed. This reasoning or knowledge can be said to be of the type described by Aristotle and many philosophers (such as al-Farabi) as intuitively necessary (in other words, there is certainty). Everyone, whether a naturalist, an illuminationist, a pantheist, whatever, recognizes this relationship and recognizes that a connective pattern does exist between occasional events. It is just that the precise connection cannot be drawn from one event to another. The best description we can come up with is occasional, and not causal. However, this idea we have of a necessary connection or a necessary connective relationship is the definition of causal. A causal relationship can be said to be an actual necessary connection between two events (as opposed to an occasional relationship where no such connection can be demonstrably discerned) such that one always necessitates the other. We know intuitively the idea of a causal relationship, we know that observed occasional relationships exist, we know we have no explanation for these occasional relationships and that there must be a causal relationship at

play somewhere but it is not between what our mind calls the cause and the effect. For instance, when the apple falls, we know that releasing an apple from a height is accompanied by its fall. We know, after careful consideration, this isn't a causal relationship. We also know, however, that there *is* some causal relationship there. Our certainty suggests a necessary relationship of some sort. The occasional relationship is *necessary* inasmuch as our certainty suggests necessity but it is not actually or demonstrably connective as a necessary connection (a causal relationship) would require. The question remains... where is the necessity? We know it is there somewhere, so where is it?¹⁶⁵

I hesitated to use the term "intuition" or "intuitively necessary", but it does describe the sort of knowledge we have of connective relationships. It is knowledge that is perceived by the mind, by virtue of its own nature, as universal, without any regard for what any other might say. Further, it is actually universal amongst all humans of sound mind. One may deny attributing relationships to the class of "causal relationships", but everyone understands this class. Lastly, it is not a metaphysical intuition, as William Craig says. It's a result of the real existence of our brains as matter in spacetime. Whether it can be classified as philosophy falling under the branch of that field known as metaphysics is irrelevant.

Even Hume, in his parroting of the occasionalists, acknowledges that our intuition has merit, but he just concludes we cannot know the nature of this necessary relationship or of how it works. We just know it is not causal between the two events. His attack on the very idea of causality or a causal relationship is borderline absurd by his own logic (regarding how he makes sense impressions his first principle then dares criticize his first principle by *a priori* logic¹⁶⁶). Furthermore, in addition to the naturalist criticism of his empiricism's reductionism (such as the argument made by Quine), a naturalist argument can be made to show how the empirical sciences do offer explanations for the validity of certain very basic principles of *a priori* reasoning in terms of *a posteriori* experience.¹⁶⁷

This, however, isn't the occasionalist argument for God. It's just the logical background for the occasionalist understanding.

I should also here criticize the Western philosophical distinction, or lack thereof, between what they call the "argument from contingency" and the "*kalam* cosmological argument".

The latter starts off with the premise, "Everything that begins to exist has a cause of

¹⁶⁵The answer to this question is our answer to the metaphysical problem of what is responsible for the uniformity of nature, see the metaphysical classification mentioned previously.

¹⁶⁶Hume's system suggests inductive-type reasoning would be of a higher order than deductive simply because of his first principle.

¹⁶⁷Though I was not familiar with the work of Quine while writing that, I recognize now my position can be seen, if it makes understanding it any easier, as a simple extension of a naturalist perspective along those lines. It is only in this sense that I invoke the term "naturalist".

its existence.” But as they use it (specifically, Craig), this merely becomes another way of expressing contingency (for temporal origin is an attribute of contingency). The rest of the “*kalam* cosmological argument” seems like a rehash of the argument from contingency.

The Occasionalist Argument

There actually was no “occasionalist argument” in the manner of Ibn Sina’s argument from contingency. In other words, a formal proof composed of premises and all that. The argument, if it can be called that, rested on the laurels of the overall case for occasionalism as an understanding or view of the world. Most of the Muslim occasionalists used Ibn Sina’s argument from contingency. Some of the Cartesian occasionalists used various forms of an ontological argument.

A properly worded expression of the occasionalist argument would draw from elements of all forms of the cosmological and ontological arguments as well as those particular arguments of the occasionalist viewpoint I briefly mention.

I should mention here that it has always been my view that such arguments are not actually arguments in the sense that they are proving a point which the skeptic will accept by rational necessity. They serve to express a basic understanding which can be used to help others understand the core point of view or defend the view from logical attacks. How many people actually change religions based on such arguments? Though that’s certainly possible, it would be very rare. If someone truly values logical proofs, they should convert if the argument is consistent and true. But it turns out most people who claim to value rationality do not value it over their own desires (of whether to belong to this religion or that, or no religion at all).

Anyhow, such an argument was drawn up in English by Mufti Yusuf Mullan of Deoband.org. Here is the URL to it:

<http://www.deoband.org/2010/03/aqida/allah-and-his-attributes/clearest-rational-argument-for-the-existence-of-a-creator/>

If the URL is unavailable, check islamtheologyscience.wordpress.com for a mirror.

For the purposes of this discussion it is absolutely necessary that the reader read and understand that link and every word contained therein, including all the footnotes, before continuing.

Right off the bat we can recognize the various parts of it that we’ve seen before in the ontological argument, the cosmological arguments (both styles), in the work of

al-Ghazali, and even some of what was just covered in the last section on European occasionalists (such as the association between power and will or Descartes' mind-body problem). Mufti Yusuf has constructed this based on the arguments and logic of Imam al-Ghazali.

I will add some comments here to better understand it and relate it to what we already know about philosophy.

The argument presupposes [...] the *real* existence of beings, attributes and events we observe in the world. Our direct observation of them is sufficient in acquiring knowledge of their real existence.

Remember, this is a presupposition. Even if you personally hold an anti-realist ontological viewpoint, you can obviously understand the argument by temporarily suspending disbelief in realism. I mention this because some people take a contrarian tone and immediately say that since anti-realism exists as a philosophical view, they won't even look at the argument.

Preponderance without a Preferrer

This particular phrase is our own English rendering of the Arabic phrase *rujhan min ghair murajjih*, and for this reason, you will not find it used in other versions of the Cosmological Argument.¹⁶⁸

This deserves some additional commentary. This principle, for some reason, didn't make it into the Western parlance yet the argument hinges on it.

You can think of it in the sense of "Determining without a Determinant" if it helps you understand it better. Let's run with that before coming back to the original wording.

With regards to the simple movement used in the article, there are two equal states with respect to necessity (necessity meaning required to exist by their nature). Existence and non-existence. They are equal when there is nothing inherent in the nature of whatever we are discussing which requires that thing's existence, nor is there anything in its nature which requires its non-existence. Anything else, any notion of probabilities, is not recognized at this juncture because they do not act as determinants or have any determining power. So if a thing's existence or non-existence is not required by its very nature, either state is possible and a determinant is necessary to determine its existence or non-existence. Otherwise if either state becomes determined without a determinant after we have acknowledge that there's nothing inherent to its nature which requires

¹⁶⁸In fact, the first known use of the word "preponderance" in the English language wasn't until 1681.

either state, we have a problem.

What we speak of is not causal determinism as the kind expressed in natural philosophy and the sciences (such as physics). In these sciences a set of initial conditions (in classical Newtonian physics) can be seen as determining the outcome because they predict with complete certainty the outcome. In actuality, the skepticism of natural causality shows us that the determining happens but it is not from the initial conditions to the outcome. The relationship between the initial conditions and the outcome is occasional, not causal. We use cause in the sense of “apparent cause” and determinism only in a colloquial manner. Upholding an absolute causal and deterministic connection (the aforementioned “necessary connection”) between the initial conditions and the outcome results in problems because of the arguments such as the sort put forth by al-Ghazali and those who came after. This is because we cannot actually identify the determining power in the system or at least we cannot put that determining power in the initial conditions.

When we enter the world of quantum mechanics this problem becomes overt and apparent for the first time in the physical sciences. Everything is understood in terms of probabilistic reasoning. There is no certainty, there is only probability. This “world” and its laws are seemingly very counterintuitive which incidentally knocks down one of Hume’s objections to occasionalism because of what he deemed the counterintuitive nature of denying natural causality. I will come back to the issue of probability.

This principle also expresses the idea of the relationship between will and power. The idea that we do not have the power to act as determining forces, though we do have the will to determine. And that initially our will actually conveys the appearance of determining power so we learn to associate will with that.

We saw it alluded to earlier in the writings of Hume,¹⁶⁹

Shall we then assert, that we are conscious of a power or energy in our own minds, when, by an act or command of our will, we raise up a new idea, fix the mind to the contemplation of it, turn it on all sides, and at last dismiss it for some other idea, when we think that we have surveyed it with sufficient accuracy? I believe the same arguments will prove, that even this command of the will gives us no real idea of force or energy.

[...]

We only feel the event, namely, the existence of an idea, consequent to a command of the will: But the manner, in which this operation is performed, the power by which it is produced, is entirely beyond our comprehension.

¹⁶⁹Hume, David - *An Enquiry Concerning Human Understanding*

[...]

Volition is surely an act of the mind, with which we are sufficiently acquainted. Reflect upon it. Consider it on all sides. Do you find anything in it like this creative power, by which it raises from nothing a new idea, and with a kind of Fiat, imitates the omnipotence of its Maker, if I may be allowed so to speak, who called forth into existence all the various scenes of nature?

Let's come back now to the original wording. Two points need to be made. The first is that the original wording, "preponderance without a preferer" includes within it probabilistic reasoning. We do not speak simply of the determining power in only the sense of absolute determinism but that power which *from our perspective* increases the probability of one of two possible states (such as existence and non-existence) over the other to the extent that it is preponderant over it (since we might not observe the actual determining happen). This is sometimes described as "probabilistic determinism" though probability is not a determinant, so "probabilistic reasoning" is more apt. Preponderance is defined as "superiority in weight, power, numbers". This is intuitively expressed in the visual or physical manifestation of this principle using a balance which appears to rise and fall in continuous movements. The traditional intent behind the phrase was likely more akin to the notion of absolute determinism but it takes into account probabilistic [predictions of] determinism (best reflected in the example of the balance). This point hardly matters in simplified theological applications but it would have some use in metaphysics and making certain concepts in physics more intuitive. Especially if we consider the implications of Heisenberg's Uncertainty Principle (to be discussed later on).

I'll cite an example from *Umm al-Barahin* otherwise known as '*Aqeedah Sanusiyyah*, an Ash'arite text of creed to shed more light on the idea,¹⁷⁰

Text: [112-113] The proof for the necessary existence of the Most High is the origination [hudūth] of the world.

Commentary: [366] Proof [burhān] is clear evidence. Origination is the existence of the world after its non-existence. Every existent besides Allāh, the Most High, is [termed] the world. The world, which has a fat.a on the lām [ālam], is everything that exists of that which is created, and it is evidence for [there being] the Fashioner, Most High.

Text: [113] This is because if it did not have an Originator but originated by itself, then it must be commanded by one of two equally applicable rules [amrain]: it can either be the same as its cause [or] preponderant over it [by] having no cause - [both of] which are impossible.

¹⁷⁰The translation from www.marifah.net

Commentary: [367] After you know that the origination of the world, which is that which is other than Allāh, is a proof for the existence of the Fashioner, Most Glorious, Most Honoured, and that this evidence cannot be annulled except through the negation of the world by itself, the author [then] argues the impossibility of the existence of the world by itself. He says that if it came into existence by itself then it arose from one of two equal possibilities [before it], namely existence or non-existence - these being equal [possibilities] in relation to its possessor and there being no preponderance of one over the other. By this is meant that existence and non-existence are of equal weight - the world can admit either of existence or non-existence in equal proportions [368] without preponderance [tarjīh] [of one over the other]. If the world could create itself, then it is necessary something equal [existence or non-existence] be preponderant without a cause, and this is impossible. Then it is necessary that the creator of the world be other than it. That other is Allāh, the Most High. Thus the impossibility of the existence of the world by itself is made clear to you. Rather, it is in need of other than it in the designation of its existence as against non-existence due to this being equal to it, in the designation of its specified space as against all other spaces, in the designation of its specified time as against all other times, in the designation of its specified measure [miqdār] [369] as against all other measures, in the designation of its specified quality as against all other qualities. All of these things are equal [in possibility] because their existence is equal to their non-existence. Their specified measure is equal to all other ranges. Thus, their particularisation and preponderance points to one who gives them preponderance over other than them and that is Allāh, Most Honoured, Most Glorious.

The analogy of a scale balance can clarify this. One cannot fill one scale with what is in the other without increasing the former and decreasing the latter. And to hold the preponderance [in weight] of both of them is contradictory, like the contradiction between the existence of a thing and its non-existence. If we were to witness these scales after the ascended one again descends and the other has risen, [370] then we know their states are substituted. The descended one has risen and the risen one has descended. [However] we do not know: was there an increase in the weight that descended, or was there a decrease [in weight] of the other? That is hidden from us due to our being there in the aftermath. But we have certain knowledge that it could not have happened except through a cause which increased the weight in that which descended or decreased the weight from the one that rose. If we put it before our intellects that it had no cause of occurrence, we will find our intellects vehemently disavowing such a notion.

The existence and non-existence of the world are like the scales. If we know that the world was non-existent, and we know that its non-existence has been

outweighed by its existence, then we would know for sure [371] that it was due to a cause of the occurrence by which the antecedent existence became preponderant over the preceding nonexistence. Thus it is clear to you that whatever happens, its coming into being is due to a cause and that Cause is Allāh, the Most High, the Unique and Alone [munfarad] in the creation of all existence. And through Allāh comes success.

This “cause” which is being referred to is equivalent to the power, force, or energy we just discussed on the subject of Hume and not the definitions of these terms in the science of physics for those are indirect definitions and are defined by observation. Such as the definition of work as a force acting through a distance, or energy as the ability of a physical system to do work, or power as the rate at which work is performed or energy converted. The actual underlying determining/causal power is not observed, just events which occasion other events.

So what it comes down to is that a “cause” must prefer the existence of something over its non-existence in order for it to [begin to] exist (or vice-versa). Since “cause” is just our way of attributing responsibility for one event to another, in effect establishing a necessary connection (a causal relationship), and since our entire notion of “cause” arises from our own minds and how we view our will and thoughts, this external cause which is determining existence must be a will. This causal will has to have power, for we have no power to enact our own wills (and the “No Knowledge” argument expressed by some Cartesian occasionalists has a corollary in Mufti Yusuf’s article). Since all the events we know of are contingent and keeping in line with this example of existence vs. non-existence, the event we speak of here which is being attributed with causal responsibility must be the event of creating, of something coming into existence where there was previously non-existence (beginning to exist). Hume’s statements logically set up this conclusion and it’s incontrovertible that he lifted his arguments straight from the occasionalists. This is the only causal relationship that we can say with certainty exists. The Creator causes creation (which is implicit in the word “Creator” which denotes a being that creates). The relationships between the various creations is occasional and is dictated or specified by the knowledge and will of the Creator (the order which we see as the uniformity of nature).

This can then be extended to the specifications of all events/objects (and this is where the wording of “determining without a determinant” makes more sense). First we discussed how it’s impossible to justify true spontaneous creation due to preponderance without a preferrer. But in addition to determining the existence (causing the existence, creating), a will is needed to determine/specify the conditions of that which is being brought into existence. Conditions such as time, place, quantity, quality, etc. One such condition for the Big Bang for example might be the total amount of mass and energy in the universe (which as we know is conserved). This includes whatever physical

manifestations correspond to the laws of nature.¹⁷¹ However, the laws of nature in and of themselves, wherever they do not correspond to creation or are not manifested as actual created things, are not attributes of the creation but characteristics of the creating (the Creator's behavior or Customary Way). In other words, what we call God's "Customary Way" can be inquired into and more can be learned, so more will be classified as actual creation itself (which we can observe or otherwise empirically verify) rather than the Customary Way of creation (which more or less describes the manner of creation more so than the creation itself, thus its sort of one level "higher"). On the other hand, God's Customary Way in more ordinary use can be a relative term. So, for instance, where one might describe the attraction between two magnets as God's Customary Way if the event in question is one magnet coming closer to another, looking at it from a different perspective where the event itself is the attraction, we might describe the attraction as an actual creation and then describe the further intricacies of physics down to the quantum level as God's Customary Way. Just so there's no confusion when different applications of the term are used. Science, especially physics, can then be seen from an Islamic perspective as study of God's Customary Way of creating. The difference is not evident in the science itself, but only in the implications of it. Where one might describe science as studying "how things come to be", a Muslim might describe it as "how God makes things come to be" and depending on one's frame of reference, this "how" may itself be further described by a thing that "came to be" and the "how" thereof in turn would be further studied. In this manner God's Customary Way can both describe creation and how creation came to be. In the case of the former, it refers to creation itself in the context of it being a part of a bigger creation.

The notion of the Customary Way (*jary al-'ada*) can also be seen as a middle step between the "how" in "how things come to be as they are", which is what science addresses and the "why" in "why things come to be as they are", which is what theology addresses. The idea is rooted in theology but takes a step towards empirical knowledge. Or we can make a tripartite division to clarify it even further. There is the "what", which science addresses, the "how" which is the Customary Way which is the theologically rooted concept which labels what science aims to study (and as things are studied and knowledge gained thereof, they get added to the "what"), and the "why" which is the pure theology. In short, "what" = creation, "how" = creating (Customary Way), and "why" = Creator. There is an overlap of science and theology/philosophy in the middle step (metaphysics). We will see this depicted more clearly in later sections about the specific manifestation of the manner of God's creating as described by the scholars.

The entire premise of the "*kalam* cosmological argument" that "everything which begins to exist must have a cause" is completely dependent on this idea. The Christianized version of the argument is therefore quite lacking.

¹⁷¹Such as, for instance, the fundamental forces of nature being mediated by elementary particles which act as force carriers.

The Infinite Regress

Another thing to briefly cover in some additional detail is the infinite regress and how to terminate it. We can understand it in two steps. The first essentially states that limiting causality to spacetime (i.e., propagating along the light cone of an event as causality is understood in classical physics) automatically results in an infinite regress which cannot be terminated in any other fashion than recourse to a transcendent (outside spacetime) cause. The infinite regress in the causal chain necessitates that the causal chain eventually terminate outside of spacetime. There is nothing in the nature of any contingent event or body within spacetime which necessitates its own existence let alone that of any other. The “laws of nature” do not do such a thing and have no determinative power. They merely describe the behavior of nature. To then say nature’s behavior is determined by nature’s behavior is tautological.

The causal chain can not only transcend spacetime, it applies to any number of containing multidimensional structures which our universe can be in.¹⁷² Some have gone to great lengths to posit an infinite nature to our universe. However, an infinite *nature* is only a *possible* infinite. If we were to make a machine that, once started would never end, that machine too would for all intents and purposes be infinite, but it’s always a possible infinite or possessing of an infinite nature. Not an actual infinite (which would mean it goes back into the past by an infinite amount of time). That which contains the infinite machine that is such a model of the universe (the brane, the bulk, whatever) is still under the jurisdiction of the causal chain.

The second step in terminating the infinite regress in this argument is the identification of the necessary being with the aforementioned “first cause”.

This is where all the questions of “why *this* possibility and not any other?” come in. Imam al-Ghazali defines will as that which distinguishes like from like. Meaning if one has a multitude of equal possibilities a will is required to distinguish or pick one over the others. The scientific answer to “why *this* possible world and not any other” is usually a reference to the specific initial conditions at time $t=0$ of the Big Bang. But these initial conditions needed to be specified. What was the entity which specified them?

This question can be delayed by resorting to the infinite universe/machine argument, but that only shifts the initial conditions further up the causal chain so long as you keep extending the causal chain. This is because we must go back to a specific temporal origin. We cannot have traversed an infinite. A possible or potential infinite is a different matter altogether, but an actual infinite cannot have been traversed. If one models the universe as an infinite machine, then the machine itself was originated or determined by a specific cause in a causal chain which goes back to whatever higher multidimensional

¹⁷²Such as those described in brane cosmology.

structure it lies on and beyond. So in the philosophical sense, causality cannot be limited to spacetime though as far as sciences like physics goes, limiting causality to spacetime has its uses (which we've referred to as "apparent causality", which no one advocates removing because it makes things more intuitive in matters of math and science).

The other response to "why *this* possible world" (i.e., "why *these* initial conditions and this specific configuration") is a postulation of an infinite number of worlds and utilizing the [anthropic principle](#) to explain how this universe could not have been any other way lest life not develop at all. The two issues with this are that it is conceivable to think of other specifications or configurations which are different from our universe's that could also allow for life. The second issue is that this is used as an attempt to block the identifying of the "First Cause" with the "Necessary Being" by eliminating the need for will. Except it does no such thing because the need to explain the cause of the existence and/or initial conditions of all possible worlds (assumed to be real) is still there. The causal chain will always go back until it's ended at a determinant will (due to the issue of preponderance without a preferrer). On top of that, the idea that an infinite number of real universes exist is obviously not accepted by the scientific community at all so it's a strange attempt at recourse to a scientific-sounding objection. Further, creating and maintaining an infinite number of universes is well within the ability of a Creator. Muslim theologians as far back as Fakhr al-Din al-Razi (d. 1209) have said an infinite number of universes would be no problem at all. Ironically, in his day it was theologians positing multiple universes while the philosophers insisted on a single possible universe. That philosophy today came from those theologians is a testament to the ineffectiveness of the old philosophers' logic. That's a subject for a different discussion however.

The necessity of ending the causal chain in a will is actually an intuitive concept even without the identifying of deterministic power with will. Mechanistic causes will always form causal chains. A necessarily existent will stops that regress. A simple will subsisting in other than itself and relying on other than itself for existence (a powerless one such as ours) would only prolong the causal chain, not end it.

Therefore, the further identification of that will with the will of a necessarily existent being is also quite intuitive. If the will in question is actually willing the existence of things (in other words, creating), then it existing in itself in perpetuity is no problem at all for it. It can basically choose its own existence, in other words, it will have always existed. It is the source or wellspring of all existence that everything points back at. Before this being is described as "the Creator", it is the "[Necessarily] Existent". This source of existence must exist in order for existence at all to be possible. The article aptly describes the necessity of Life and Knowledge for the attributes of Will and Power we just discussed.

The last thing is the nature of this Necessarily Existent being's relationship with the creation dependent on it. In this case, the universe. Since it exists outside of spacetime, its attributes distribute or propagate everywhere within spacetime because they were everywhere to begin with and to end with since there is no beginning, no end, and

no “where” outside spacetime. These attributes cannot then be separated from the set of all things in spacetime coherently without nothing less than *another* equally powerful entity blocking it. And if such a thing existed, we no longer have necessarily existent beings, but contingent beings, and the regress has once again returned.¹⁷³

This relation can be expressed in the following manner symbolically, where -> represents a causal deterministic connection:

(God’s Attributes of Will, etc) -> (Set of events in spacetime)

God’s Attributes -> (1, 2, 3, 4, 5...)

Now, that’s if we don’t see a causal connection between events, but we do. Even if it is an illusory effect of time (which is also created and controlled by God).

God’s Attributes -> (1 -> 2 -> 3 -> 4 -> 5)

According to the above argument, it’s incoherent for God’s Attributes to be limited by spacetime whilst outside spacetime. What we’re actually seeing then is this,

(God’s Attributes -> 1) (God’s Attributes -> 2) (God’s Attributes -> 3) (God’s Attributes -> 4) (God’s Attributes -> 5)

And inbetween each of the relations one can put (God’s creating of time) to show the progression. Obviously simply dividing through by God (heavy handed use of reductionism that is less like Occam’s “razor” and more like a machete) shows how panentheism (whether of occasionalism or outright pantheism) can beget atheism.

This also neatly illustrates the idea behind occasionalism. The only way for the situation to be as it is described in the second to last expression is if another entity comparable to God is suppressing or holding back His Attributes. This is in addition to the idea that if God endowed events or objects in spacetime with creative/causal/deterministic power, then where is it and why have we not been able to identify it within the apparent causes? If it were true, the arguments of everyone from al-Ghazali to Hume would not stand and this would be self-evident. The way the universe works would be entirely different had apparent causes been effective causes imbued with power of their own.

Objections on Causal Grounds

Objections to this argument are usually made on causal grounds. Most people who take issue do so with the premise, “Everything which begins to exist must have a cause”.

¹⁷³Pure Dualism, therefore, is incoherent with the idea of existence and creation.

What they usually cite as their reasoning is quantum mechanics and the apparent violation of causality that they've heard happens in some QM experiments. Such protests might even go to the extent of claiming that there is no causality whatsoever in the world. And such protests would of course be nothing more than sophistry, made by people who don't know the first thing about quantum physics. They're trying to mix and match Hume's skepticism of causality with the strange behavior that exists at the quantum level.

There are several responses.

Firstly, Immanuel Kant already made a decent response to Hume's categorical skepticism of causality. He said that causality by definition denotes a necessary connection, therefore it must be an *a priori* idea from our understanding of conditional statements. Hume's assertion that we see a habitual connection and then get causality from that does not hold. There is no necessary connection in these sense perceptions according to Hume's own arguments, but causality is necessary connection. Therefore our notion of necessary connection (causality) could not have been a product of observing habitual, and not necessary, connections.

Secondly, there really isn't a violation of causality in quantum mechanics. Physicists believe in their concept of causality (one in which causal relationships propagate along the light cone of an event and which does not correspond to a strict notion of determinism which is what we traditionally mean by causality in the philosophical or theological sense). The newest QFTs (quantum field theories) rigorously preserve causality. The purposes of this document do not include explaining physics to that degree so I recommend that any interested readers do their own research, talk to any (hopefully accredited) expert in physics and try to ascertain the consensus of the scientific community.

Thirdly, all the interpretations of quantum experiments which do claim a violation of causality only do so for *local* causality. I will take realism (CFD, counterfactual definiteness) for granted.¹⁷⁴ That leaves the door open for non-local causality or even FTL (faster than light) causality. Even BTI (backwards-time) causality can be interpreted.¹⁷⁵ We can go further and reinterpret apparent causal violations to only be correlations and not actually instances of causal relationships¹⁷⁶ in the traditional deterministic sense which is the obviously preferred solution.

¹⁷⁴Though this seems obvious given that Islamic theology maintains realism, it doesn't necessarily have to be the case. A lack of uniform realism could theoretically be postulated (seen taken to its extreme in Berkeley's metaphysics). For simplicity's sake, we'll assume uniform realism.

¹⁷⁵Dolmatova & Werbos, *The Backwards-Time Interpretation of Quantum Mechanics - Revisited with Experiment*

¹⁷⁶Gaasbeek, Bram (2010) - *Demystifying the Delayed Choice Experiments*, K.U. Leuven

The purposes of such an objection are to discount an early premise so as to completely avoid entering the rest of the proof. As if the validity of the proof will be denied by avoiding it. All of this was already accounted for in the article where it was argued that any notion of causality limited to spacetime would not be enough, and where I previously argued that even a recourse to mechanical causal factors transcending spacetime would not be enough.

What it amounts to is playing semantics and we can circumvent this by simply clearly defining causality in terms of the language of conditionals and correlations. For example,

"The existence of any contingent thing is conditional upon some factor(s) external to that thing."

Or,

"The existence of everything which begins to exist is conditional upon some factor(s) external to that thing."

We can restate the above as the following,

"Everything which begins to exist, exists conditionally. The existence of any such thing is conditional upon some factor(s) external to that thing. There is nothing inherent to that thing which requires its existence for that would mean it never began to exist but existed for all time. There is also nothing inherent to that thing which, by requiring its existence, brought it into existence. For example, horses are real things which exist. This does not mean horses exist because they are real things."

And then we can say,

"This external factor upon which its existence is conditional is what we are defining as its 'cause'".

What cannot be avoided is the fact that occasionalism argues *for* a violation of natural causality. Any violation of causality would back up occasionalism's account. Trying to argue against this form of argument contained in the article on causal grounds is counterintuitive and only helps make the case for occasionalism.

Moreover, divine causation by definition would not be limited to spacetime. It could (and would) be independent of the speed of light, of the movement of time, or of any spatial dimension (not limited by distance).

So we can also simply define cause for the purposes of this argument by saying "The coming into existence of any thing is determined by a factor external to that thing".

On first sight, the sophist might wish to deny this as well, but that would result in incoherence. If we deny that, then what is to distinguish things which can determine their own existence from things which can't? Our mere observation will not suffice. So we cannot deny the existence of anything. Even more ironically, it makes the ontological argument for God valid and one cannot deny that argument while holding such a position.

Off the top of my head, another possible working definition of causality for physics could be something akin to "The coming into existence of any thing must correlate to an event which specifies the information regarding that thing", if we want to use a play on the traditional physics idea of the outcome being determined by the initial conditions. Unfortunately I do not have the time to fully explore this idea here.

Causality vs. Determinism

Wherever I mention causality I speak, of course, of causal determinism. One could make the objection that causality simply refers colloquially to the influence of any event upon another but does not have to imply determinism. The argument would go that determinism is therefore not supported by nature and is therefore an incoherent concept.

This is similar to the objection on causal grounds because it is the exact same argument with a simple change of terminology.

We can define determinism as,

*The world is governed by (or is under the sway of) determinism if and only if, given a specified way things are at a time t, the way things go thereafter is fixed as a matter of natural law.*¹⁷⁷

It can be argued that due to a modern understanding of quantum mechanics, "determinism is dead". We have no problems with arguing for this in the specific context of the above definition. This is, after all, what the occasionalists have said since the early days of Islam. What we take issue with is the assertion that determinism in general, as a rule, can never exist. The same argument made earlier against objections to divine causality on the basis of Hume's arguments follows. Such objections are artifacts of outdated European empiricist epistemologies and could not be entertained by a Rationalist. We understand the concept of determinism, it just falls on us to prove it exists in reality and not just in our minds and that's where Islamic theology comes in. It's a completely coherent concept and it's perfectly fine to use it.

The question of which theory in quantum mechanics can be supported theologically

¹⁷⁷Hoefer, Carl, "Causal Determinism", *The Stanford Encyclopedia of Philosophy (Spring 2010 Edition)*, Edward N. Zalta (ed.)

might be one Muslims wonder about. The answer is that it doesn't matter at all where any scientific theory identifies the determinism. Whether they believe in an indeterministic theory or a deterministic theory makes no difference in the same manner as the intended meaning of *jary al-ada* (the Customary Way of God's creating) can apply to varying levels of descriptions of reality depending upon one's frame of reference; the issue of identifying where creating ends and creation begins when we speak of creating through existing creation (which will be elaborated upon in a more nuanced manner in the section on atomism). If they believe there's no determinism, that simply means they cannot identify it among the natural laws. If they believe there is determinism, that simply means they've established that as the Customary Way to a more definite degree. For us, by definition the Customary Way is just that: a customary way.

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Orthodox Theology and the Implications of Islamic Monotheism

As it stands today, the orthodox theology of Imams al-Ash'ari and al-Maturidi dominate the Muslim world. Over a billion people follow the Islamic occasionalist doctrine. So what is this theology and what are its implications? Specifically, how do their ideas on knowledge and reality relate to the philosophy of science?

First we need to distinguish between the Ash'ari and Maturidi creeds. We've mentioned in passing some of the minor theological differences but there are also some subtle differences which have greater ramifications in epistemology and philosophy of science.

For one thing, we can put the Ash'ari vs. Maturidi distinction in terms of one that anyone familiar with philosophy ought to recognize. That of Empiricism vs. Rationalism.

For those readers unfamiliar with philosophy we must first be careful to address the misconceptions behind the term "rationalism". It probably does not mean what you think it means. The empiricism vs. rationalism debate is a debate about the primacy or superiority of empirical knowledge as opposed to rational knowledge. By their very nature empiricism is more suited to science and rationalism more suited to things which involve human reason. A misconception exists that there is no distinction between the use of human reason and science and this couldn't be further from the truth. The use of human reason can be seen (and is by many a conservative empiricist or naturalist) as a corrupting factor in science, which is in turn best served by empiricism. Empiricism, as an epistemology unto itself, simply means to not go beyond one's experiences. That leaves very little room for rational thought. Another *extremely* simplified view of the dichotomy can be expressed as empiricism corresponding to a preference for "facts" while rationalism upholds the role of "opinions" (including the idea that most facts, if not all, are really just opinions). Both can work in a scientific pursuit but obviously empiricism lends itself more naturally to those pursuits.

This seems ironic when you consider criticism of religion on the basis that it isn't "rational" and that science, contrarily, is rational. When you hear someone say something like this what they are actually saying is that the person or persons being criticized for their adherence to religion are treating religion as science should be treated. They should be treating religion as merely an opinion that can be challenged by other opinions. So, while such a criticism makes sense in its own way it's also quite deceptive because people offering such criticisms are reluctant to include a statement which says science is considered "above rationality" (i.e, transrational). They are not advocating rationality, they are advocating a reordering of what one considers rational

(opinion) and “transrational” (beyond rational, sense experience or what the empiricists’ dub “matters of fact”).

I am using transrational here to mean above or more important or of higher priority than rationality and suprarational to mean something not addressable by rational means. There’s a subtle but important distinction there. That use of suprarational is common. Transrational is more vague so I am defining it clearly here because I needed a word for that purpose.

My use of such a word already should indicate that something is wrong with this dichotomy. Why don’t I just say Empiricism vs. Rationalism rather than Transrational or Suprarational vs. Rational? This is because both empiricism and rationalism need to coexist within a worldview and if they do not, incoherency (like the sort we saw with Hume) results. One can be given priority or primacy over the other, but if you attempt to deny the existence of either empirical knowledge or knowledge gained from our reason and reduce one to the other, you’ll run into problems. One can reduce all facts to rigorously authenticated opinions, or reduce all opinions into the facts they are made up of. Rationalism typically has the upper hand whenever the two are pit against one another because even Empiricists have to acknowledge the “separation” that exists between our subjective worlds and the objective world, that is to say the degree of correspondence to reality of our sense experiences. Empiricism, it would seem, would lend itself to naturalism and Rationalism would lend itself to Idealism. The reality is, however, a bit more murky. While Hume has popularly been interpreted to have been an exponent of naturalism, there’s most definitely an undercurrent of Idealism in his work which no doubt made Kant’s task more intuitive. Furthermore, as I’ve mentioned, empiricism has had offshoots (logical positivism or logical empiricism) which has drawn the ire of the naturalists.

So, how do we reconcile the dichotomies? Rationalism seems better able to explain our subjective view, while Empiricism just works (despite sitting on unstable grounds like the problems of induction/causation and the uniformity of nature). What have evolved are attempts at bridging the two. Rationalism (or Idealism) with an emphasis on scientific methodology without descending into logical positivism and while de-emphasizing metaphysics entirely (in an overture to the naturalists). Empiricism, under the guide of Naturalism, on the other hand has tried to bring all rational fields under the domain of empirical or scientific study (thanks to modern advances that allow such a thing) and not rejected them outright. The first attempt at mating the two, logical positivism, wound up having an extremely negative fallout due to the inconsistencies in logic and the compounded effects thereof. The state of philosophy of science today in the West will be discussed later on.

Going back to Occasionalism, occasionalist philosophy combines both naturalism and Idealism. Or rather, it accomplishes what both of those philosophies set out to do under a banner of monotheism and realism. It’s no coincidence that as Europe turned from

Christianity to an “Age of Reason”, reason was ushered in by Occasionalism (inherited from the Muslim world along with many other philosophies that helped pull Europe into the Renaissance and Enlightenment). The appeal of Occasionalism is quite simple. It offers the power of scientific inquiry while also offering the most powerful conception of a monotheist God. It seems to be a win-win all around. The only problem being that it wasn't very supportable by the Christian texts and religion without Scripture (for those occasionalists who struck out on their own) is limited to a personal affair so it wouldn't catch on to the extent of the former. Occasionalism can rightly be called the religion of reason. It was this characteristic of the Islamic worldview which catapulted Islamic civilization to the top of the world in science and knowledge right out of the gate.

Occasionalism has drawn comparisons to Roman Stoicism in the sense that both worldviews appear to bring God “into nature”. While the Stoics did this literally in that they were pantheists (it was a peculiar sort of “naturalist pantheism”), the occasionalists only brought the will and power of God into nature, maintaining a strict separation of Creator and creation in order to uphold *tawheed* or the Oneness of God which they believe is needed to completely avoid contradiction. Naturalistic pantheism can also be used to describe Neoplatonism though it's far less overt and full of logical convolutions that ultimately lead it into error (Neoplatonism can be seen as combining Greek thought with Roman Stoicism with Christian tradition). All of these ideologies do the same thing which is combine the domains of rationalism and empiricism, though methodological empiricism (scientific method) truly did not really start until the advent of Islamic Monotheism (occasionalism). What bridged the empiricism of groups like the Stoics and the methodological empiricism of the Muslims? As I discussed earlier, methodology is another contribution that traditional organized religion brings to the table. So, such organized empiricism in the form of the scientific method can be seen as the unique contribution of the Islamic worldview to the philosophy of science we inherit today.

As I mentioned earlier, pantheism offers several advantages as a worldview, particularly in the way of resolving some logical convolutions. Though it lacked the emphasis on empiricism (even in its naturalist form). Is it a coincidence then that some of the biggest ancient advancements in mathematics came from the Indian subcontinent? Such as the zero and the number system we use today? Some Hindus today will go to great lengths to claim their old literature contains concepts synonymous with the idea of random, uncertainty, and other concepts considered esoteric until the advent of 20th century physics.

The flexibility and the robustness of occasionalism become apparent when we view the history of Islamic civilization and how it brought in these foreign ideas, like the Indian number system, like Greek rationalism, like various technological advancements of the Chinese, even the ideas based on the materialism and naturalism of the atheists (such as their own ideas of determinism and free will), and managed to incorporate all of them into its own worldview *natively*, improve upon them, and integrate them into a new tradition. The key word is *natively* because it did not need to utilize ideas it

was at a loss to explain (like Europe often did). The products of the other civilizations' worldviews could be understood natively in the Muslims' own theological language (which corresponds with the propensity of Muslim intellectuals to turn to perennialism rather than atheism when they deviated from their faith, contrary to what happens in the mostly Judeo-Christian West).

All philosophies found a home in the occasionalist civilization of the Muslim world. This is something you'll find Western academics (often non-historians) usually admitting in an attempt to explain the success of Islamic civilization. Their misapplication of causal attribution in this regard is particularly amusing in light of their troubles grappling with causality. They usually devote a few sentences here and there to this concept while glossing over the Islamic period because they cannot explain it in any other way that would conform to their preconceived narrative or agenda. The truth can be found in the answer to the question, "So if it was that easy, why didn't other civilizations just invite everyone together to start science?". The truth is that many rulers throughout the ages did, but scientific pursuit needed a mass following among the intelligentsia. No matter how much responsibility you put on the "mixing of various cultures", the lion's share of responsibility lies on the host civilization because it is all of their people and intellectuals who can possibly sustain a scientific civilization. If the host civilization itself did not have a worldview conducive to science, then a few sympathetic rulers here and there could do nothing on their own. And what does history show us? That Muslims themselves, most of them devout and orthodox, made most of the biggest strides in the sciences during the Islamic Golden Age. Even the tinges of Neoplatonism which plagued scholars like Ibn Sina were essentially using pantheistic doctrines to accomplish what occasionalism did, which was to explain God's role in everything. The basic goal was the same, and the orthodox theology accomplished that same goal better without any of the side effects of Neoplatonism.

The situation really wasn't all that different in the West. The Age of Reason in Europe was ushered in by occasionalists (since occasionalism went hand in hand with empiricism and skepticism, two of the necessary ingredients of science) and most people were still devout believers in God, albeit skeptical of certain Christian doctrines. In fact, were it not for Newton, I would have discounted entirely non-occasionalist deistic monotheism. Newton was an ardent monotheist and anti-trinitarian. Occasionalism could not be sustained in Europe without supporting scripture and eventually gave way to offshoots. It splintered into pantheism, deism, naturalism, idealism, and those ideologies in turn splintered into philosophies (which will be discussed later).

Let's bring this back to the context of Ash'ari theology vs. Maturidi theology.

Ash'ari theology can be seen, as I've mentioned earlier, as emphasizing empiricism. It does not do this by necessarily elevating empiricism beyond the Maturidi approach. Their approach rests in deprioritizing rationalism by expressing a greater skepticism of it. The best example is how in the Ash'arite creed, a non-Muslim unreached by

the message of revelation is considered not to be held to account for their disbelief. Ash'arites also don't think humans can independently arrive at morality without revelation. Revelation has to be verified empirically, and prophets must be accompanied by empirically verified miracles to be accepted by a people. Empirical inquiry gave us necessary knowledge according to the Ash'arites. In addition, the Ash'arite doctrine of atomism furthered the "naturalist" aspect of their worldview.

The Ash'ari idea of necessary knowledge functioned similarly to the empiricist elements in the philosophy of the British Empiricists (and before either of them, the Stoics) in that knowledge gained from the sensory organs' autonomous function is gained without a choice in the matter. The Ash'ari theologians went further in developing empiricism. While some of the Stoics viewed impressions as "stamps" of objects of perception upon the sensory organs¹ (and it seems even Berkeley or Hume did not go that far), Ash'arite scientists such as Ibn al-Haytham actually proved this in his work on Optics in which he asserted that rays of light enter the subject's eye from the object, that light travels in straight lines, and (probably owing to his atomism) light was composed of discrete particles. He even demonstrated it with his *camera obscura* experiment.² The Ash'arite understanding of a subject (composed of accidents) is akin to a spatial convergence of autonomous sensory systems. The mind is where the impressions are processed and manipulated. The human being is thus a natural system where subject and object are not entirely distinct for everything reduces to substances and accidents (atomism), but where the subject can hold memory of perceptions.³

As we can see, what advanced the Ash'arite understanding of empiricism was their understanding of the natural world (an understanding on par with naturalism) based on their conception of atomism, substances and accidents, and how everything could be reduced to it within our world. For the purposes of any discussion on science, the Ash'arite theology and its doctrine of atomism is more relevant. However, when we discuss the philosophy of science, then the Maturidi "rationalism" becomes quite relevant again.

Imam al-Maturidi did not emphasize atomism to nearly the same extent as Imam al-Ash'ari. He focused more on accidents rather than the role of the *jawhar* (substance, corresponding to elementary particles). What is most useful about the Maturidi tradition is actually their epistemology which is quite simplified and less varied amongst its adherents than the Ash'aris (due to the Ash'ari focus on necessary knowledge, certainty, etc). It also gives us a decent framework or structure within which can be included the Ash'arite ideas. I'll try to avoid discussing atomism until the section on it which is to come shortly.

¹Simko, Ivan (2008). *Parallels of Stoicism and Kalam*, University of Vienna

²<http://www.youtube.com/watch?v=a5icY1dMin4>

³Simko (2008)

These characteristics of the individual Imams' approaches can be seen in how Ash'ari theology was predominant amongst the scientists of the Abbasid and Mameluke periods whereas the Maturidi creed became ascendant with the latter day empires, the Ottomans, the Mughals, and depending on which interpretation you follow, either the Ayyubids or Seljuqs (it's likely the Ayyubids were Ash'arite and the Seljuq Maturidi, or the both of them Ash'ari). The Maturidi creed also made headway into the circles of political and judicial power of the Abbasid caliphate because of its association with the Hanafi legal school which ensured that the Hanafiyya came to dominate the legal discourse in Sunni Islam. The reason for this is not strange at all when you consider that the Hanafi legal code was attached at the hip to the Maturidi theology. The Maturidis put greater responsibility on the person due to a greater emphasis on the role of man's Reason (*'aql*). Even non-Muslims unreached by the message of Islam could not be saved unless they had independently arrived at a belief in the Creator. They also believed man could independently arrive at some of the more major moral judgments of his own accord. A pattern thus emerges where the Maturidi creed seemed to dominate judicial/political discourse and the Ash'arite dominated scientific discourse (aside from the religious sciences where they each dominated in their respective regions). To be sure, the differences between the two are very subtle and the Maturidi creed in no way limited or hindered scientific development, but it just naturally focused on different things. If one so intended, they could easily derive all the Ash'arite ideas from the Maturidi creed and vice-versa.

So, in choosing a statement of creed for the purposes of this work, a Maturidi one seems like the most obvious choice. The philosophy that has the biggest impact on science is epistemology, and the Maturidi theory of knowledge is quite robust and easy to follow. It also bears more social relevance in this day and age, due to the inherited Hanafi-Maturidi tradition which built up a great body of legal precedent all the way into the 20th century and the current discourse about rationalism which the Maturidi statement of epistemology seems better fit to address.

The best choice is the *Sharh al-'Aqid an-Nasafiyyah (Commentary on the Nasafi Creed)*, which is an Ash'ari's (Imam al-Taftazani) commentary and exposition of a Maturidi's (Imam al-Nasafi) statement of creed. A very good English translation of this exists, done by Earl Edgar Elder and published by Columbia University.^{4 5} It's been a core text in the curriculum of *madaris* for centuries.

The Creed of Islam

Imam an-Nasafi (1068-1142) was a famous Hanafi scholar from Samarkand.

⁴The translation is decent, though there are a few flaws in the introduction.

⁵Additional thanks must be given to Defending-Islam.com for their transcribing.

In the introduction, Imam al-Taftazani briefly describes the history of theology in Islam.

Then when philosophy was translated into Arabic and the followers of Islam plunged (*khada*) into it, they attempted to refute the Philosophers on the points in which they differed from the canon law (*al-shari'a*). So they mixed up with *kalam* much of philosophy in order to understand thoroughly the goals of philosophy and so to be put into a position to show the unreality of it. This went on until they included in *kalam* most of physics and metaphysics and plunged into mathematics until theology was hardly to be distinguished from philosophy had it not been that it included "things to be believed on authority" (*al-sam'iyat*). This is the *kalam* of the Later Theologians (*al-muta'akhkhirun*).

Al-sam'iyat refers to things believed on the authority of the Qur'an and Sunnah, such as regarding God, the Prophets, Heaven and Hell, Scripture, the Day of Judgment, etc.

Ontology

Imam al-Nasafi opens with,

Chapter I

THE REAL ESSENCES OF THINGS

The People of Reality say that the real essences of things exist in reality and that the knowledge of them is verifiable as real in contradiction to the Sophists.

Essence and Existence

The first thing we notice is that the statement on the essences of things is more similar to Aristotle than Plato. In fact, it's because of Aristotle and the far reaching impact of his work in the Muslim world that the creedal text even opens with a statement using Aristotle's terminology to describe the Islamic view of the world.

Aristotle's idea of universals was that they existed in things, not as the separate, abstract, real "Forms" of Plato. As mentioned earlier, Aristotle was much more of an empiricist than Plato and took both deduction and induction seriously (whereas Plato was more concerned with deduction).

For more on Aristotle's metaphysics and his terminology, a very good article on it is

available at the SEP,

<http://plato.stanford.edu/entries/aristotle-metaphysics/>

If the reader is completely unfamiliar with the philosophy of universals and essences, a perusal through that article is recommended before continuing.

Al-Taftazani's commentary follows (the footnotes of the translators are in normal font),

The real essence (*al-haqiqa*) of a thing and its quiddity (*al-mahiya*) are that which constitutes the identity of a thing (*ma bihi 'l shay' huwa huwa*), as is exemplified by the application of the term "rational (*natiq*) animal" to man in contrast to the application of the terms "laughing animal" and "writing animal"; in which case it is possible to conceive of man as not being described by the terms "laughing" and "writing," inasmuch as they [laughing and writing] are accidents. And it may be said further that that which constitutes the identity of a thing is, with respect to its being verified as having external reality, a real essence; and with respect to its being individualized, it is a certain particular thing (*huwiya*), but without respect to either of these it is a quiddity.

Thus in our opinion the term *shay'*¹⁴ (a thing) is identical with the term *al-mawjud* (that which exists); and the terms *al-thubut* (real existence), *al-tahaqquq* (being verified as having real existence), *al-wujud* (existence) and *al-kawn*¹⁵ (coming-into-existence) are synonymous, and the meaning of them is immediately perceived (*badihi al-tasawwur*).

¹⁴ *Al-shay'*. With the Ash'arites the *shay'* was the entity (*mawjud*) but with the Mu'tazilites it included the non-entity (*ma'dum*). The Basriya and al-Jahiz of the Mu'tazilites defined it as that which is known (*ma'lum*); al-Nashi Abu'l-'Abbas defined it as the eternal (*qadim*) and in the case of "that which is originated" it is used metaphorically; the Jahmiyyah said it is that which is originated; Hisham said it is the body.

¹⁵ *Kawn*, which is often translated "being," really has the significance of "coming into being" or "state of coming into being." The *Dict. of Tech. Terms* (p. 1274) quoting the *Commentary on al-Mawaqif* says, "The Mutakallims, although they denied the rest of the categories, admitted that of place (*al-ayn*), and called it *al-kawn*. The majority of them said that the *jawhar* [self-subsistent entity] itself was all that was required for obtaining the boundary (*al-hayyiz*) which marked existence, that is there was no quality subsisting in the *jawhar* itself. So there were two things, the *jawhar* itself and the obtaining of a boundary in existence, which they called *kawn*. But those of the Mutakallims who established the states (*al-ahwal*) said that this obtaining a boundary on the part of a *jawhar* was caused by a quality which subsisted in it. So they called obtaining a boundary '*al-ka'ina*' and the cause

of this obtaining '*al-kawn*.' There are then three things in the process, *al-jawhar*, *al-ka'ina*, and *al-kawn*. There are four species of *al-kawn*: motion, rest, being separated into parts, and aggregation of the parts."

But if it is objected that such a logical statement as that the real essences of things exist in reality is tautological in the same way as our stating that really existent things exist in reality, to this we answer that what is meant thereby is that what we believe to be the real essences of things and designate by certain terms such as "man," "horse," "sky," and "earth" is something existing in the things themselves. It is analogous to the statement that the necessarily existent being (*wajib al-wujud*) is existent. This statement conveys some useful information; in fact it may have to be demonstrated by argument. It is not like the statement that the really existent things exist in reality, nor is it like the statement that I am Abu'l-Najm and my poetry is my poetry, in which case the statement is self-evident [and hence conveys no useful information].

And the verification of this is to be found in the fact that a thing may have different aspects, in consequence of which when something is predicated of it the judgment may be useful when the thing is seen in one aspect, and useless when it is seen in another. In the case of man, for instance, when taken with respect to his being a body of some sort, to predicate of him animality conveys useful information, but, when taken with respect to his being a rational animal, then to predicate animality of him is tautological.

With regards to the part about knowledge of the essences,

and that the knowledge of them/that is, of the real essences, both of that which they are perceived to be (*tasawwur*) and of that which is affirmed of them or of their modes

is verifiable as real/Some say that what this statement refers to is undoubtedly the knowledge of the reality of the existence of the essences, for to know the essences themselves as a whole is impossible. In reply to this it may be said that the reference here is to the genus, in refutation of those who say that there is no real existence to any of the essences and also of those who say that there can be no knowledge of the fact whether an essence has real existence or has no real existence.

The term "genus" is being used in the same sense as in Aristotle's metaphysics (see the SEP article).

The People of Reality

The People of Reality, أهل الحق, or *Ahl al-Haqq* (sometimes transliterated as *Ahl-e-Haqq*),

is an important term. It's one of the two major terms used by the orthodox to self-identify themselves. So it provides a keen insight into their worldview or what they see as the essence of their worldview.

The other more common term is أهل السنة والجماعة or *Ahl al-Sunnah wa'l-Jama'ah*, which is commonly translated as "People of the Approved Way and the Community".

Approved Way here refers to the word, *Sunnah*, which references the example of the Prophet Muhammad (saw) in his sayings (*hadith*) and actions. Namely, his interpretation of the Qur'an. Thus the shortening to simply "*Sunni*".

The Community refers to the word *Jama'ah* which carries with it an implicit connotation of the main body or majority of the Muslim *ummah*.

The translator's comments in the footnotes include,

The term *ahl al-sunna wa 'l-jama'a*, which is implied here in the statement of al-Taftazani, means the people of whole orthodox communities who refrain from innovation and deviation from the beaten path. Al-Khayali ('I.D., p. 14) adds that they are the Ash'arites in Khurasan, Iraq, Syria, and most countries, but that in the lands beyond the river (Oxus) they are the Maturidites, the followers of Abu Mansur al-Maturidi. Cf. Sayyid Murtada's commentary on the *Ihya'* of al-Ghazzali, II, 6 f., where he quotes this statement of al-Khayali.

This is the group that is referred to by "orthodox".⁶ The other term, *ahl al-haqq*, also translated as "People of the Truth" or "People of the Right/Righteousness", was also used by Sunnis themselves from very early on. So the natural extension of this term from its colloquial theological usage to an implicitly philosophical one with ontologically meaningful connotations is quite remarkable.

The translator makes this footnote on the subject of the term *ahl al-haqq*,

Al-Khayali ('I.D., p. 15) says that the evident meaning of this term throughout the book is the People of the Approved Way and the Community (*ahl al-sunna wa 'l-jama'a*). However, from al-Taftazani's explanation the term means not only that they alone were right and therefore orthodox as some translate the term, but also **that they are peculiar in that they believe in the reality of things. Lest they be confused with those realists who believe only in the reality of ideas, the term "People of Reality" has been used.** See also Enc. of Islam, II, 223.

This is an important distinction and definition.

⁶The translator of this text even uses the term "catholic", though "orthodox" has been the preferred term of most Orientalists.

The Sophists

The Sophists, السفسطائية, or *al-Sufasta'iya* are named after the Greek term, sophistry, indicating substanceless or specious argumentation. Disputation for disputation's sake, intellectual dishonesty, and so on.

They were not an actual group of people by the time of the Muslims, but it was a label applied by the theologians to various groups of people based on their arguments. It was most popularly identified with some of the more extreme Skeptics.

Imam al-Taftazani's commentary follows,

For some of them deny the real essences of things and maintain that they are fancies (*awham*) and vain imaginations (*khayalat*). These are the Obstinate (*al-inadiya*). Others deny the real existence of essences, maintaining that essences only follow from what one happens to believe, so that if we believe a thing to be a substance (*jawhar*) it is a substance, but if we believe it to be an accident it is an accident; or if we believe a thing to be eternal (*qadim*) it is eternal, but if we believe it to be originated (*hadith*) it is originated. These are the Opinioners (*al-indiya*). Still others deny that there can be any knowledge of whether a thing has real existence or not. They assert that they are in doubt and that they are in doubt even of their doubt, and so on. These are the Agnostics (*al-la-adriya*).

These terms do not exactly correlate to specific names we use in philosophy today. Here it's obvious that the term "Agnostics" refers to a sort of anti-realism, but also overlaps with some forms of Empiricism or Idealism (who deny that we can ever truly gain objective knowledge, people who believe only in the reality of ideas as mentioned in the previous section). The "Obstinate" describes an extremely skeptical nominalism. The "Opinioners" describes conceptualism (including its extensions, such as Idealism), also overlapping with some nominalism. It should be noted these are the descriptions of their beliefs from the Islamic point of view, not their own.

As for us, however, to prove our point of view we first convince ourselves, either by sense perception or by demonstration, of the necessity of establishing that certain things have real existence. Then from this premise we argue that if the negation of those things is not proven, then the real existence of those things has been established. But if, on the other hand, the negation has been proven, then, inasmuch as that negation by virtue of its being a species of judgment is one of the real essences it necessarily follows, again, that something of real essence has been established and that it is not proper to negate it absolutely. It is evident that this argument applies to the

Obstinate only.

The Imam turns to their skepticism of knowledge,

[As for the Opinioners and the Agnostics], they say, with regard to those types of knowledge described as necessary (*al-daruriyat*) that (a) some of them are sense perceptions (*al-hissiyat*), but that sense perception may sometimes err, as in the case of the squint-eyed who sees one to be two, and of the bilious who finds the sweet bitter, and (b) some of them are immediate perceptions (*al-badihiyat*) but that these are subject to differences of opinion and are open to ambiguities for the solving of which there is need of subtle speculation, (c) Another type of necessary knowledge [they say] is that arrived at by means of syllogistic speculations (*al-nazariyat*) [from major premises which are either sense perceptions or immediate perceptions]; but as for these [they argue] with the unsoundness of these major premises, there necessarily follows the unsoundness of the conclusions. And it is for this reason [they add] that thinking human beings have many differences of opinion [concerning conclusions arrived at by syllogistic speculations].

To these we reply:

(a) The error that may occur in sense perception by reason of particular causes in certain instances does not negate the validity of the sense perception in other instances where the particular causes of the error are not present.

(b) The differences of opinion that may occur with respect to immediate perceptions by reason of one's lack of acquaintance with the subject or of one's difficulty in forming a clear notion of the subject on account of its abstruseness do not destroy the possibility of forming immediate perceptions.

(c) The many differences of opinion that may occur in conclusions arrived at by syllogistic speculation as a result of the unsoundness which may sometimes occur in the act of speculation do not destroy in other instances the validity of conclusions arrived at by syllogistic speculation.

But the truth is that there is no way to enter into discussion with them, especially the Agnostics, because they do not admit anything known by which an unknown is to be established. Rather the only way is to punish them with the Fire, that they may either confess or be consumed in the Fire.

Sufasta is a name given to falsified wisdom and specious knowledge, because *sufa* means knowledge and wisdom, and *asta* means the specious and false. And from this is derived *al-safsata* just as *falsafa* is derived from *faylasufa* (philosopher), which means "the lover of wisdom."

Epistemology

Which brings us to the Islamic view of knowledge as stated by Imam al-Nasafi,

Chapter 2

THE CAUSES OF KNOWLEDGE

The causes of knowledge for all creation are three: the sound senses, true narrative, and Reason. The senses are five, namely, hearing, seeing, smelling, taste, and touch, and by each of these senses one is informed concerning that for which it was appointed.

True narrative is of two kinds: one of them is the *mutawatir* narrative, and it is the narrative established by the tongues of people of whom it is inconceivable that they would agree together on a falsehood. It brings about necessary knowledge such as the knowledge of former kings in past times and of distant countries. The second kind is the narrative of the Messenger aided by an evidentiary miracle, and it brings about deductive knowledge, and the knowledge established by it resembles the knowledge established by necessity in certainty and in fixity.

Then as for Reason: it is a cause of knowledge also; and whatever of it is established by immediate perception is necessary, just as the knowledge that the whole of a thing is greater than the part of it; and whatever is established by deduction is acquired.

Illumination is not one of the causes of the cognition of the soundness of a thing with the People of Reality.

I will include some of the commentary of Imam al-Taftazani before discussing the further implications of this epistemology.

The causes of knowledge/ Knowledge is an attribute of the knowing subject by means of which any object referred to becomes revealed (*yatajalla*) to him; that is to say, it becomes clear and evident and capable of being described by words, and this regardless of whether that object is something existing (*mawjud*) or something non-existing (*ma'dum*). Knowledge includes both the comprehension (*al-idrak*) by the senses and the comprehension by Reason (*al-'aql*), and this again both of things conceived (*al-tasawwurat*) and of things asserted (*al-tasdiqat*), the latter of which may be both

certainties (*al-yaqiniya*) and non-certainties (*ghayr al-yaqiniya*).

This is in opposition to the view of the Sophists that knowledge is an attribute [of the knowing subject by means of] which [he] makes an affirmative judgment of which the contradictory (*al-naqid*) cannot be admitted. This definition of theirs, although it includes the comprehension of the senses, provided only that the thing to be perceived is not inaccessible to the senses; and although it also includes the things conceived [by Reason] provided only, as they claim, that the things to be conceived do not have contradictories; yet it does not include the non-certainties of things asserted. So much for their view. Accordingly the revelation of an object to the knower must be taken to mean a complete unveiling (*al-inkishaf al-tamm*) [which has been identified with knowledge] and therefore precludes opinion (*al-zann*)⁴ so that knowledge with them is to be contrasted with opinion.

⁴ *Al-zann* is that faculty which produces opinion or belief with the admission that the contrary may be the case.

are three: the sound senses (*al-hawass al-salima*), **true narrative** (*al-khabar al-sadiq*) **and Reason** (*al-'aql*) / This is by way of enumerating the particulars (*al-istiqra'*).⁷ From the standpoint of classification, if the cause of the knowledge is some other person outside the knower, then it is true narration; [but if the cause of knowledge is within the knower himself] then, if there is an organ distinct from the perceptive faculty (*al-mudrik*), it is sense perception; otherwise, it is Reason.

⁷ *Al-istiqra'* is induction; the judgment concerning a universal based on particulars.

Objection may be raised that the efficient cause (*al-sabab al-muaththir*) in all kinds of knowledge is Allah, since they all exist through His creation and His bringing them into existence without any impression (*ta'thir*) being made by the sensory faculty, true narration, and Reason. Reason only appears to be a cause, as for instance fire in the case of burning; and as for the senses and narration, the former are only instruments and the latter a method of comprehension.

Further objection may be raised that the ultimate cause (*al-sabab al-mufdi*)= taken as a whole wherein Allah creates within us knowledge according to the customary way (*jary al-'ada*) in order to include the percipient (*al-mudrik*) such as Reason, the instrument such as the sensory faculty, and the method such as narration= is not confined to three things, but there are other things such as sensibility (*al-wijdan*) surmise (*al-hads*), experience (*al-tajriba*) and the speculation (*al-nazar*) of the Reason, meaning the arrangement of principles and premises (*muqaddimat*).

To this we reply that this [threefold division given] is according to the method of the Early Theologians, who limited themselves to the aims pursued and shunned the minute precisions of the Philosophers. When these theologians discerned that some of the things perceived came as the result of the use of the external senses, about which there is no doubt, whether in rational beings or non-rational beings, they, therefore, made the senses one of the causes; and since most of the things known about religion are derived from true narrative, they made it another cause. Since they were not positive about the internal senses (*al-hawass al-batina*) which are called the common sense (*al-hiss al-mushtarak*) or the estimative faculty (*al-wahm*) or something else; and because they did not attach much importance to the details of surmises (*al-hadsiyat*), experiences (*al-tajribiyat*), immediate perceptions (*al-badihiyat*) and speculations (*al-nazariyat*) and because all these go back to Reason, they made Reason a third cause which ultimately arrives at knowledge by merely giving attention to or by drawing to itself a surmise or an experience or the arrangement of premises. So they made Reason the cause of knowledge in that we have hunger and thirst, that the whole is greater than the part, that the light of the moon is derived from the sun, that scammony is a laxative, and that the world is originated, although in some matters Reason is aided by sense perception.

This is al-Taftazani's justification for al-Nasafi's tripartite division in epistemology. While epistemology is generally similar between the Ash'aris and the Maturidis this division allows compartmentalization and systematization and greater complexity in the end.

The senses (al-hawass) are five/meaning that of necessity Reason determines their existence. But the proofs for the internal senses, which the Philosophers maintain, are incomplete according to the fundamentals of Islam.

However, our knowledge in the modern day has reached such a stage that we can link the function of some of what al-Taftazani explains as the "internal senses" in the previous section to physical faculties in the anatomy of the brain (as I discuss in earlier sections of this document). This, however, will have little noticeable impact on this epistemology due to the foresight of the Maturidi Imams who have already given Reason its proper place as well as the choice of the "necessary" / "acquired" distinction which transcends this. Additional investigation nonetheless remains a worthwhile pursuit for theologians. The only thing I can think of right off the bat which could be gained from moving away from this distinction is establishing a greater cogency in deductive arguments if such research were to become widely accepted by consensus.

True narrative/that is, that which is in agreement with the fact, for narrative is [a form of] speech in relation to which there is something external

with which the relationship agrees, so it is true; or the relationship does not agree with it, and it is then false. So truth and falsehood are descriptives of narrative. They therefore may be used with the sense of giving information about a thing according to what is or what is not. This means [that narration is] the making [of something] known by a complete relationship which agrees or does not agree with the fact, so truth and falsehood are among the attributes applied to the narrator. And for this reason in some books the term "the true" is used as an attribute of "narrative" (*al-khabar al-sadiq*), and in others it is placed in annexation, "the narrative of the truthful one" (*khabar al-sadiq*).

is of two kinds: one of them is the *mutawatir*¹⁴ narrative/It is so called because it does not occur just once, but in sequence and continuity.

¹⁴ In the science of the Muslim traditions the *mutawatir* (verbal noun, *tawatur*) is the most trustworthy from the standpoint of the number who attest it.

and it is the narrative established by the tongues of people of whom it is inconceivable that they would agree together/that is, Reason does not permit their concurring together

on a falsehood/The thing that proves it is that knowledge takes place without any doubt.

It/of necessity

brings about necessary knowledge such as the knowledge of former kings in past times and of distant countries/The latter phrase "distant countries" may be joined to "the kings" or to "the times"; the former, namely "the kings," is more likely although further away in position in the sentence.

Here then are two matters to be noted; one of them is that the *mutawatir* narrative brings about knowledge and that of necessity, for we come of ourselves to the knowledge of the existence of Mecca and Baghdad and that such facts are only gained through narratives. The other matter is that the knowledge derived from such *mutawatir* narrative is necessary, and that is because it may be obtained by one who is capable of making a deduction and by others as well, even by children who have not yet been brought up to the right way, by the method of the acquisition of knowledge and of arranging the necessary premises. But as for the narrative of the Christians (*al-Nasara*) concerning the killing of Jesus, on whom be peace, and that of the Jews (*al-Yahud*) concerning the perpetuity of the religion of Moses, on whom be peace—well, such *mutawatir* narrative is absurd.

I will elaborate further in a separate section on the general idea. The problem with that narrative of the kind of Jesus' (as) alleged crucifixion is that it has not enough narrators and transmitters to the actual event. It's more like a *mutawatir* narrative from the testimony of the authors of the Bible, but not a *mutawatir* narrative of the actual event (from a mass number of witnesses or an authenticated chain). It is further complicated by the presence of narrators and narratives who offer no corroboration or offer opposing testimony, such as the case with the Jews. In this case, the *mutawatir* narrative is limited in scope to a single (in fact, minority) group out of the larger group of possible witnesses, narrators, and transmitters. Contrast this with the *mutawatir* nature of the Qur'an whose transmission was propagated along authentic chains vetted by multiple sources and included with it a mass number of witnesses comprising well near everyone from the group of possible witnesses and narrators. There is an overwhelming consensus from Islamic, Eastern, and Western academic historical scholarship on the authenticity of the Qur'an.

Objection may be raised that the narrative of each individual only gives an opinion (*zann*), and heaping opinion upon opinion does not bring about certainty, and also that the possibility of each individual's falsehood brings about the possibility of the whole group's falsehood, for it is made up of the same individuals. To this we reply that it often happens that in the grouping together of individual cases there is something in them collectively that was not in them separately, as for instance in the strength of a rope made of hairs.

What is being referred to here is the change in nature of humanity when moving from an individual to a social group or society. A society is an organic and distinct thing from the individual with its own distinct nature, similar to the difference between a hair and a rope. There is a quality in the rope which did not exist in the individual hair, even though the rope is made up of individual hairs. I will discuss this further in a later section.

It may be objected that in the case of necessary types of knowledge there is no irregularity or contradiction; still, we do find in the case of such knowledge that the knowledge that one is half of two is stronger than the affirmation of the existence of Alexander. Furthermore, some of those people who employ Reason in their investigations, such as *al-Sumaniya* and the Brahmins (*al-Barahima*), deny that *mutawatir* narrative produces knowledge. This argument is inapplicable as an objection, for it is to be admitted that various kinds of necessary knowledge sometimes differ from one another by difference in usage, custom, and practice, and in the occurring to one's mind and conceiving the terms of judgments (*atraf al-ahkam*). And there may be a contradiction about *mutawatir* narrative because of pride and obstinacy just as the Sophists exhibit in contradicting all types of necessary knowledge.

The second kind is the narrative of the Messenger (*al-rasul*) aided/ that is to say, whose message is established

by an evidentiary miracle (*al-mu'jiza*)/A Messenger is a man sent by Allah to creatures in order to convey His judgments; and the bringing of a book may be stipulated of him, in contrast to a prophet (*al-nabi*), for "prophet" is a more general term. An evidentiary miracle²⁰ is something that annuls the customary way of things (*khariq lil-'ada*), the purpose of which is to demonstrate the truthfulness of the one making the claim to be the Messenger of Allah.

²⁰ Seven stipulations have been laid down regarding the evidentiary miracle. It must (1) be from Allah, (2) annul the customary way of things, (3) be impossible for those who contend with Allah's Messenger, (4) appear at the hands of him who claims the prophetic office, (5) be in accordance with that claim, (6) substantiate his veracity, and (7) not happen before the claim to the prophetic office is made.

and it/that is, the narrative of the Messenger

brings about deductive (*istidlali*) knowledge/that is, that which is arrived at by deduction (*al-istidlal*), which is by consideration of proof (*dalil*). Deduction is (1) that thing by the sound consideration of which one is enabled to attain the knowledge of any subject that has been transmitted by narrative. (2) It has also been said to be a [minor] proposition, composed of judgments, which necessarily demands a [major] proposition.

So according to the first definition the proof of the existence of the Maker is the world, and according to the second definition it is our saying that the world is originated and that everything originated has a maker. But their statement that proof is that thing from the knowledge of which the knowledge of something else follows is more suitable to the second definition. But as for its bringing about knowledge, that is because it is absolutely certain that he through whom Allah performs an evidentiary miracle for the purpose of asserting his claim to the office of Messenger is truthful in the judgments which he brings. If he is truthful, then the knowledge concerning the contents of his message absolutely follows.

And as for its being deductive, that is because it depends upon deduction and because it brings to the mind the fact that it is the narrative of the one whose office of Messenger is established by evidentiary miracles. Every narrative of this kind is truthful and its contents are according to fact.

and the knowledge established by it/that is, by the narrative of the Messenger

resembles/ that is, is like

the knowledge established by necessity/ [this means] like the things perceived by the senses, those immediately perceived, and the *mutawatir* narratives.

in certainty/that is, in the impossibility of predicating the contradictory

and in fixity/that is, in the impossibility of predicating the discontinuance of this knowledge by that which is ambiguous (*tashkik al-mushakkik*). And it is a kind of knowledge that means the absolute established conviction (*i'tiqad*) which agrees with the fact, else otherwise this knowledge would be a matter of ignorance, or of opinion, or of following tradition (*taqlid*).

If it is objected that this explanation is applicable to the *mutawatir* only, and therefore goes back to the first section [of true narrative], we reply that the statement is about that narrative which is known to be of the Messenger because it has been heard from his mouth or because that or something else possible has been transmitted of him by *tawatur*. The individual narrative is not useful for knowledge because there may be some doubt of its being the narrative of the Messenger.

An objection may also be made that since the statement is *mutawatir* or heard from the lips of the Messenger of Allah, the knowledge which results is then necessary and consequently not deductive, just as in the case of the rest of knowledge obtained by *tawatur* and sense perception. To this we reply (1) that the necessary knowledge, in the case of the *mutawatir* narrative which is from the Messenger, is the knowledge that the narrative is the narrative of the Messenger of Allah==may blessing and peace be upon him==because this means "that by which the giving of the narrative has become *mutawatir*." (2) In regard to that which is heard from the mouth of the Messenger==may Allah bless him and give him peace==the necessary knowledge [in this case] is the perception of the verbal expressions and that they are the speech of the Messenger. (3) But the deductive knowledge [in this case] is the knowledge as to its content and the establishing of that which it proved. For example, the statement of the Messenger, "It is incumbent on the claimant to produce proof, and the defendant must take an oath" is known by *tawatur* to be the statement of the Messenger. This knowledge is necessary. Further it is known from this statement [of the Messenger] that proof devolves on the claimant. [The knowledge of] this [fact] is deductive.

Further objection may be raised that truthful narrative which gives useful knowledge is not confined to these two kinds, but may be narrative coming from Allah or from the Angel or the People of Agreement (*al-ijma'*), or narrative coupled with that which removes the possibility of falsehood, like the news of the arrival of Zayd as indicated by his people rushing to his house.

To this we answer that what is meant by narrative is a narrative which is a means of knowledge to all creatures by merely being a kind of narrative without regard at all to the contexts which give certainty by the evidence of Reason.

So the narrative coming from Allah or from the Angel is able to impart knowledge in relation to all creation only when it comes to them by way of the Messenger. The same judgment applies to the narrative of the Messenger and to that of the People of Agreement in the case of a *mutawatir* judgment. Answer may be made that it has no meaning by itself alone but rather by consideration of the proofs which indicate that Agreement is an argument. We then say that likewise the narrative of the Messenger is of the same class and for that reason was classified as deductive.

We move now to the last of the three,

Then as for Reason (*al-'aql*)/which is a faculty of the soul (*al-nafs*), by which it is prepared for the reception of things to be known and perceived. That is the meaning of their saying, "It is an innate property (*ghariza*) which, whenever the instruments of perception are sound, is followed by the necessary types of knowledge." Some people define it as the substance (*al-jawhar*) by which the things not perceived by the senses are perceived through means, and by which sense perceptions are perceived through observation.

Note the similarity to a naturalist or empiricist's idea of Reason. It is defined in terms of its relation to sense perception. We know it exists by its product, knowledge, which is evidence of that which produced it. We can identify the input (sense perception) and the output (our knowledge) and the regularity with which the correlation occurs. The sensory faculty alone cannot account for the production of knowledge since it can be traced to certain anatomical structures (of which knowledge existed at that time and even earlier) and this does not account for the rest of the brain which is host to (or synonymous with) the mind, which is host to the *Nafs* (Self). The specific means of its operation or function are not mentioned or even speculated upon, which makes things easier for those of us who were to follow several centuries later who do have better knowledge on these matters.

it is a cause of knowledge also/He made this clear because there is a disagreement about it among the heretics (*al-Malahida*) and the *Sumaniya* in regard to all types of speculation, and among some Philosophers in regard to metaphysical speculations, on the basis of numerous differences and the contradiction of opinions. The reply that this is due to the unsoundness of speculation does not preclude the fact that sound speculation on the part of

Reason is useful for giving knowledge, although the very thing you mentioned is a deduction by the speculation of Reason. Thus it establishes that which you have denied, so it is contradictory to itself. And if they assert that this means the opposing of the unsound with the unsound, we answer that either it means something and therefore is not unsound, or it does not mean anything at all and therefore there is no opposing [of the unsound with the unsound].

Al-Malahida (plural of *mulhid*) is generally translated as Atheists (those who rejected all religion) but was also synonymous with *Zanadiqah* (plural of *zindiq*), or a general term for heretics; in this case most likely those heretics who were accused of atheism in spite of affirming a particular belief in religion due to the particulars of their beliefs logically amounting to atheism (such as some pantheists; in India there's a tradition of pantheistic and atheistic traditions of the same religion existing side by side). *Al-Sumaniya* is, as mentioned earlier, referencing Indian Skeptics, originally outright atheists in themselves, though the usage of the term among the theologians might simply be indicating the sort of Skepticism from that region which characterized these people and not any particular religious opinion that goes along with it.

The Imam also offers up a rebuttal to those who would say Reason cannot give knowledge by arguing that the very idea contained in the protest itself is knowledge given by Reason.

Some may say, "Let us grant that speculation is useful for giving knowledge. Well then, if this knowledge is necessary there is no contradiction about it, for it is just as though we said, 'One is half of two'; and if it is speculative, then it is necessary to establish speculation by speculation and that is circular proof (*al-dawr*)."

To this we reply that sometimes there may be a contradiction about necessary knowledge because of obstinacy or the limitation of perception. The people who use Reason are agreed that the reasoning faculties of men are distinctly different according to the nature created (*al-fitra*) in them. [This position is reached] by deduction from precedents (*al-athar*) and by the testimony of narratives (*al-akhbar*) [from the Prophet]. The speculative type (*al-nazari*) of knowledge itself may be established by a special speculation which is not expressed in terms of a [general] speculation. An example of this is our saying, "The world is changing, and everything changing is originated." Of necessity that is useful for giving the knowledge that the world was originated. This [necessity] does not rest upon the special character of the speculation, but because it is sound and accompanied by [that which meets] its conditions. So every sound speculation accompanied by that which meets its conditions has a meaning, and in verifying the answer to this objection there is more detail than is fitting to this book.

Speculation is largely referring to deduction here. What he is basically saying here is that the particular speculation is not justified by itself (speculation) but by its soundness (its validity or internal consistency which gives it meaning, along with the truth of the premises which makes it sound). In other words, if speculation is useful for giving necessary knowledge, then sound speculation gives necessary knowledge and it ends there. If the soundness of the speculation cannot be established, the objection can hold (that it would be justifying itself by itself... people would be expected to accept the truth of a speculation simply on the basis of the special character of the speculation).

This method of skeptical arguing (that some act of reason is justified by itself) has been echoed throughout history in all arguments against reasoning processes, even by modern philosophers (Hume, Quine, etc).

and whatever of it is established/that is, of knowledge established by Reason

by immediate perception (*al-badiha*)/ that is, at the first glance without the necessity of thought

is necessary, just as the knowledge that the whole of a thing is greater than the part of it/For after conceiving the meaning of "all" and "part" and "greater" it is seen that this [proposition] does not rest on anything; and whoever hesitates about it so that he asserts that a part of a man, like the hand for example, may sometimes be greater than the whole does not conceive the meaning of "whole" and "part."

and whatever is established by deduction (*al-istidlal*)/that is, by consideration of proof, whether by deduction from cause to effect, as whenever one sees fire and so knows that it has smoke; or from effect to cause, as whenever one sees smoke and so knows that fire is there. The first process may be specified as "assigning the cause" and the second as "deduction."

is acquired (*iktisabi*)/that is to say, obtained by acquisition (*al-kasb*). This is [done by] immediate causality (*mubasharat al-asbab*) through choice, as in the application of Reason and in speculation on the matters which pertain to deduction, and by inclining the ear, turning about the pupil of the eye, and so forth, in matters which pertain to the senses. So we see that "acquired" is a more general term than "deductive" because deductive knowledge is that which is obtained by consideration of the proof. Everything deductive then is acquired, but not everything acquired is deductive, as for example the use of the faculty of sight which results from purpose and choice.

As for necessary knowledge: it is sometimes contrasted with acquired knowledge and it is then explained as that the obtaining of which is not within the power (*maqdur*) of [choice apportioned by Allah to] the creature; and sometimes necessary knowledge is contrasted with deductive knowledge and explained as that which results without thought or speculation regarding proof. And so some termed the knowledge resulting from the use of the senses "acquired," that is, resulting from immediate causality through choice; and others termed it "necessary," that is, resulting without the use of deduction.

There does not seem to be a contradiction in the statement of the author of *al-Bidaya* when he says that originated (*al-hadith*) knowledge is of two kinds: (1) necessary, which Allah originated in the soul of the creature without his acquisition and choice, like the knowledge of his existence and the change of his states (*ahwal*); and (2) acquired, which Allah originates in the creature by means of his acquisition, and this is by immediate causality in respect to knowledge, its causes being three: sound senses, truthful narrative, and the speculation of Reason. Then he went on to say that from the speculation of Reason there result two kinds of knowledge: (1) necessary, which comes at the very beginning of speculation without any cogitation (*tafakkur*), such as the knowledge that the whole is greater than the part; and (2) deductive, in which a kind of cogitation is necessary, as the knowledge of the presence of fire on seeing the smoke.

Illumination (*al-ilham*)/ it is that which is explained as the casting of an idea into the intellect (*al-qalb*) by means of overflowing (*al-fayd*).

is not one of the causes of the cognition (*al-ma'rifa*) of the soundness of a thing with the People of Reality/This statement was made to answer the objection to confining the causes of knowledge to the above-mentioned three things only. It would have been better if al-Nasafi had said, "One of the causes of the knowledge (*al-'ilm*) of a thing," unless it was that he tried to call attention to the fact that for us knowledge and cognition are the same, not, as some do, making a technical distinction between them by confining knowledge to compounds (*al-murakkabat*) or to universals (*al-kulliyat*), and cognition to simple things (*al-basa'it*) or to particulars (*al-juz'iyat*); otherwise there was no use of his particularizing the statement by saying "the soundness of a thing" [instead of "a thing"].

Then it is clear that he meant that Illumination is not a cause by which knowledge results to creatures in general nor by which it is right for one to force knowledge on another; otherwise there is no doubt that knowledge does result from Illumination. There have been reported statements regarding Illumination in the tradition of the Prophet such as, "My Lord illumined me." And this has been said of many of the Fathers (*al-salaf*) also.

As for the narrative of a single unprejudiced person and the following of the tradition (*taqlid*) of one who attempts a legal opinion (*al-mujtahid*), they are sometimes useful for opinion and sometimes for strong conviction which is enduring. It appears that al-Nasafi meant by knowledge (*al-'ilm*) that which does not include these two things mentioned; otherwise there is no reason for confining the causes of knowledge to the three [causes mentioned].

So, if the cause of knowledge is another person, it is a True Narrative (*al-khabar al-sadiq*). If it's from within the person and it's not due to an organ of sense perception (sight, hearing, touch, taste, and smell), then it is from Reason (*'aql*).

Knowledge from within the person (senses and Reason) is divided into that which is conceived or conceptualized (*tasawwurat*) and that which is asserted (*tasdiqat*, which amounts to a value judgment on the former). The *tasdiqat* are further divided into certainties (*yaqiniya*) and uncertainties (*ghayr yaqiniya*).

As is mentioned above, knowledge gained from Reason is “a third cause which ultimately arrives at knowledge by merely giving attention to or by drawing to itself a surmise or an experience or the arrangement of premises.”

Combining the three gives can give us knowledge via induction (*istiqra'*), as is stated by al-Taftazani in his first line of commentary on the causes of knowledge being three. I say all three because if we just combine knowledge gained from the senses and from Reason, we can in fact use inductive reasoning. Or if we use just narratives and Reason. But in order to wield induction properly, empirical observation and narratives both must be incorporated and preferably in a rigorous methodological framework (which gives us all the ingredients of the scientific method).

Induction is not seen as a method that is “within” Reason in the same way deduction is. All we are concerned with is laying out the most important (necessary or certain) sources of knowledge. From Reason we thus focus on the two most necessary categories which are deductive (which falls under the category of “acquired”) and necessary (immediate⁷) knowledge, the former resembling the latter in certainty. From the sense perceptions we have necessary knowledge. From the True Narrative we also have necessary knowledge, depending on the type of Narrative (*mutawatir*).

Combining all three sources gives us the ingredients for induction. The combination happens within the *'aql* or Reason of course, which can go beyond giving us simple necessary conclusions (and as stated earlier, we have simplified all such reasoning processes under the banner of *'aql* for later further categorization if necessary). Thus, “inductive reasoning”. Since induction is treated in this way, proper use would have to be a methodological combination of the three sources in a framework which plays

⁷Immediate or intuitive... such as the first principles of *a priori* logical/mathematical reasoning.

to the strengths of each. Empirical observations are the ultimate litmus test, our more reliable forms of reasoning are used to weed out error from the procedure and ensure accuracy, and the True Narrative links it to other humans in a group or society which is the ultimate culmination of the process.

The Sound Senses (*al-hawass al-salima*)

Significant attention was paid to investigating the nature of their operation, as evidenced by Ibn al-Haytham's revolutionary work in Optics and investigating eyesight. Islamic civilization was centuries ahead of the rest of the world in human anatomy, physiology, and medicine perhaps more than any other fields of knowledge for a long time.

Quoting what I said earlier,

The sound senses were associated with the necessary knowledge they provided. The Ash'ari idea of necessary knowledge functioned similarly to the empiricist elements in the philosophy of the British Empiricists (and before either of them, the Stoics) in that knowledge gained from the sensory organs' autonomous function is gained without a choice in the matter. The Ash'ari theologians went further in developing empiricism. While some of the Stoics viewed impressions as "stamps" of objects of perception upon the sensory organs⁸ (and it seems even Berkeley or Hume did not go that far), Ash'arite scientists such as Ibn al-Haytham actually proved this in his work on Optics in which he asserted that rays of light enter the subject's eye from the object, that light travels in straight lines, and (probably owing to his atomism) light was composed of discrete particles. He even demonstrated it with his *camera obscura* experiment.⁹ The Ash'arite understanding of a subject (composed of accidents) is akin to a spatial convergence of autonomous sensory systems. The mind is where the impressions are processed and manipulated. The human being is thus a natural system where subject and object are not entirely distinct for everything reduces to substances and accidents (atomism), but where the subject can hold memory of perceptions.¹⁰

Already by the time of Imam al-Taftazani common anatomical knowledge included the pathing of the various nerves as well as the general function of the sensory organs. In addition to sight, al-Taftazani describes hearing as functioning "by way of connecting with the ear hole the air which has assumed the quality of the sounds...".

This idea of a lack of distinction between subject and object was a precursor to ideas

⁸Simko, Ivan (2008). *Parallels of Stoicism and Kalam*, University of Vienna

⁹<http://www.youtube.com/watch?v=a5icY1dMin4>

¹⁰Simko (2008)

of holism present in modern science coexisting with the reductionist methodology of science. For instance, holistically defining an entire natural system by a theoretical physical model (atomism) and then operating on that assumption by reducing everything in that natural system to that physical model (atoms; substances and accidents). This allowed for a mechanistic view in which the human subject was another part of the “machinery” (implying the determinism of materialism, a common theme in the modern scientific and philosophy communities). Lifting a pen involves the motion of the pen as well as the motion of the hand.

This is fundamental to a modern understanding of science. It makes understanding things much more intuitive. Especially in light of developments in quantum physics where the famous double slit experiment showed that the observer and our observation itself was a part of the system (the act of observing or measuring collapses the wave function).

In terms of philosophy (of science) this extends to modern ideas of confirmation holism or the idea that observation itself is theory laden. An observation of sight, for example, includes with it the theory underlying the operation of our sight and the theory underlying the design and construction of the instrument used to make the observation (for instance, a telescope or microscope) and in turn the theories underlying whatever processes it operates on (light, the properties of lens, etc). This is reflected in the work of Ibn al-Haytham simultaneously exploring how light works as well as how the eye works. Or in the instruments designed by Muslim astronomers being underpinned by their theories of astronomy, and the accuracy of predictions obtained thereby (and the changes seen in instrumentation correlating with developments in theoretical astronomical models).

What this all amounts to is further reinforcing the lack of certainty in scientific knowledge (which, in the absence of empirical proof, was only as strong as the theory which acted as the weakest link), and asking the question “well, where did we go wrong?” when results are not as expected. The error need not be limited to the procedure of the experiment in question but could also exist in any of the theories underpinning it or in the absence of a required theory or explanation.

Within a few centuries Muslim astronomers ran into the problematic implications when they couldn’t bust out of the geocentric paradigm (the idea that the Sun orbits the Earth and not vice-versa). This last example sets the stage for a discussion on the epistemological structure of the narrative and its role in philosophy of science.

True Narratives (*al-khabar al-sadiq*)

The choice of the Narrative as a primary source of knowledge in an epistemology is no doubt controversial and not one to be echoed in the West until very recently and

then only indirectly (by redefining the characteristics of knowledge to indicate its shared nature).

This is unfortunately ignorant of the nature of man, especially in a biological or even evolutionary sense.

What most distinguishes *Homo sapiens* from other species? Is it our large brains? Our opposable thumbs? What makes us distinct?

Perhaps one of the better answers from an anthropological perspective is our ability to share knowledge and more importantly... inherit it, via language, across multiple generations. In other words, building on it over time. What this basically means is that unlike other primates or intelligent species who might have been able to invent the wheel, we only had to invent the wheel once.

Let's consider for a moment the possibility of the great apes being able to communicate effectively enough to equivalently share language as we do. Let's posit an oral communication ability although apes lack the faculties of speech that humans have. This would allow them to overcome all other limiting factors and essentially establish a rudimentary form of advanced social grouping or society that would resemble human civilization. There is no doubt in this. The only question that remains is of the link between brain and ability in language. There is debate whether apes right now truly have any innate ability to learn language at all or whether all the results currently observed with apes who are taught sign language are merely symbolic gesturing to obtain desirable outcomes (like a reward from the researchers). Still, the ability displayed by some of the success stories is remarkable and almost eerie. The point is, being able to share knowledge (even if only an oral tradition) would completely change everything.

While this point may seem simple enough, there are those who would inevitably argue with it simply for the sake of arguing.

The objection may be raised that we cannot detach the notion of language as we know it (human language which carries with it implicit connotations of sharing/inheriting across generations) from the context of our brains' development and configuration or our general biological context (such as our organs of speech). Hence, it may be asserted that to single out language in this sense is absurd and makes no greater point than making an example of any difference between humans and the great apes.

While we have no intention of making this about apes, humans, and our linguistic capabilities, we can extend our example above to answer such doubts in the minds of those who are willing to entertain the point. The point is the advantages that human-like linguistic capability confers on a species and how it affects their character.

The True Narrative is not implicit or contained within the apes' linguistic capabilities; it's

established that their linguistic capabilities are not capable of containing it. So imagine, if you will, that this was not inherent in their language but an actual external thing, not an ape. Let's say this "thing", "the narrator", functioned as a storer and transmitter of ape knowledge. Each generation of apes was taught a rudimentary language that made maximum use of their linguistic capabilities and then was taught knowledge learned by the apes that came before them. This knowledge would be in terms of that which they already understood. Apes are certainly capable of understanding the ideas of "friendlies", "enemies", "safety", "danger", and fighting (whether for dominance, for specific resources, whatever). As well as knowledge about things which they might run into (specific animals, plants, and other things). So all heavy mental processes are offloaded to this external "narrator". What sort of advantages would this confer on apes? All the hallmarks of a rudimentary civilization. Development of a more advanced and organized tribal structure, task specialization, perhaps even an ability to war on a species-wide level.

The rest of nature transmits its information through DNA, a slow and laborious evolutionary process that takes ages. Being able to use language like this would amount to cheating. Let's say an ape runs into a threatening snake and barely survives. The ape would be able to spread awareness about the danger of this snake such that the snake's advantage over these apes is forever negated. Further, the immediate social network around the ape in question might opt for revenge and start stamping out all such snakes in the vicinity. The poor snakes would not know what hit them. Evolutionary genetic change and adaptation would not be fast enough to stave off elimination. The apes would be, relative to all that came before them and that co-exist with them (with the exception of humans), freaks of nature in their utter dominance of the ecosystem. This raises interesting questions about anthropology from an information standpoint and how that bears on natural selection (allowing for, in effect, "artificial" or unnatural selection).

This also answers the question of why distinguish the True Narrative as a separate source of knowledge from Reason or sense perception. Because humans are a social species. Should the ant be considered as a standalone specimen? Or in the context of colonies and their dynamics? Increasingly, the scientific community will choose the latter. The behavioral sciences have attained a level of prominence on par with their traditionally physical biological counterparts. With the advent of neuroscience-related fields, it is linked directly to the physical sciences. The True Narrative is a specific species-wide characteristic peculiar to humans. It subsists not in the mind, nor the body, but in the relationship between individuals in a society. It is thus external. With regards to its internal aspect (how we "gain" knowledge from it), it depends on Reason on the same way that sense perception depends on Reason. It depends on sense perception in the same way Reason depends on it. Reason and sense perception are distinct as sources of knowledge. Knowledge can either come directly from the senses, or it can come from a conclusion made by the mind, which as we've established through science is a distinct object with its own configuration, properties, and mode of experiencing through existing. Engaging in reductionism to break down the judgments of the mind into their

constituent sense perception components would erase the knowledge. The knowledge from Reason (the useful knowledge) actually resides not in the impressions but in the relations between these impressions. Each mind analyzing the constituent parts would need to engage in reasoning activity on par with the original mind in order to reconstitute the original knowledge. The knowledge is not in the pieces, it was in the whole. It is a piece that goes missing when we split up any bit of knowledge into its component impressions. It is thus clear that Reason needs to be made distinct from raw sense perception if we are to facilitate greater understanding of our own species. In the same manner, it becomes clear that the True Narrative needs to be made distinct from both sense perception and Reason in order to facilitate greater understanding of our species.

Developments in the behavioral sciences and the physical science of biology demand an epistemological framework that is conducive to study in these fields. The true naturalist would have no objection to making philosophy subservient to the philosophy of science and thinking of epistemology in this context. Engaging in needless philosophical reductionism as typifies empiricism-centric epistemologies is anti-science. It is purposely undoing everything we have accomplished as a part of the scientific tradition. Reductionism has its place. Epistemology is not it.

Contrary to the opinions of some naturalists, epistemology need not be replaced with psychology outright. Using only psychology would be neglecting the other behavioral sciences. A properly developed “naturalized epistemology” must make use of any and all the “natural sciences”. Psychology itself cannot solely cover even the *‘aql*, how can it possibly act as an entire epistemology? What we want psychology to be and what it actually is are two different things. Let’s not put the burden of philosophy on the psychologists then. This tripartite division of epistemology is thus extremely intuitive from a scientific and naturalistic perspective. Sense perception has its own philosophy which in effect acts as a “meta-science”, choosing and rearranging which particular sciences to apply. The same goes for the True Narrative and for Reason. A different group of natural sciences correspond to study of each mode of knowledge. This tripartite division effectively covers all bases. What we mean by philosophy of science then, from an Islamic epistemological and theological standpoint, is merely the science of sciences; the science of rearranging and applying the sciences to their particular areas of study, widening or constricting the scope of fields as necessary.

Coming back to the theological view, the True Narrative is identified with man’s nature. We, as humans, tend to self identify with Reason, Rational thought, or Wisdom. Thus the terms “rational animal”, or even our species name, *Homo sapiens* which is Latin for “wise man”. And how do we distinguish ourselves (modern humans) from ancient hominids? We tack on another “*sapiens*” to the end.

This, frankly, is not “meta” enough. We need to go up at least one more level. We’re finally starting to understand now, from a scientific standpoint, the extent of our social nature. Without the group, can an individual organism from our species be said to truly

be “human”?

The Qur’an identifies man by this characteristic. The very first verses revealed to the Prophet Muhammad (saw) were from *Surah al-’Alaq* (chapter 96).

How would the God of humanity choose to identify His creation?

The story of the first revelation in the cave of Hira is well known and can easily be found by checking a search engine or Wikipedia. Prior to this, Muhammad (saw) had no inkling of what would happen to him. Only the first five verses were revealed. This fact alone has significance since it is specifically these five which cover the question “how would the God of humanity choose to identify and address His creation?”. The first was simply the command of “Read”, to which Muhammad (saw) responded that he could not read. The command and Muhammad’s (saw) response were repeated thrice, then the first five verses were revealed to him. They are,

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

أَفْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ

READ with the name of your Lord who created (all things),

خَلَقَ الْإِنْسَانَ مِنْ عَلَقٍ

He created man from an ‘*alaq*.¹¹

أَفْرَأْ وَرَبُّكَ الْأَكْرَمُ

Read, for your Lord is the most Bountiful,

الَّذِي عَلَّمَ بِالْقَلَمِ

who imparted knowledge by means of the pen.

عَلَّمَ الْإِنْسَانَ مَا لَمْ يَعْلَمْ

He taught man what he did not know.

The translation, specifically verse 5, is from Mufti Muhammad Taqi Usmani. He is a traditional, conservative scholar and captures appropriately the meaning of the sentence. It’s traditionally or colloquially relayed as simply, “...Who taught man by the pen; taught him that which he knew not.”

So the primary identifier here is *al-’alaq*, which can be translated as a clinging cell or

¹¹Please see Addendum A for comments on the meaning of *al-’alaq*.

clinging clump of cells (see: Addendum A). Man is created from this (i.e, in the womb).

What's mentioned next? Teaching knowledge by the pen. The word used is "*qalam*" and not "*kalaam*". The latter of which we know as the name for speculative theology, *Kalam*, which means speech, words, talk, or utterances. *Qalam* means specifically pen or stylus. It is not merely language by which man was taught knowledge, but specifically written language which carries implicit within it the connotation of knowledge inherited and shared as that is what distinguishes it from normal spoken language (which even animals have).

Our knowledge is imparted in books. It is a language capable of being written on physical things and hearts (memorization, oral transmission). No theory of knowledge can be fully coherent without acknowledging this in an overt and fundamental manner.

The justification used by al-Taftazani was quite interesting. He used the example of a rope. There is a quality in the rope which does not exist in its constituent hairs. Just as there is a quality in True Narratives (due to their *tawatur* nature arising from a multiplicity of sources) which does not exist in normal narratives. Where we'd expect compounded error to get completely out of control in transmitted narratives (such as the propagation of rumors), this does not happen in *mutawatir* narratives, especially those which are methodically documented and scrutinized with a critical eye. It brings up an interesting point of discussion from an anthropological perspective. Can a social group of humans be considered a distinct organism of its own? A collective with its own internal dynamics?¹² Can the way we look at ants, for instance, be turned on us? Should it?

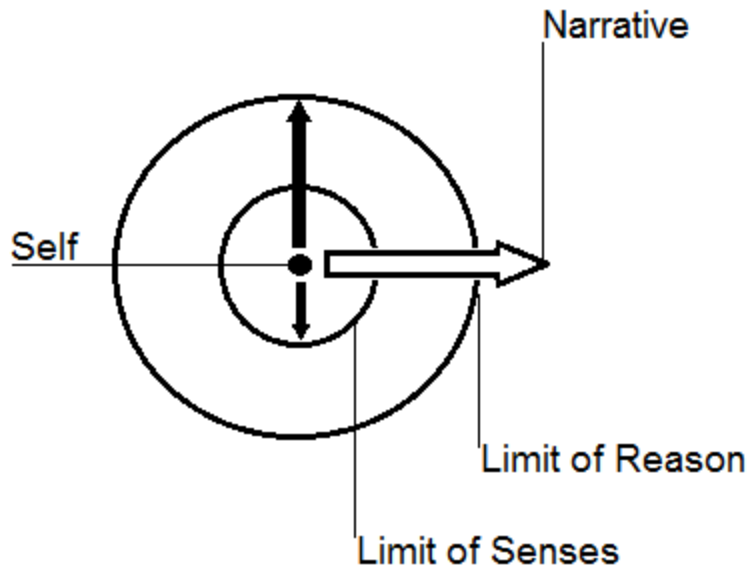
Now that we've covered the philosophical and theological basis for the True Narrative as a source of knowledge, let's move on to the implications.

A Visualization Method

There's an easy and intuitive way to visualize the epistemological structure both at the individual and social level. Remember the dated Bohr model of the atom that everyone learned about back in school? It doesn't depict reality well at all since an atom is obviously not like a solar system but it was intuitive and easy to grasp at the time. We can use a similar structure to understand this epistemological division. The key to visualizing it is to remember that there is a limit to an individual's sense perception as well as their reason. The former is easy to grasp. We can't hear, see, taste, etc beyond a certain physical limit. There is also a limit to reason. The edge of this limit is where we get into circular arguments, infinite regresses, and complete uncertainty. To some, this is indication that we're doing something wrong; it's a limit we shouldn't be approaching.

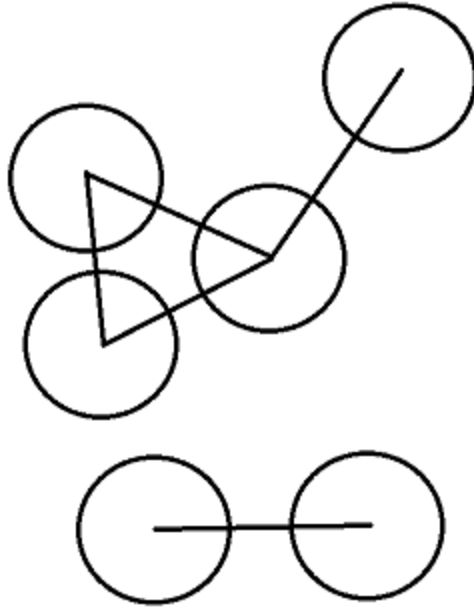
¹²c.f. Prophet Muhammad's (saw) well known hadith, "The believers, in their love, mutual kindness, and close ties, are like one body; when any part complains, the whole body responds to it with wakefulness and fever." [Sahih Muslim]

To others, this is the natural extent of our reason. Some even get frustrated and become so obsessed with the loops and regresses they allow it to undermine their entire idea of rationalism. These limits can be represented as simple circles signifying the extent of each domain.



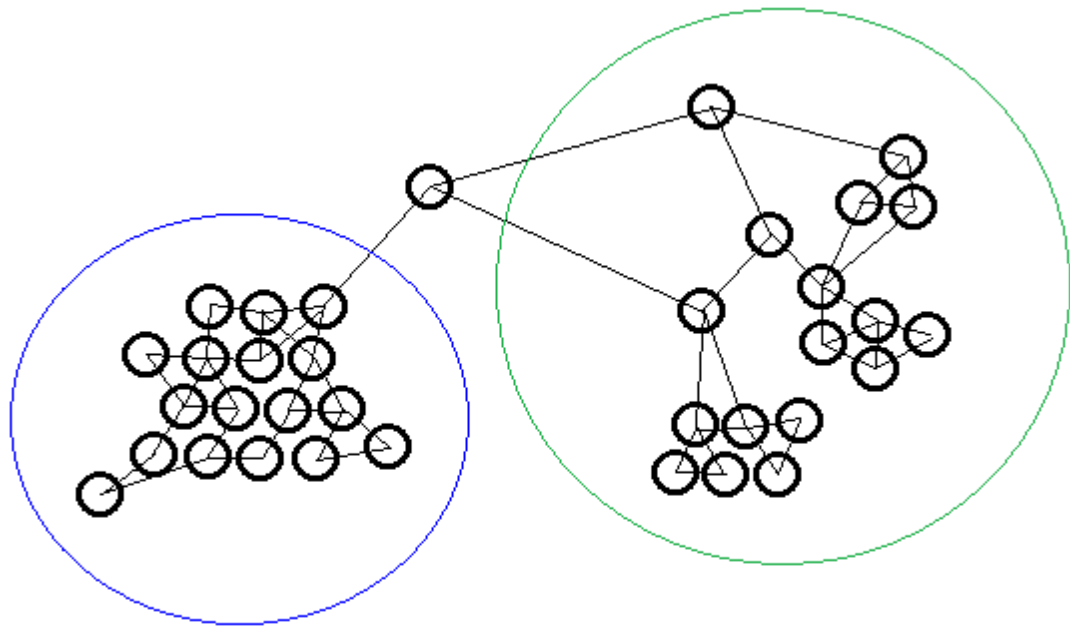
The arrows simply represent where our mental focus is at any given moment. Obviously there would be more arrows to represent all the senses, and perhaps many multiple arrows at once to symbolize the varied extent of our attention spans and mental focus. The goal here, however, is to simply visualize what the narrative does.

The Narrative arrow leaves the subjective limits of our own minds. It acts sort of like a bond between two minds who become connected with a sharing of narratives.



Here I've simplified it with each circle representing a person or "mind" and the lines representing the arrows of Narrative connections. This is starting to look like any model of a social network. But what's linking people here are their fundamental Narratives, the ones that give necessary information, the *mutawatir* (or at least, that are treated as *mutawatir*).

And if we take it one step further,



Here we see that people clump up according to whom they are grouped with, with whom they are sharing their fundamental narrative connections. We can see two distinct groups, connected by one outlier. This can be used to model the *sanad* (chain of transmission) of narrations.

Though the arrowheads are not drawn, they could be used to show one way or two way connections.

We could even say the green and blue circles represent two *madhabs*.

Using a more philosophical application, the green and blue circles can also represent Kuhnian paradigms (using the same narrative connection). The green could represent the paradigm of geocentrism. The blue could be the school of heliocentrism. The outlier between the two could've been Copernicus or anyone on whom Copernicus heavily relied (perhaps al-Tusi or Tyco Brahe, though the point here is just to throw out names to show how this could also model Kuhnian paradigms, not to make accurate connections between these two specific schools of thought).

How so? Well, a paradigm as Kuhn describes it includes an entire worldview. Each of those circles include within them the circles and arrows for Senses and Reason. If we imagine that all of these circles representing minds inhabit a space (a "landscape of knowledge") where each coordinate represents a certain philosophical position or view, then by virtue of proximity those circles who clump up into clusters (groups) based on shared fundamental narratives will necessarily wind up with very similar worldviews. Even the shapes of the clusters could represent a topography; a landscape of knowledge. In fact, Kuhn's paradigms would also use narratives to connect the circles. They would be the narratives contained in science textbooks and publications.

Most of Kuhn's philosophy was focused on distinguishing the behavior of scientific knowledge as opposed to other knowledge. A scientific paradigm, he argued, only moves in one direction, towards progress, and in non-linear fashion according to "scientific revolutions", such that one paradigm comes to dominate at any given time (as opposed to multiple existing schools of thought as happens in the social sciences or humanities). His idea of incommensurable theories would correspond to paradigms in the above diagram who share no links whatsoever. Let's leave the discussion of Kuhn there for now and come back to it later.

Landscape of Knowledge

This might be confusing at first and is only tangentially related to the issue of the epistemological narrative so let's discuss this separately for a bit.

It's better illustrated using philosophy. If there are two adjacent circles connected by a narrative, let's ignore the narrative for a second and pretend they're just two adjacent circles. By virtue of the spot they are in, and the idea that the human rational mind itself has a "direction" of sorts (like a vector, with magnitude and direction), a focus, reflecting its subjective nature of thought... then they will be viewing the world from extremely similar angles. If you stand next to someone you are both looking at the same sky. You might not be seeing the same thing someone standing on another continent in another hemisphere is seeing. So from one spot on this "landscape of knowledge", perhaps existentialism as a philosophy makes sense (if the spot is near the idea of a Necessarily Existent being where existence and essence are overlapped), from another position perhaps essentialism makes more sense (if the spot is near the idea of a man or created being). So perhaps Plato and his Forms were right from one "point of view" (which is literally visualized here) and Aristotle from another.

This also makes the idea of an objective reality something easier to tolerate. Different philosophical views are just different vectors (different views of things from different angles). Each view might work from the "spot" in which it was made and in the direction it was made. So everything adds up to slowly revealing a part of the objective reality. If you pretend that the one sense of Sight is like our faculty of Reason, then it's equivalent to people exploring an area and establishing a picture of the topography then telling each other about it. By objective I mean the reality we are all sharing, exploring, and assembling a picture of. Recall the story of the men locked in the dark room with an elephant, where each felt a different part of the elephant and came to a different conclusion about what it was. The story came out of India and became famously retold in Muslim (Sufi), Buddhist, and Hindu traditions. It's an allegory that Plato would have loved.

As Rumi retold it,¹³

SOME Hindus had brought an elephant for exhibition and placed it in a dark house. Crowds of people were going into that dark place to see the beast. Finding that ocular inspection was impossible, each visitor felt it with his palm in the darkness.

The palm of one fell on the trunk.

'This creature is like a water-spout,' he said.

The hand of another lighted on the elephant's ear. To him the beast was evidently like a fan.

Another rubbed against its leg.

¹³Arberry, A.J. (2002) - *Tales from the Masnavi*

‘I found the elephant’s shape is like a pillar,’ he said.

Another laid his hand on its back.

‘Certainly this elephant was like a throne,’ he said.

The sensual eye is just like the palm of the hand. The palm has not the means of covering the whole of the best.

The eye of the Sea is one thing and the foam another. Let the foam go, and gaze with the eye of the Sea. Day and night foam-flecks are flung from the sea: of amazing! You behold the foam but not the Sea. We are like boats dashing together; our eyes are darkened, yet we are in clear water.

One major implication of this is that a theory of everything might be impossible, for a theory is “something” and “everything” must include within it all theories, including a theory of everything. Multiple “theories of everything” would be needed tackling different aspects of reality. What I mean here by “theory of everything” is a theory truly accounting for everything. The current focus is on a theory that connects general relativity and quantum mechanics. Philosophically speaking, unifying these two doesn’t mean science is done, and a theory of everything would have to account for any further developments made after that.

***Taqlid* (Blind Imitation)**

This brings us back to the subject of *taqlid*. We can now visualize the effects of it on a wide scale. When people form groups based primarily on narratives unquestioningly, large isolated clusters can form very quickly. This also confers stability to the group and its worldview (or groupthink).

The way it happens is this. Instead of what we’d call a *sanad* (chain of transmission) linking the narratives to some source, be it Scripture or a specific movement or group from a previous time or place, if the narratives form a circular connection, an isolated cluster can form rapidly. This group will share a worldview and engage in groupthink, but will not have their worldview anchored properly. Since Kuhn associated scientific paradigms as only moving in one direction, that of progress, such groups will obviously be stagnant and resistant to change. These characteristics are generally true of most clusters which rely heavily on unquestioning narrative connections (*taqlid*, like the clusters which would represent the laypersons in *madhabs*, since the scholars obviously have their scope of *taqlid* limited according to their ability and knowledge). But what makes isolated clusters so different is the sheer speed or rapidity with which they form and the almost unlimited range of position (in the topography corresponding to a “landscape of knowledge”) they can occupy. For a microcosmic example, look no

further than the incident of the Salem Witch Trials. In other words, these things can set up shop on “crazy mountain” since they have no anchor to mainstream human thought or narration. This also alludes to the “cargo cult science” of Feynman mentioned earlier. That groupthink in his famous example had no narrative connection to anchor them to what they were trying to imitate. It was blind imitation of the blind.

We see examples of this sort of hysteria all the time even today in the political landscape of many countries. The media, which controls the narratives, only exacerbates this. This pundit quoted that anchor quoting this pundit who’s quoting the first anchor again. Other people quickly buy into this narrative at any of these points or nodes in the chain and quickly a self-sustaining phenomenon is generated (see: birther controversy surrounding President Obama in US politics).

Some might even extend this to traditional world religions (atheists especially). The point could be raised that many religions’ narratives simply turn back on themselves. As for Islam, the case for the religion, the prophet (saw), and the Qur’an are clearly laid out so any person can investigate them and judge for themselves whether those *sanad* go back to God or not. More on that later.

We see such phenomena represented on the internet as people from various forums and websites wind up exchanging similar reading material, using similar arguments, adopting similar slang, memes, etc.

These are all microcosmic examples of how human society functions on even the most grandest of scales, the civilizational scale. Which brings up an interesting point related to Kuhn’s philosophy. What a paradigm would need to break with tradition are outliers; paradigm busters. Copernicus is the most famous example. These outliers often tend to belong to different groups since one group can become so caught up in its own worldview. This happened to Islamic civilization. The geocentric paradigm was actually at its peak under Islamic civilization. They couldn’t think outside of the paradigm. Copernicus, however, was literally outside their paradigm. Just as how the Muslims first challenged everything the Greeks did, eventually perfecting a non-Ptolemaic geocentric model of the solar system not long before Copernicus. It’s quite simple: it’s just easier to challenge foreign opinions. This will be discussed further under the section on Kuhn.

Needless to say, *taqlid* in science and journalism is not a good thing. It goes back to the Qur’anic verse mentioned earlier on not trusting reports from disreputable characters. The Narrative at its core is a connection of trust. As I said earlier in the discussion on *taqlid*,

This is as opposed to the coexistence of belief, understanding, *and* imitation, in which case these three do not really exist separately and this is merely another instance of the epistemological structure of the narrative (basic exchange of knowledge by humans) and the word “trust” might make

more sense than “belief” in this context (in some cases, ‘understanding’ makes ‘belief’ better understood as ‘trust’ which conveys the sense of a very solid belief or foundation to belief... or a justified belief) since the person being “imitated” is not really being imitated as such but acts as the source of the knowledge in the form of a narrative connection.

As Imam al-Ghazali said, the pursuit of scientific knowledge is a *fardh al-kifayah* (collective or communal obligation) and I would add journalism (with integrity of course) to that as well. These are, unfortunately, not obligations currently being fulfilled by Muslim society. News organizations are built as for profit corporations and serve under governments whose agendas they cannot help but be influenced by. Even the age old institution of the *waqf* is not safe as there are some *madaris* (plural of *madrassah*) which no doubt do cater to this or the other political agenda (perhaps Al-Azhar under the former Egyptian regime was the biggest example of this). Still, a way out of the madness lies in the concept of *waqf* which could function as a sort of tenure for entire institutions. But these days what can possibly protect any institution from the meddling of the State? Even institutions of science and secular study have been bent to the will of capitalist forces.

Going back to the subject of the trust that is at the core of the True Narrative, Shaykh Hamza Yusuf had a great lecture on *taqlid* and the necessity of following a *madhab* in which he touched on Islamic epistemology and the nature of the *mutawatir* narrative in the first two parts,

[Part1](#) | [Part 2](#)

In closing, even for the hardened naturalist, the True Narrative as a separate epistemological source of knowledge makes sense. It must, of course, be treated in a scientific manner and if they so feel, they can associate it with the various historical and anthropological sciences.

The Theological Narrative

Another type of true narrative mentioned, distinct from the *mutawatir* transmission is the theological narrative, or the narrative of a Messenger (*Rasul*) who is aided by an evidentiary miracle (*al-mu'jiza*).

Now, the existence of God has already been established elsewhere in the ontology/metaphysics and worldview. This is discussing a rational interpretation of how such a being would communicate with mankind. This (the judgment concerning the theological narratives) is what distinguishes one religion from another.

The excerpt from Imam an-Nasafi's creed is mostly self-explanatory. In short, God would

send a Messenger aided by a miracle (an event which departs from the Customary Way, or what some call the natural order of things).

Knowledge transmitted in such a fashion from such a Messenger is classified as deductive for the aforementioned reasons. However, the narration of the theological narrative of the Messenger is grouped under *mutawatir* rules (which leads to the hadith sciences for example by which we ascertain through a scientific methodology the authenticity of transmissions of narrations from the Messenger).

It (the knowledge from the narrative of the Messenger himself) is deductive and not necessary because by definition necessary knowledge is that the contrary of which cannot be accepted and for which no real reasoning process is required (such as sense perception or that *mutawatir* narrative coming from mass witnessing of verifiable sense perception). By nature and theological necessity, the theological narrative must be one that can be denied in order to uphold free will and human choice. Secondly, we have to listen to the content of the narrative, understand it and ponder over it, and after using our reasoning we accept it. Thus it is deductive but resembles necessary knowledge with regards to certainty.

So, the narrative of the Prophet (saw), which is to say the Qur'an, gives deductive knowledge (from judgments on its contents).

It is transmitted to us through *mutawatir* narrative (literally, the Qur'an is a *mutawatir* narrative). So the knowledge of the narrative's existence and contents is necessary. Even non-Muslims accept the historical authenticity of the Qur'an.

The evidentiary miracle(s) of the Prophet (saw) must also be transmitted to us via *mutawatir* narratives and so the knowledge of the miracles themselves must be necessary.

The Evidentiary Miracles of the Prophet (saw)

Let us first establish that due to their very nature, necessary knowledge of miracles cannot really be established through *mutawatir*. It must be accompanied by direct witnessing. By default we will classify narratives regarding events which do not conform to the Customary Way (the natural laws or natural order of things) as absurd.

The Prophet (saw) was accompanied by several evidentiary miracles. Let us first cover a few of those which were meant for his time and for the people around him who witnessed them.

There are two which are perhaps most famous and most widely witnessed.

At Zarwa, the Companions were without enough water to perform *wudhu* (ritual ablution). The Prophet (saw) had them bring him a bowl of water into which he put his hands and water gushed forth from his fingers like from a fountain. This was witnessed by three hundred people and is narrated in the *sahih* hadith collections.

Perhaps the most famous is the splitting of the moon. The people of Makkah asked the Prophet (saw) for a sign and then the moon split. A verse of the Qur'an was revealed which mentioned it (54:1). It was witnessed by many people far and wide. It's narrated in the hadith collections through multiple chains of transmission. For those unfamiliar with the event, the pagans thought they had become bewitched or the Prophet (saw) had worked some form of magic on their minds and sight. The Qur'an mentions in 54:1-2,

The Hour draws near and the moon has split asunder. When these people see a sign, they turn away and say, (This is) a transient magic.¹⁴

There are many other narrations of miraculous incidents, too numerous to count or mention. Some of the other more obvious ones are the prophecies contained in hadith which predict, accurately, events to happen after the Prophet's (saw) death. The Prophet (saw) mentions the mode of death for the first three Caliphs¹⁵, the civil war to ensue between two camps of Muslims (which started with Mu'awiyah and 'Ali (ra) and culminated in the succession dispute after the death of 'Ali (ra)) and his grandson's (Hasan (ra)) role in making peace between them, the emergence of the Khawarij, the conquest by Muslims of Jerusalem, Persia, and eventually Constantinople, the Muslims' war with the Mongols, the decline and fall of Islamic civilization and the subjugation of its lands by non-Muslim powers in spite of the massive population of the Muslims, the emergence and dominance of Europe, the rise to power of the bedouin Arabs from Najd (the Saudis, the first people from the region to gain power there), the very same people described as uncouth and predicted to compete in the construction of high rise buildings each higher than the other (i.e, modern Gulf Arab states), many changes in cultural trends (political, economic, social trends), technological advancement (indirectly described in the language of his time as peculiar things which the people of his time could not understand but which we can see as clearly referring to modern technological innovations such as the hadith about a person's hip telling them what is going on in their home while they are out¹⁶), the Western embargo/boycott of Iraq (which happened in the 1990s and is mentioned in *Sahih Muslim*¹⁷), and so on and so forth. These are all contained in the major hadith collections which have been vetted by non-Muslim and Western scholars regarding their authorship and time of publication. These books were all put out many centuries before any of the recent events and these hadith were widely known in the Muslim world since Islam's inception. If you would like to read more, you

¹⁴For more translations of 54:2, see <http://islamawakened.com/Quran/54/2/default.htm>

¹⁵Sahih Bukhari - Volume 5, Book 57, Number 24

¹⁶Reported in Musnad Ahmad

¹⁷Reported in multiple places but one is in Book 41, Number 6961.

can find some translations online in English that you can peruse. There are also specific books which collect hadiths from different collections related to prophesies and signs of the latter times.

It would not be fitting, however, for the evidentiary miracle of the Prophet (saw) to be limited to just these things. This is because unlike, say, Jesus (as), Moses (as), etc, Muhammad (saw) and his message is intended for all people of all time to come after him. Within the context of this notion of theological narratives from Messengers aided by evidentiary miracles, it would make sense for Jesus (as) to come with the miracles he did (which both Christians and Muslims acknowledge) because it reached its target audience and he was sent as a prophet/messenger to specifically the Bani Isra'il (Children of Israel or Israelites), regardless of what Christians made of the religion after him.

It would thus be appropriate for Muhammad (saw) to have a miracle that would be everlasting and which could be continuously witnessed for all time and all people to come. This miracle is the Qur'an (which meets all these requirements by virtue of being a literary miracle) and the specific nature of its miraculous nature will be discussed in a later section.

Reason ('*aqI*)

You may have thought that this section would be the most complicated and require the most explanation but that's not the case. Our Reason or '*aqI*' is perhaps our most well investigated source of knowledge. We could just copy and paste the entire philosophy of Rationalism right here as a description of the '*aqI*' and be done with it. The specifics of conceptions, judgments, speculations, etc have already been mentioned.

The Islamic conception of Rationalism is, however, of the conservative sort. It's more akin to the philosophy of Kant in its harmony of empiricism and traditional rationalism and less like the more purely logical/mathematical-based reason of Descartes, though the foundations are the same. It is up to the believer in question how far they can attempt to take this Rationalism (as far as they can justify it). As we can see, some of the non-orthodox sects had developed philosophies that were extravagant in their support of Rationalism and the supremacy of reason over all other sources of knowledge.

So we can say the rationalism which describes the '*aqI*' of the orthodox theologians is in its default state a barebones philosophy. We speak mainly of basic concepts such as the aforementioned *tasawwurat*, *tasdiqat*, *nazariyat*, etc. But in our definition of gaining knowledge we also allow for certainties (*yaqiniya*) and uncertainties (*ghayr yaqiniya*) amongst the value judgments which offers a degree of flexibility in our view of Reason that does not exist among the Empiricists. As was mentioned here,

Knowledge is an attribute of the knowing subject by means of which any object referred to becomes revealed (*yatajalla*) to him; that is to say, it becomes clear and evident and capable of being described by words, and this regardless of whether that object is something existing (*mawjud*) or something non-existing (*ma'dum*). Knowledge includes both the comprehension (*al-idrak*) by the senses and the comprehension by Reason (*al-'aql*), and this again both of things conceived (*al-tasawwurat*) and of things asserted (*al-tasdiqat*), the latter of which may be both certainties (*al-yaqiniya*) and non-certainties (*ghayr al-yaqiniya*).

This is in opposition to the view of the Sophists that knowledge is an attribute [of the knowing subject by means of] which [he] makes an affirmative judgment of which the contradictory (*al-naqid*) cannot be admitted. This definition of theirs, although it includes the comprehension of the senses, provided only that the thing to be perceived is not inaccessible to the senses; and although it also includes the things conceived [by Reason] provided only, as they claim, that the things to be conceived do not have contradictories; yet it does not include the non-certainties of things asserted. So much for their view. Accordingly the revelation of an object to the knower must be taken to mean a complete unveiling (*al-inkishaf al-tamm*) [which has been identified with knowledge] and therefore precludes opinion (*al-zann*) so that knowledge with them is to be contrasted with opinion.

This idea in Islamic epistemology of the “uncertainty of knowledge” is what most distinguishes it from Western epistemology and the conundrums over the definition of knowledge that occur in the latter’s philosophical tradition. This allows us to not get flustered over the philosophy of induction (and it is only philosophers that get flustered over this... it isn’t stopping scientists by any means) and other questions of “meaning”.

Metaphysics

What I mean here by metaphysics is simply that which by definition falls under the category of metaphysics which we use to explain, from the perspective of theology, the material/natural/physical existence of the world. Refer to the brief discussion on the definition of metaphysics in the opening section.

As we’ve discussed, science is itself a philosophy. A “proto-science”. Physics and the other physical sciences were preceded by what we traditionally call the natural sciences (and the terms are still interchangeably used today) which were preceded by “natural philosophy” which can be identified as “proto-science”. Metaphysics, on the other hand, was discussing physics from a different perspective and with a different goal. The goal was not to enter natural philosophy so much as lay the foundations for it. This is because the physical sciences only go back or “deep” so far. Metaphysics is the part of

a person's worldview which is their theory underpinning their view of the physical world, including the physical sciences. It is by definition outside the domain of the physical sciences.

In the history of Islamic theology, *kalam* has been identified as the theological discourse which engaged in the rationalization of theology into philosophy all the way to the extent of mathematics and natural philosophy (Imam al-Taftazani's description was quoted above). What we need to do is identify the specific point where theology (dictated by Scripture/Revelation) ends and philosophy (our theories) begins. This is easy. The hard part is just remembering this principle whilst engaging in such discourse or trying to understand it so as to not become confused. It is of utmost importance to remember that here. At some point, theology *will* transition into philosophy. That's perfectly fine. That does not mean that we are necessarily making that philosophy a part of theology. It just means that philosophy is the current *preferred working theory* or *preferred explanation* of the theologians. That's all it means. That carries considerable weight to be sure, but it is not adding anything to the theology, to the religion or *Deen*. It's *explaining* the theology.

The theologians of the *'ulema* carry considerable weight. More so than the layperson. This is why you or I, for example, cannot simply dictate the preferred philosophical viewpoint of our theology. The very term "orthodox theology" implies consensus of the community (which is a part of what makes it orthodox). As I mentioned above, the main theologians which we commonly refer to are Imams Abu Hanifah, Ahmad ibn Hanbal, at-Tahawi, al-Ash'ari, al-Ghazali, and al-Maturidi (and here, an-Nasafi and al-Taftazani further representing the views of Imams al-Maturidi and al-Ash'ari).

While the *salaf* and the Imams thereof (Abu Hanifah and Ahmad) advocated sticking to the narrations without getting too involved in philosophical matters, Imams al-Ash'ari and al-Maturidi had more detailed positions and explanations of metaphysics (owing to their time when Islam was under constant philosophical/theological attack from within and without). What I'm referring to is of course atomism.

Atomism

The history of atomism, the intricacies of the various forms of atomism, and the debates of the atomists would be far too much to cover for the purposes of this document. I will concern myself only with what's necessary for a basic understanding of the conception of atomism that is relevant to Islam's orthodox theology.

First let's discuss how physics works. Going back to Ibn al-Haytham, the use of mathematical models to describe reality is part and parcel of the science of physics. This is true now more than ever. The smallest scale is called the quantum level (the Planck scale). Everything we describe here, particles, waves, fields, etc are mathematical models. We cannot actually observe what's going on. An example is the idea of [virtual](#)

[particles](#). Virtual particles are not real. They do not actually exist as far as we know. They are a physical-sounding intuitive descriptor of a mathematical model which in turn is a description of reality insofar as much as we can test this theory indirectly so its effects are real and therefore there's something real to it but we cannot actually say that there are real, literal, virtual particles (note the name, "virtual") which are there and then not there. Scientists do NOT say this either. This is a common misconception. Even the ideas of fermions, bosons, etc cannot be said to describe a "picture" of reality. We can test for the presence of what we call a boson, which we call an elementary particle, but we cannot say for sure whether it actually is a real, physical, particle in the sense of what we picture in our minds when we use the word particle. This is something a physicist intuitively knows but the layperson does not.

This is because what it means to "see" becomes incoherent at that small of a scale where light itself is discussed of as being composed of discrete particles. Our minds work intuitively with the input of our five senses. Everything we imagine is in the context of these; a picture that can essentially be drawn. You can't "see" things at this level in the same way. Even taking up space is an iffy proposition depending on what we're discussing so geometry of these individual units can hardly be coherently discussed.

This goes back to the fundamentals of epistemology and ideas like confirmation holism. It is theories composed of mathematical models stacked on top of each other, all describing a reality we cannot perceive (at that scale) with our senses, but only indirectly measure... by coming up with, in turn, newer theories about how to test for and measure the presence of these theorized things.

So, we don't really have a coherent "picture" of reality in modern physics. We have an almost coherent model for the most part but who knows how much is left to be uncovered or whether we'll come up with an entirely new and better model some day.

This also means we can't just mix and match components of different theories outside of their respective contexts. Each theory has to be taken in context of all the other theories it is composed of and depends on.

Metaphysics actually functions in much the same way. It's a model of reality, but of a domain of reality where the models of physics do not go.

In this context, atomism as a *metaphysical theory*, during its history became divorced into the physical theory of atoms (and modern physics), and the original metaphysical aspects of those atomist theories. A lot of the original discussions on atomism are therefore quite irrelevant for anyone but the student of history. What we want here is the metaphysics. We don't want the physical theory of atoms from the 12th century because we're centuries beyond that in knowledge and one can simply open up a physics textbook.

The original metaphysical theory of atomism of the Muslim theologians was also a mathematical model in that it originated in geometry. What we want to discuss here is the current or contemporary metaphysical theory of atomism which is basically the old one, with all the stuff now covered by the science of physics removed. So the mathematical considerations are mostly irrelevant for our purposes.

Let's move on to the purpose of atomism, or the purpose of the theologians in their use of this theory or model. In the extended debates with those of other viewpoints, the logical justifications for various philosophical positions naturally extended to a level where debate raged about the nature of physical matter as it related to the metaphysical theories on reality, existence, coming into existence, etc. The *falasifah*, for instance, had complicated theories of matter and forms (hylomorphism) to justify their more commonly understood positions.

What the orthodox theologians needed was a model of reality's creation and existence as it related to being created or annihilated by God which reflected and justified their more easily understood and common positions (such as occasionalism). What they came up with is the Islamic theological/metaphysical theory or model that we call "Islamic Atomism". This theological atomic theory was, without a doubt, the most complex and elaborate of all such metaphysical theories of atomism in the pre-modern time.

Please understand this was a *model* of reality. It was intuitive to a point where everyone truly believed that matter was indeed composed of atoms because it had to be, but they knew their geometric applications didn't necessarily have any bearing on reality until they were able to observe and confirm. This trust proved well founded since, it turns out, atoms are very real and everything is indeed composed of them (or rather, elementary particles).

First, let's understand that "atom" here does NOT refer to the "atom" of physics. The word is *jawhar* or "substance" and the most appropriate correlation in physics is the term "elementary particle" though it is not exactly the same thing (being that physics and Islamic theology are two separate models of two separate domains of reality).

Second, let's consider the term "accident" or '*arad*. A substance or *jawhar* is that which subsists in itself. An accident or '*arad* subsists in the *jawhar*. This corresponds to "property" or what we would refer to as the "state" of something in physics.

The theologians posited that all matter is composed of these discrete particles, of substances and their accidents. The equivalent term for this process in physics is "quantization".

That's half of what essentially constitutes Islamic atomism. Next up is the question of what these "atoms" do.

The theologians posited that Allah is at each and every moment continuously creating and annihilating what we call our universe or reality. Namely, all substances and accidents. Thus in each instant the universe is essentially annihilated and re-created. This formed a solid philosophical/logical foundation for the theological principle of Allah being the primary or efficient cause of everything; the Creator of the cause and the effect.

Hence, rest is also an accident. Just as much as motion. The lack of a property is itself interpreted as a property. God just creates that "atom" in the same state twice for example and to us it appears as if there's been no change.

The entire universe is composed of such *jawhar* and each of these particles is identical, only differing by accident.

Elements (corresponding to the ancient idea of elements) are certain accidents which routinely occur and are inseparable from matter (though this is also attributed to the Customary Way so they act as non-permanent qualities). This idea of elements was similar to the Roman Stoics. Imam al-Maturidi used this concept more often and called them "natures" (*al-taba'i*) which actually do function similarly to our modern idea of elements (which are the actual atoms).

This and no more constitutes the essence of Islamic atomism.

A decent brief description of Islamic atomism is given by Henry Corbin in his *History of Islamic Philosophy*,

Of course, the theory behind this was already familiar to the thinkers of Greece and India; but the Ash'arites developed it in accordance with their own concern to deduce from it consequences which would preserve their conception of God's omnipotence and their idea of creation.

Correspondingly, implicit in the idea of the indivisibility of matter is another consequence, namely that of the recurrence of creation. If matter does not possess in itself the cause of its own differentiations and combinations, then any conglomeration of atoms which defines a certain being must be purely accidental. Because these accidents are in a state of continual change, they require the intervention of a transcendent primary cause to create and sustain them. The conclusion is evident: matter and accident must be created at every instant. The entire universe is maintained from instant to instant by the all-powerful divine Hand. In the Ash'arite conception of things, the universe is continually expanding, and only the divine Hand is able to preserve its unity, its cohesion and its duration, even though our senses and our reason are too feeble to perceive that this is so.

Causality

Now that we've covered the basics of the Islamic creed, let's move to some of its implications. What first comes to mind is of course causality since it would be drastically altered in light of Islamic theology's occasionalism. If God is the efficient cause for all events and creates everything, both the cause and effect, in a logical or rational order, what are the implications?

Time

*“Do not curse Time, for I am Time.”*¹⁸

Since the notion or concept of causality is inseparable from time, let's discuss that first.

The Islamic view of time is best expressed in two main excerpts from its theological canon. The first is the 103rd chapter of the Qur'an entitled *Al-'Asr*, translated as “The Epoch” or “Time”,

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَالْعَصْرِ

- (I swear) by the Time, [M. Taqi Usmani]
- By (the Token of) Time (through the ages), [Yusuf Ali]

إِنَّ الْإِنْسَانَ لَفِي خُسْرٍ

- man is in a state of loss indeed, [M. Taqi Usmani]
- Verily Man is in loss, [Yusuf Ali]

لَّا الَّذِينَ ءَامَنُوا وَعَمِلُوا الصَّالِحَاتِ وَتَوَّصَوْا بِالْحَقِّ وَتَوَّصَوْا بِالصَّبْرِ

- except those who believed and did righteous deeds, and exhorted each other to follow truth, and exhorted each other to observe patience. [M. Taqi Usmani]
- Except such as have Faith, and do righteous deeds, and (join together) in the mutual teaching of Truth, and of Patience and Constancy. [Yusuf Ali]

¹⁸ In a Hadith Qudsi (hadith in which the Prophet (saw) narrates something from Allah)

According to Arabic/Islamic convention, the swearing of oaths is done upon the Creator by the creation,¹⁹ while the Creator is free to swear by the creation. Thus in the Qur'an, Allah swears by the various creation and in *Surah Al-'Asr* He swears by Time itself.

Scholars throughout the ages (*al-'asur*), most notably Imam Shafi'i, have declared that this one chapter summarizes the essence of the Qur'anic message so thoroughly that it contains enough guidance to have sufficed for all mankind should Allah have chosen to reveal only it.

The word used for time here signifies a limited time that is running out. That is to say our time, the time of this world, has an end just as it had a beginning. Consequently, man is in a perpetual state of loss as his time runs out.

Here's a part of the commentary for this chapter from the *Ma'ariful Qur'an*,

The first point we need to analyze here is the relationship between the 'oath of time' and 'its subject' because there needs to be a relationship between an 'oath' and its 'subject' The commentators, generally, state that all conditions of man, his growth and development, his movements, his actions and morality - all take place within the space of 'Time'. Man will lose the capital of his existence. Hours, days, months, and years of life pass quickly, spiritual and material potentialities decline, and abilities fade. Man is like a person who possesses great capital and, without his permission and will, every day, a portion of that capital is taken away. This is the nature of life in this world; the nature of continual loss.

The comparison of the nature of our time in this world to the laws of economics is endorsed by the following prophetic hadith which no doubt made the concept intuitive to a people such as the Arabs who primarily occupied themselves with trade, something which will be familiar for our modern view of life which is heavily influenced by capitalism:

"When a person wakes up in the morning, he invests his soul or life in a business enterprise: some of the investors free or save the capital from loss and others destroy it."²⁰

The commentary points out the Qur'an itself uses the word *tijarah*, or trade, in the verse 61:10,

"...shall I tell you about a trade that saves you from a painful punishment?"

¹⁹As per the Prophet's (saw) hadith: "Allah forbids you to swear by your fathers. If anyone swears, let him swear by Allah or keep silent." [Malik's Muwatta 22.9.14]

²⁰Quoted from *Ma'ariful Qur'an* Vol. 8, p. 870

61:10

The commentary continues,

Since 'Time' is man's capital of life, the man himself is the trader. Under normal circumstances, his capital is not a frozen thing that may be kept for a while and used up later when the need arises. The capital is fluid or flowing all the time, every minute and every second. The man who invests it needs to be very wise, intelligent and agile, so that he is able to swiftly and readily reap the profit from a flowing capital. One of the old scholars said that he had learnt the meaning of this verse from an ice-seller whose trade required utmost diligence, and if he were neglectful for a moment, his entire capital would melt away. That is why this verse has sworn an oath by the 'time' to indicate that it is a melting capital, and the only way to escape loss is to take every moment of his life as valuable, and use it for the four acts mentioned in the Surah.

The second excerpt from the canon is the hadith qudsi (a hadith in which the prophet (saw) narrates from Allah) already quoted, the full version of which follows,

“Allah says, ‘The sons of Adam offend Me and say, Woe to time, but they should not say Woe to time. I am time, I alternate the night and the day, and if I willed, I could seize them both.’”²¹

Imam al-Nawawi commented on the hadith,

They said: this is a metaphor, because the Arabs used to inveigh against time when disasters such as death, old age, loss of money, etc., happened. They would say, ‘Woe to time’ and other phrases cursing or inveighing against time. So the Prophet (peace and blessings of Allaah be upon him) said: ‘Do not inveigh against time for Allaah is time’, i.e., do not inveigh against the One Who brings about those disasters, for that will be directed towards Allaah, for He is the One Who causes them to happen. Time (*al-dahr*) means *al-zamaan* (time) which cannot do anything in and of itself, for it is just one of the things that have been created by Allaah.

The meaning of the phrase “for Allaah is time” means that He is the One Who causes those events and accidents to happen, and He is the Creator of all that happens. And Allaah knows best.²²

Similarly, just as one can curse Time, one can also attribute creation to it (essentially deifying it). The group who does this was mentioned earlier in the history section, the

²¹Sahih Muslim 5827

²²(Sharh Muslim, 15/3) as quoted in Islam-QA.com's fatwa No. 9571

Dahriyyah (from the word *ad-dahr* or 'Time'). This is the same word used for time in this hadith where Allah says He is [responsible for] *Ad-Dahr*.

The Qur'an speaks of them in *Surah al-Jathiyah*,

"And yet they say: "There is nothing beyond our life in this world. We die as we come to life, and nothing but time destroys us." But of this they have no knowledge whatsoever: they do nothing but guess."

45:24

In the commentary of this verse and hadith Ibn Kathir says,

Al-Shaafa'i, Abu 'Ubaydah and others said, in their commentary on the hadeeth of the Prophet (peace and blessings of Allaah be upon him), "Do not inveigh against time for Allaah is time" – During the Jaahiliyyah (pre-Islamic time), if some difficulty, trial or disaster befell them, the Arabs would say 'Woe to time', attributing those events to time and inveighing against it. But the One Who brought those events to pass is Allaah, so it was as if they were inveighing against Allaah, may He be glorified, because in fact He was the One Who caused those things to happen. So it was forbidden to inveigh against time in this manner, because Allaah is Time, i.e., He is the One Who is controlling it, but the Arabs were attributing those events to Time.

From the *tafsir* of Abdul Majid Daryabadi,²³

23. Hast thou seen him who takes for his god⁴⁵² his *own* vain desire, and Allah has sent him astray despite *his* knowledge,⁴⁵³ and has sealed up his hearing and his heart⁴⁵⁴ and has set a covering on his sight? Who will guide him after Allah?⁴⁵⁵ Will you not then be admonished?

⁴⁵² *i.e.*, who follows the dictates of his own lust and lower self.

⁴⁵³ (so that he has knowingly and deliberately chosen the path of error).

⁴⁵⁴ (in consequence of his own contumacy).

⁴⁵⁵ *i.e.*, after God has withdrawn His grace and left him to wander perplexedly.

24. And they⁴⁵⁶ say: naught is there but the life of this world,⁴⁵⁷ we die

²³Maulana Abdul Majid Daryabadi's (1892-1977) *tafsir* is notable for his insight into philosophy due to the study of which he in fact briefly turned towards communism and atheism during his time at Aligarh Muslim University and from which he later repented. On the advice of a friend, another Islamic scholar, he read the *Mathnawi* of Rumi and re-read the Qur'an as just a story or novel without any preconceptions. The truth of Islam dawned upon him again and he returned to the *deen*.

and we live;⁴⁵⁸ and none kills us save Time.⁴⁵⁹ And they *have* no *true* knowledge of it,⁴⁶⁰ they only conjecture.

⁴⁵⁶ *i.e.*, the deniers of Resurrection, disbelievers in Final Judgment and consequently man's accountability to the Almighty for his deeds and misdeeds.

⁴⁵⁷ *i.e.*, no other life. 'The South Arabians believed as little in a life after death as in spiritual blessings.' (Hell, *The Arab Civilization*, p.7)

⁴⁵⁸ (of ourselves; with no reference to a Creator). The Arab pagan, carefree, materialistic, and indifferent to spiritual impulses, had little if any religion at all. To him, it was the immediate present which was full of meaning and of real consequence. He cared little for the past and showed even less interest in the future. Undisturbed by any serious thought or care for the morrow, his life was one emotional orgy, like most of the modern Europeans. 'The hedonistic Arabian character was too much absorbed in the immediate issues of life to devote much thought to the hereafter. In the words of an old bard;

We spin about and whirl our way through life.
Then, rich and poor alike, at last seek rest
Below the ground in hollow pits slate-covered;
And there we do abide.' (Hitti, *op. cit.*, p.102)

⁴⁵⁹ Or 'Fortune.' *dahr* is literally, 'Time from the beginning of the world to its [relative] end... [time without end; it differs from *zaman* in having no end] Hence because, in one sense, time brings to pass events, good and evil, *ad-dahr* was applied by the Arabs to Fortune, or fate; and they used to blame or revile it.' (LL²⁴) 'Time' as an abstract deity was personified by the Arabs, and formed perhaps a regular part of their pantheon. 'Time in the abstract was popularly imagined to be the cause of all earthly happiness and especially of all earthly misery... The poets are continually alluding to the action of Time, for which they often substitute 'the days,' or 'the nights.' Time is represented as bringing misfortune, causing perpetual change, as biting, wearing down, shooting arrows that never miss the mark, hurling stones, and so forth. In such cases we are often obliged to render 'time' by 'fate' which is not quite correct, since time is here conceived as the determining factor, not as being itself determined by some other power, least of all by a conscious agent.' (ERE.²⁵ I. pp. 661, 662). 'The people of Central Arabia, to judge from the poetical and other remains, were indifferent to religious ideas. The utmost they could attain to was a vague deism or belief in Fate.' (EI.²⁶ I. p.999)

²⁴Lane's Arabic-English Lexicon

²⁵Hastings' *Encyclopedia of Religion and Ethics*, 13 Vols. (Clark, London).

²⁶Houtsma and Wensink's *Encyclopedia of Islam*, 5 Vols. (Luzac, London)

⁴⁶⁰ *i.e.*, no real true, knowledge; no proof, either in reason or of fact, to support them;...

Miracles

The first thing that might come to mind is the idea of miracles. If everything is simply the Will of God, then what exactly is a miracle? What separates a miracle from any other event?

The answer is, technically, nothing. The creation of a miracle is no different to God or difficult for Him and His Power than the creation of anything we would call normal. The distinction lies with us and our perception, not with God. God then creates in accordance with our nature since His creating occurs according to what can be described as a rational or logical plan and we are a part of the creation with our own proper place in it. It's just that we might not necessarily be able to always identify the wisdom behind the creation.

The literal definition of a miracle according to Islamic theology, then, would be any creation of Allah whose manner of creation is a departure from Allah's Customary Way of creating. And what we generally mean by the Customary Way is the observed laws of nature and reality.

It was the hubbub raised by the *falasifah* over miracles that prompted al-Ghazali to take up the challenge in his work, the *Incoherence*. The entire point to expounding upon Islamic theological doctrine in a philosophical format which started the modern skepticism of causality was originally to logically account for miracles and God's omnipotence. The *falasifah* held that the laws of nature were inviolable, even by God, so they denied all miracles including miraculous descriptions in the texts of events that had come to pass or had yet to pass. This naturally limits the power of God and brings His omnipotence into question. Al-Ghazali's explanation restored the Attributes of Allah to their proper place, including the view of Him as an active, creating, willful, powerful deity in contrast to the passive emanationist Neoplatonist view of the *falasifah*.

So how do we describe the idea of miracles in terms of the laws of nature? Are miracles violations of the laws of nature as they are traditionally described?

A great article on this subject has been written by Adam Deen and Hamza Tzortzis. It is available here:

[An Introduction to the Philosophy of Miracles](#)²⁷

²⁷Backup URL: <http://islamtheologyscience.files.wordpress.com/2011/06/intromiracles.pdf>

Please read the document before continuing. It's quite short. The conclusion is that the most appropriate definition of miracle is not as a violation of natural law but as,

“An event which lies outside the productive capacity of nature.”

This is an appropriate definition of miracle in terms of its relation to natural laws.

The Miracle of the Holy Qur'an

Much has been made of the issue of the Qur'an's miraculous nature. Much misinformation also exists and also misunderstanding, especially by non-Arabic speakers.

The essence of the miracle of the Qur'an is the *ijaz al-qur'an* which refers to the specific inimitability of the Qur'an's linguistic style and structure.

Some include with it the preservation and transmission of the Qur'an as well. While there is assurance in the Qur'an that God will protect this last revelation from corruption until the very end, the places where and when God enacts miracles to protect the Qur'an would be hard to discern. Especially since so much of its history has been rigorously documented and seems like an extension of the Customary Way.

Returning to the Qur'an's linguistic style/structure, it can be simply stated like this: All Arabic speech produced by mankind fits into categories. These are three main ones. Rhymed Prose, Normal Speech, and Poetry (the latter being divided into 16 specific metrical patterns). All human speech in Arabic, any composition greater than a few lines, fits into those categories. The Qur'an is the only work in Arabic that does not. The challenge has been laid down in the Qur'an to try and attempt something similar. It should be a few lines to match the length of one of the shortest chapters and it should be coherent or intelligible, not gibberish. The challenge has been attempted but has never been met.

You can read a short rundown here:

<http://www.islamic-awareness.org/Quran/Miracle/ijaz.html>

A more in-depth elaboration can be found on theinimitablequran.com, written by Hamza Tzortzis.

Read the following links for information on the Qur'an's unique literary form,

<http://www.theinimitablequran.com/uniquelitform.pdf> ²⁸ (This is most of it, you only need

²⁸Backup URL: <http://islamtheologyscience.files.wordpress.com/2011/06/uniquelitform.pdf>

to read this before continuing here)

Supporting articles,

<http://www.theinimitablequran.com/uniquegenre.pdf>

<http://www.theinimitablequran.com/eloquencechapteralkawthar.pdf>

<http://www.theinimitablequran.com/rhetoricalfeatures.pdf>

<http://www.theinimitablequran.com/arrangement.pdf>

<http://www.theinimitablequran.com/aestheticreception.pdf>

<http://www.theinimitablequran.com/accuracyadequacy.pdf>

Regarding why the above constitutes a miracle (must be read after the previous linked article on miracles),

<http://www.theinimitablequran.com/whymiracle.pdf>

And a bit on the history of attempts to meet the challenge:

<http://www.theinimitablequran.com/ABriefHistoryOfTheQuranicChallenge.html>

<http://www.theinimitablequran.com/MusaylamahsAttemptToImitateTheQuran.html>

This is the objective criteria by which the Qur'an can be judged. On top of that are all the subjectively discerned features (or those where objectivity and subjectivity are harder to separate thus it's acknowledged that opponents to the doctrine will not accept them).

I'll cover some of those here now.

Some Additional Features of the Qur'an's Arabic

One of the major points is the Qur'an's perfect word choice or usage. There are 24 common words used for death identified by the Andalusian scholar, [Ibn Sidah](#) ([also here](#)) among all the works of the Arabs.

"Most of these words reflected the ancient faith of the Arabs that due to death the components of a man were destroyed forever, with no possibility of resurrection. This was because they did not believe in resurrection, hereafter, or reckoning." If the Qur'an had remained content with these words of ancient

etymology, "an erroneous impression of its conformity with these beliefs about death might have been created. hence wherever the Qur'an describes the reality of death, it uses a new word [...] thus, it has given to the Arabic language such a [...] short, concise, and eloquent word that clearly depicts... [the new belief about] death. The word is 'Tawaffi', the literal meaning of which is 'to receive something wholly.' The word also clarifies that death does not mean eternal extinction but it is the returning of the soul to Allah." "This word was never used for death before it occurred in the Qur'an. And thus it is that while using other words for 'death' [...] Ibn Sidah has quoted examples from couplets of Arab poets but for 'Tawaffi' he has quoted only the Qur'an."²⁹

Another example is that some words are considered vulgar in Arabic. The words used for 'baked bricks' (for the construction of building) are an example. All of them are considered vulgar (Ajurrun, Qarmadun, and Toob). In the Qur'an, the use of this word is required in the story of Pharaoh who ordered a minister of his to bake bricks for the construction of a palace. The usage of one of these words would seem unavoidable. The Qur'an instead leaves out the word altogether without missing a step in conveying the meaning:

Whereupon Pharaoh said: "O you nobles! I did not know that you could have any deity other than myself Well, then, O Haman, kindle me a fire for clay, and then build me a lofty tower, that haply I may have a look at the god of Moses although, behold, I am convinced that he is of those who tell lies!"

28:38 - M. Asad translation (Brackets removed)

The translator added explanatory brackets for the literal translation because the choice of Arabic does convey the meaning of baked bricks:

Whereupon Pharaoh said: "O you nobles! I did not know that you could have any deity other than myself Well, then, O Haman, kindle me a fire for [baking bricks of] clay, and then build me a lofty tower, that haply I may have a look at the god of Moses although, behold, I am convinced that he is of those who [always] tell lies!"

28:38 - M. Asad translation

This seems like nothing to an English speaker but any ear well versed in classical Arabic would pick this out immediately and sense what was just done. This conveys the impression of an extremely noble and high sense of speech, something no poet did. After all, no poet goes to that extent, and Muhammad (saw) himself was not a poet and spoke humbly apart from this narration. The first target demographic of the Qur'an, the 7th century Arabs who happened to be brilliant linguists and poets, were duly impressed

²⁹Mufti Muhammad Taqi Usmani - *Uloomul Qur'an*

by such nuances (on top of everything else).

Another example, some common plural forms of words that are fine in the singular are treated as derogatory or vulgar in the plural. The Arabs can't get around their use. The Qur'an does it without breaking a sweat, you can't even tell what's happening. One such word is 'earth'. In the singular it is great, in the plural it's regarded as inelegant. On top of sticking to the impossible style, the speech of the Qur'an takes every possible luxury in word choice. Instead of using the plural form, the following is done:

Allah is He who created seven heavens, and of the earth their like...

(65:12)

And this is done all over.

Another example is the usage of certain 'harsh' words in 'soft' contexts. Only the most skilled of poets did this. The Qur'an did it routinely (the word for division in 53:22 is one example, where the word is used in a way that sounds rhythmical and smooth).

Other nuances in syntax include what can only be described as one upping the proverbs of the day with completely new ones. One example: An eye for an eye to deal with murderers was popular in that day (and also a part of Islamic law with regards to murder). It was considered virtuous and the culmination of justice. They had catchphrase-like proverbs for it, one such being 'killing is collective life' (because it protected society from murderers)... "القتل احياء لجميع" (this style of Arabic is no longer used so Google Translate will have trouble trying to read it for you, I checked, it also translates it weirdly. Anyway, the Qur'an instead used this: 'In the Law of Equality (Retribution) there is Life for you'... "وَلَكُمْ فِي الْقِصَاصِ حَيَاةٌ" (2:179). Needless to say, the Qur'an's new one sounds much better, even to someone who doesn't know Arabic (Google Translate will recite that just fine or you can listen to a recital of that verse). It makes the old proverb sound like the Arabic equivalent of broken English.

As for an explanation of the Qur'an's poetic sound (namely, how it can achieve it despite not fitting into any type of Arabic poetry), think of it this way. Each language has its own rules of poetry. This book I was using to quote from earlier (translated from Urdu) compares Arabic poetry to Persian, Hindi, and even English. It says about English,

"In this context the trend of English poetry is perhaps more liberal than all the others. In it a line may have variable proportions in its metric length and there may be no considerations of rhyming, but a specific rhythm is produced by the syllabic pronunciation of words, and it is this rhythm that imparts pleasure to the people of that language."³⁰

³⁰*Ibid.*

This author, Mufti Taqi Usmani, says that the aim of all poetry's rules and regulations is to achieve a "balanced sonic rhythm" (again, it's a translation from Urdu so I have no idea what this is called natively in English if anything) or that nice sound we all like. The Qur'an basically hits that balanced sonic rhythm of Arabic poetry without using any of the rules or regulations. That's why when you listen to it, it sounds like poetry or even entrancing like singing, except it's not poetry or song when you look at the words.

When you read it in English, it sounds like typical Biblical-style regal speech. When people focus on the meaning of the Qur'an they're concerned with what each word means (because the flexibility of the Arabic language which allows for this style is also what makes translating it into other languages difficult), not why that word was used instead of others.

No one has been able to duplicate even the bare minimum of simply mimicking the style. To say nothing of all the subjective and aesthetic intricacies of the book.

Some final points,

- The first converts to Islam were mostly from the poor. Islam has often had that reputation, despite its later opulent and sometimes decadent history, of being a religion of the poor masses. To this day you'll find the poor who have no clue about any of the finer points of its language are most enamored of the Qur'an and its message. On top of that the Qur'an held the marvel of the world's leading orators, poets, scientists, etc who natively spoke Arabic for over a thousand years and still has that effect. People today (including actual scientists and engineers albeit their Qur'anic scholarship credentials are in question) are trying to stick wormholes, the speed of light, the multiverse, and all sorts of things into its meaning. It's appealed across the board to people of all types.
- The Qur'an actually sounds like it's taking a "scientific" tone at times, and that may be why past generations of Muslim scientists looked to it for inspiration and why some newer generations of Muslims are trying to do the same (without the benefit of Qur'anic scholarship so they stretch the meanings). There are informal styles of rhetoric (different from what I mention above). Namely, Oratorical, Literary, and Scientific. The Qur'an hits them all.
- Repetition can be a flaw, even an annoyance, in any language of any speech, of any speaker. It's the opposite for the Qur'an. One of my favorite chapters (*surah*) of the Qur'an from a young age was *Surah Ar-Rahman* precisely because of its repetition and it is one of the most recited *surahs*, especially of those used often in public recitations (*tilawat*).
- It treated cumbersome (and quite frankly, boring) academic subjects like inheritance law with the same style as the above. Try making a legal document, declaration or constitution in the form of a poem (or a chant of sorts) about inheritance law that people would listen to just because the sound of it pleased

them.

- One of the most obvious differences between the Qur'an and any other work of poetry is that most poets stick to specific themes. The Qur'an is all over the place covering many different facets of the human experience.
- Brevity. The verses pack a ton of meaning and "punch" even standalone, plus they were revealed piecemeal over 23 years. Each verse (or each few verses) has its own full historical context and implications. Yet they all connect seamlessly to make that sweet sounding recital and form even more layers of meaning (which is the last point, the layers of meaning from the most literal to the most mystic/esoteric).

Some Common Questions and Objections

Question: You say that the challenge has not been met. But assuming that just because the challenge hasn't been met yet, that it won't at some point in the future is an inductive generalization, no?

Answer: The actual *Ijaz al-Qur'an* is not the result(s) of the challenge. The challenge merely serves to force people to actually look at the Qur'an in this sense seriously. The typical specious objection would be to avoid the book altogether while making declarations about it without having learned a thing about it. The challenge serves to throw down the logical gauntlet of refuting the doctrine (falsification, as mentioned earlier) and to force those obstinate opponents who would refuse to just look at the Arabic into actually making a serious attempt at understanding the literary form of the Qur'an. So, in short, the challenge is not the miracle, nor are the results of the challenge the miracle. These serve to bring people to the miracle, essentially. The miracle is contained within the words of the Qur'an itself.

Question: How does inimitability mean divine origin?

Answer: A miracle is of divine origin. The inimitability of the Qur'an is not the miracle. The Qur'an itself is the miracle. The inimitability is a sign of it, a way to test the miracle which in this case is a use of human language in a manner that humans cannot achieve (which seems paradoxical and implies impossibility). The miracle itself is of direct perceivable divine origin (or we can perceive that it was outside the productive capacity of any natural law or system, and humans are a part of nature). The sign of a miracle on the other hand does not itself have to be of divine origin because that becomes a case of circular logic where you define sign and miracle as the same thing and it becomes a sign of the sign of the sign, etc. One sign of a miracle must be that it cannot be duplicated within the natural system of laws (which includes the normal productive capacity of mankind), otherwise it's no longer a miracle. This is what the inimitability is referencing.

Anyway, the best way to falsify such a thing (a feature of human language) would be

for humans to reproduce it. The inimitability refers to the inability of any person to make something like it.

The inimitability is a reference to its falsifiable-in-principle yet unfalsifiable-in-reality (irrefutable) nature. Everything we know of how the universe works indicates that humans should be able to use human language in the way any other human has, assuming all the necessary time and resources are in order and there's complete transparency and availability of all necessary knowledge of the language. It is almost by definition falsifiable. Yet anyone who learns Arabic will read the Qur'an and realize what has been done is impossible. In other words, the inimitability is a sort of "proof" or objectively discerned sign of the miracle, rather than the miracle itself, which is of course the language of the Qur'an.

I hesitate to use the words "scientific proof" even though the idea behind the doctrine of the challenge is pure philosophy of science. I hesitate because science doesn't deal with miracles and many of its most central theories have at one time or another been falsified or been in need of rectification in light of falsifying empirical results, so someone familiar with the contemporary Western scientific tradition will be utterly baffled because "science" means something different now. But it does serve as a sort of evidence in line with the other examples of evidence in the Qur'an that were used, for example, in legal theory and also applied to scientific theory (such as when the Qur'an was compiled). It's one of the "granddaddies" of modern scientific theory³¹, which is something we associate with a certain group of people in a certain time period, so it is outside of that narrow scope but it does function in a similar manner (as evidence, hence "evidentiary" miracle). What sets it apart from what science traditionally studies is that science rarely (if ever, according to the philosophically literate) has irrefutable evidence for anything.

That this is a sign of non-human origin is intuitive to those who are genuinely interested in learning about Islam and are not merely opposing it for some agenda, regardless of whether someone makes a proper logical statement out of it or not. It's for this reason that objections on this point hardly concern us. Any truly interested parties will find out the truth on their own and nothing can get in their way.

Question: But it's only avoided refutation thus far. We cannot say what will happen in the future?

Answer: This is how you would think if you did not know Arabic. Then it just becomes like another scientific experiment, albeit one with a huge data set, and the idea of irrefutability seems strange. However, the miracle is there, regardless of how we measure it or gauge it. Anyone can learn Arabic, read the Qur'an, and directly experience its unique form and style and realize the impossibility of it. If you haven't

³¹In that these ideas from the Qur'an were reflected in Islamic scientific theory which eventually influenced Western development.

investigated the phenomenon yourself, I would certainly expect you to not believe in the irrefutable nature of the evidence.

Question: [Any claim that a statement is meaningless]

Answer: Some of the obstinate add up the above questions then refuse to look at the Arabic of the Qur'an so they're saved from having to ever acknowledge anything they might not want to. They use these as "premises" by which to conclude that a certain statement is meaningless. They are engaging in justificationism, hoping to attack an empirical claim as if it were a logical one. The argument boils down to "it's not possible to have such a thing, therefore it doesn't exist, even if it's in front of my face"³², but stringing together any amount of specious or sophist arguments will not cause the evidence to disappear.

Question: If it's of non-human origin, who says it has to be God?

Answer: The Qur'an, for one. If you have a communication which you cannot explain, then it might be prudent to listen to its contents. Secondly, the magnitude of what the Qur'an achieves would be outside the ability of anyone. It's *impossible*. It should just never happen. Other posited things such as Demons, Angels, Spirits, Aliens, etc do not, intuitively, seem as if they'd have any impact on human language other than perhaps through indirect and illusory means (such as bewitchment, like what the Arabs claimed with regards to the moon). Once again, actually reading the book in question would go much further towards understanding and clearing up doubt.

Scientific Miracles of the Holy Qur'an

These days perhaps the most misunderstood aspect of what Muslims deem the miraculous nature of the Qur'an is that these are "scientific miracles", where the Qur'an talks about science not discovered by man until many centuries later.

Let's understand what we mean by "scientific miracle". What a scientist or philosopher of science would value most would be the predictability of a scientific theory. A "scientific miracle" in this sense would therefore be a miracle in the same vein. It would be like a scientific theory with incredible predictive power that exceeds the known capacity of the human population at the time. It cannot be a post hoc rationalization. It has to directly lead to new scientific knowledge. While such a thing would be a miracle of sorts, it's obviously still not quite on the level of the actual *ijaz al-Qur'an* involving the Qur'an's linguistic structure and form, which is a more ideal example because it's an impossibility staring you in the face.

³²Pointing out that the Qur'an does exist and that they can read it right now usually gets no response.

Most orthodox scholars are ambivalent about these claims of scientific miracles for a multitude of reasons.

Firstly, the Qur'an is a book of guidance for mankind. It tells people how to behave, how to view the world, and how to approach the world (including other people in it). Laying down scientific knowledge as if it were an encyclopedia would run counter to that nature.

Most of Prophet Muhammad's (saw) message wasn't new at all, and that's the entire idea of the Messenger in Islam. The Qur'an repeatedly orders the Prophet to say that he comes to affirm that which was already revealed to the people. A prophet sent by God is a miraculous intervention to correct a deviation in knowledge that cannot be fixed otherwise.

Secondly, the Qur'an tends to concern itself with knowledge that man cannot come upon by himself in the world. This knowledge, besides the various theological points, concerns a person's relations with other human beings and himself. Typical scientific research can tell us a great deal about physics, mathematics, chemistry, and so on, but what can it tell us about psychology, sociology, ethics, morals, etc? People will argue that we have the behavioral sciences but these are not definitive sources of principles, these are subjects of research and academic study. Through these we seek to understand how we already function, they cannot tell us *how* to function. If we had to wait for science to tell us anything about morality, human society would never have survived long enough to start science. Scientific knowledge (about the environment) can be gained by man quite easily. Knowledge about morality, ethics, human laws, isn't quite like that. We're still operating on the same ideas without making much headway for the last several thousand years. Thomas Kuhn mentions this when discussing paradigm shifts. He applies his philosophy only to science, because "in Kuhn's view, the existence of a single reigning paradigm is characteristic of the sciences, while philosophy and much of social science were characterized by a 'tradition of claims, counterclaims, and debates over fundamentals.'"³³ For example, the United States' principles of democracy, republic, etc are old hat and don't work everywhere but still nobody in the West has been able to figure out anything besides that. Furthermore, it may not even be possible to figure out morality on our own. I'll discuss this point in detail later on.

Can science tell us how to do science? Say what you will but science was born out of philosophy, not some psychological science (which wouldn't make sense as it would require science to exist before it began in order to create itself). What the Qur'an concerns itself with, in relation to science, is telling mankind to pursue knowledge of the world and some basic guidelines for how to do so (as has been covered already). Starting a scientific tradition is a part of what constitutes our view of the world and how we interact with it.

The Qur'an is a book of law, but not of the laws of physics. What would be the point

³³http://en.wikipedia.org/wiki/Paradigm_shift - Retrieved 06/11/11

in that? Do we need a revelation in order to obey gravity? We have no choice in that matter. We are under deterministic slavery to the will of God as manifested in the laws of mathematics, physics, chemistry, biology, even some psychology. It's only when we start getting into the more nuanced matters of the behavioral sciences that we truly start distinguishing ourselves from the rest of creation which obey the laws of nature without protest and it is in these matters where we are completely clueless, each advocating for their own opinion over the other, neither being fundamentally superior to another in any way. There can be no objectivity in the study of man without external intervention and that's what the Qur'an is for.

Thirdly, scientific knowledge is one of our human endeavours. It refers to our knowledge as humans which is fallible, error prone, and constantly being updated. If a book which was meant to remain unchanged and applicable for the rest of humanity's time had to be interpreted in light of something that was constantly changing and evolving, then the interpretation would vary drastically until after a while it no longer resembled the original doctrine.

Fourthly, the Qur'an is a book geared for all humanity. Many of the first converts to Islam were from the poor people of society. The poor have an elevated spiritual place in Islam and the religion, in its political context, has been traditionally seen as a sort of populist movement. Stuffing the Qur'an with things about science would've been targeting a tiny portion of mankind while being completely irrelevant for everyone else. This would not fit with the nature of the Qur'an. This is exacerbated when you consider that these things would be targeted for a tiny portion of people living centuries in the future (a strange concept, but one you'd expect from people attempting objections at past events)

Which brings us to my fifth and final point here. What was the purpose or nature of prophetic miracles? People reject new knowledge without evidence. The evidence for a claimant to prophethood is a miracle, and Muhammad (saw) came with several. Those miracles are evidence for the existence of God and the legitimacy of the Messenger. But how do you give people evidence for a claim if they cannot understand that evidence? Was Muhammad (saw) supposed to start teaching all of them math and physics instead of morality and ethics? Even if all the people of Arabia were miraculously transported to the moon and back, they would have no idea what they just saw. It wouldn't look any different from what a geocentrist would have expected ("look! everything orbits the Earth!"). When teaching people, one has to be sensitive to their temperaments and Muhammad (saw) literally said these exact words. Instead of giving them a miracle which cut to their core of understanding (being composed of their language), they would be asked to believe a concept which they could in no way verify. Let's take an example, what if the Qur'an overtly endorsed heliocentrism? Instead of serving the purpose of a miracle, it'd only drive people away. It would seem like an almost incoherent concept, and one they'd have no hope of being able to verify for quite some time. Was Muhammad (saw) to somehow leave his book and retire immediately so the message lay dormant for centuries until humanity could one day verify these scientific miracles?

Such an objection is nonsensical.

In short, the issue with looking for science in the Qur'an is that, whether "true" or not, these are post hoc arguments when they are used as arguments at all. So it's not that I would say looking for science in the Qur'an or finding it in the Qur'an is bad or that it should not be done, but it isn't a *scientific miracle*. It may qualify as miraculous by your own personal view (and a few verses do that for me), but if it doesn't have proven historical predictive effects (one of the biggest tests of scientific theories), then it's not deemed objective. So when people find such awesome things in the Qur'an, that's great. But running to people and telling them that's *the* objective miracle of the Qur'an is not correct.

All such interpretations, whether clear or ambiguous, seen as supporting modern scientific findings must therefore be classified as esoteric meanings or interpretations. I find plenty verses of that nature myself, but it does not constitute the sort of official evidence we could use in theology.

In the 20th century, there's been a growing movement of reinterpreting theology (those principles of theology derived directly from the Qur'an and hadith, such as those concerning the signs of the Day of Judgment) to suit modern scientific findings. Like the *falsifah* of old, they rewrite theology to fit it to the science of their time. This only leaves them vulnerable when the times change and the science along with it (and already cosmology has changed quite a bit so some of their earlier arguments are already outdated). We see plenty of such things coming out of Turkey and while they make for interesting reading, they cannot be used as sources of theological doctrine.

I will cover one such interpretation, one of the most overt, sound, and traditionally accepted, in one of the appendices to this document.

And with regards to the issue of the Qur'an being contradicted by modern science, no such argument or example is tenable. Every supernatural thing in it is beyond falsification, speaking of events long ago in the past about which no definitive scientific evidence can be sought, or events taking place outside this universe, or events which have yet to take place (eschatology). The more petty arguments, such as the Qur'an allegedly arguing for geocentrism and other such claims can easily be refuted with even just a cursory textual analysis.

Laws

What is a law? The most general definitions include,³⁴

³⁴Dictionary.com

- any rule or injunction that must be obeyed;
- a rule or manner of behavior that is instinctive or spontaneous;
- a statement of a relation or sequence of phenomena invariable under the same conditions;
- a principle based on the predictable consequences of an act, condition, etc.;
- a rule, principle, or convention regarded as governing the structure or the relationship of an element in the structure of something, as of a language or work of art;
- A well-established, observed physical characteristic or behavior of nature.³⁵

The etymology of the word “law” in English is interesting. It comes from the Old Norse, *lagu*,

Lagu is related to the Old Norse verb **leggja**, i.e. ‘set down, establish, determine’, and just as the German **Gesetz** (‘that which is established’, same relation to the verb **setzen** ‘to put/lay’ as **lög-lagu/leggja**) and underlines the act of legal decision as a conscious act of creation.³⁶

So, generally speaking, a law is a standard of behavior or a rule governing behavior.

We can ask, the behavior of *what*, exactly?

Different types of laws describe the behavior of different things. Human law, for instance, governs our behavior. While we govern ourselves with our own laws, we’re also under the governance of the law of gravity. We’re grounded and don’t simply fly away. This law, like all the other physical or natural laws, can also be said to describe a behavior. It’s most readily apparent when we speak of the behavior of heavenly bodies; of planets in orbit around stars.

Now, what do we mean by behavior?

Behavior refers to the actions of a system or organism, usually in relation to its environment, which includes the other systems or organisms around as well as the physical environment. It is the response of the system or organism to various stimuli or inputs, whether internal or external, conscious or subconscious, overt or covert, and voluntary or involuntary.³⁷

The concept of law is a human one and we came up with it to describe our own

³⁵Wiktionary.org

³⁶Miglio, Viola - *Old Norse and Old English Language Contact: Scandinavian Legal Terminology in Anglo-Saxon Laws*, Icelandic E-Journal of Nordic and Mediterranean Studies, University of Akureyri

³⁷<http://en.wikipedia.org/wiki/Behavior> - Retrieved 06/06/11

behavior. Going back to the etymology of the Scandinavian/English word for law, it alludes to rules we create and set down to govern ourselves (our behavior comprised of other actions we seemingly create).

What we can distinguish here is that the original behavior we observed, our own, was under our conscious will or willpower. Issues have been raised about how exactly mind-body causation works. We can naturally extend that to the behavior of everything else. If the only insight into behavior we have, our own behavior, indicates a relation to a conscious will (in our case, our mind), then who or what is causing the behavior of everything else? This goes back to the uniformity of nature and how all worldviews, whether theological or philosophical, can be categorized by how they address that principle. This becomes one of the most fundamental acts of reasoning of a human being; knowing the Self and knowing the Other. The Sufis investigate the relation between the two forms of knowing in order to get closer to the Other, whom we call God.

If anything is the essence of the human idea of God, this is it. There is our will and our mind and then there is "the Other" who creates reality as effortlessly as we seem to create thoughts. Whether the pantheists of ancient India, the occasionalists of Islam and later Europe, or even the skeptical atheists exemplified by the philosopher David Hume, all acknowledge this thinking or relation and its innateness.

Further investigation leads us to realize that even we are under this Other's deterministic power. It's through this line of reasoning that humans, now as much as ever, gain insight into the nature of existence by turning our very existence into an act of experience which gives us knowledge. Perhaps some of the purest conceptions of knowledge at that since they come from the very nature of our consciousness.

It is in this light that Islamic monotheism's specific brand of occasionalism makes most sense. We can intuitively grasp that the relation between the Self and the Other (which is responsible for the uniformity of nature) is best described not by the power of our own ideas, for we can identify no real such power. Nor can it be described as completely analogous to the working of our own mind, because that is too fundamentally flawed to account for the existence of everything in so orderly a manner. The active Creator, distinct from creation, who acts as the embodiment of perfect power, will, knowledge, is the most perfect, simplest, and even poetic solution. Now let's discuss some of the implications this worldview has for our understanding of the world.

Physical Laws

"To say that a stone falls to earth because it is obeying a law makes it a man and even a citizen."

-C. S. Lewis

We can use our understanding of the physical laws, or laws of nature, to make understanding the worldview of Islamic theology easier or more intuitive for someone coming from a naturalist perspective.

The occasionalist conception of God is very, very far from the stereotype popularized in the West of an imaginary human-like being floating in the sky. Or even the Deist view. It's far more similar to the view of the Stoics, the Buddhists, and other pantheists and panentheists in that God is directly attributed with responsibility for deterministic power which underlies nature. Allah, for Muslims, is the Necessarily Existent (*wajib-e-wujud*) being who makes existence possible by virtue of His own existence, then makes existence possible for other things by virtue of His Power as the Creator.

This deity is utterly awesome in His Power. Allah created the Heavens and its denizens as the first form of other living creation for the sole purpose of worshipping Him. Why should creation worship and glorify the Creator? Why should the Earth orbit the Sun? Why should an electron orbit a nucleus?³⁸ Why should the Sun orbit the center of the galaxy? Why should we circumambulate (*tawaf*) the Kabah in Mecca? It is just what we do and our place. It is the law that creation follows. We're also sentient enough to understand existence is not to be taken lightly and the cause of our existence deserves a personal relationship. Allah wants us to live happy lives for eternity in Heaven, the place for which we are really intended. This brings us to the issues of free will.

The best way for the Creator to be glorified, it turns out, is not by Angels (who have no free will). The Creator makes creation in His own image (as Christians say, anyway). In Islam, Sufis have a saying that mankind is simply supposed to be a mirror that God has created to reflect His own Glory. Meaning, via the mechanisms of physical creation (cause and effect, natural laws, etc), God has created a creature that has free will. He gave it physical tools (in the form of our biology) that can help us functionally approximate the Divine Attributes (the 99 names of Allah... The Merciful, Just, Beneficent, etc)... which we do from within our physical biology. But the biggest thing is Free Will. Allah's Will is an important thing, hence man is given Free Will to reflect Allah's Will (which is accomplished by submitting your will to the Will of Allah³⁹).

So, man has free will and needs to choose to obey Allah. Since now the choice to disobey Allah exists, an antithesis to Heaven also exists... Hell. For those who do not obey.

The whole Adam and Satan in Eden situation is orchestrated by God (for Adam's sake, because you can't just tell humans about things, you have to show them because they learn from experience and the emotion that comes with it). Satan is also a creature of Free Will but Allah already knew about his impending betrayal.

³⁸Note: An electron does not actually "orbit" a nucleus like a planet

³⁹Contrast with pantheists who might say one must submit themselves to the universe.

So now man is in this universe, separated from Allah by a veil. Those who choose to obey Allah without the influence of literally seeing Heaven or Hell (in which case, even Satan would choose Heaven... which he did... that's why he was in Heaven to begin with... he had direct knowledge of Allah, not faith or trust in Allah) pass the test, go on to Heaven. Those who do not (and there must be some, like Satan, because without the possibility of manifesting the bad, good becomes worthless in an imperfect creature because it really cannot be distinguished from the possible bad), go to Hell (to varying degrees of sentences, depending on whether they had faith or not).

The best of the best, who'd never eat from the forbidden tree even if God hadn't told them "in person" not to, are left in Heaven. To simply exist (to love and live with their fellow man and their Creator). Most of the stuff about "faith", "worship", and "glorifying God", is actually described as love in Islamic spirituality. The poetry of Sufis like Rumi is well known across the globe.

This narrative argues against the idea of a test of free will being inane or shallow (as the objections usually go). Free will necessitates it. This also brings up the point that although many find it philosophically impossible to justify free will, we know it must be the case because we only function when we acknowledge it. The idea of God might be the only way to truly justify free will, a concept we know must be justified because its results are known.

Now let's look at the physical laws as they directly relate to these theological doctrines.

If God sent Revelation to lizards, what would be in it? Assuming that lizards had free will with which they could deviate from their natural determined behavior.

If God sent Revelation to orbiting bodies (planets, moons, stars), what would be in it?

Another way of looking at the injunctions in the Qur'an is that humans are the only creation that has free will (well, aside from Djinn⁴⁰). Other creation, animate or inanimate, do not have free will. They all obey the laws of Allah. There's a multifaceted tier of laws acting on each and every body. For some it's only gravity and other basic physical forces. For some bodies, the arrangement of physical matter is such that even more forces come into play (math -> physics -> chemistry -> biology -> psychology). The bodies follow the laws applicable to their makeup (laws of physics, chemistry, biology, psychology, in that order) and are sufficiently complex formations of matter that, given the capacity for rational thought and a soul capable of free will, they can then choose whether or not to follow the next level of laws (behaviors) which allow for a degree of variance and choice. They are created in the manner they are because their biological nature gives them biological/psychological tools with which to functionally understand and reflect God (including will of their own, life, etc). God has given us biological/psychological form in matter in a specific way to manifest free will and use

⁴⁰The race of Spirits to which Iblis, or Satan, belongs.

it to understand Him. So that's why Islam means submission. To use the free will and voluntarily submit it to His Will.

This is reflected in the Sufi conception of the soul (*Ruh*) being made of different levels, the mineral soul (physical matter and the laws which govern it), the vegetative soul (our biology), the animal soul (our base instincts), the personal soul (our minds), and so on.

For example, the moon has no choice but to orbit the Earth. The Earth has no choice but to orbit the Sun. The Earth was not given Free Will to decide what it wanted to do. In fact, this seems preposterous to us because nothing disobeys gravity. That's why certain forms of creation were created sufficiently complex enough that they operated under laws which were more malleable (allowed for variance) and in this context Free Will is established. Free Will cannot really be expressed on the level of the atomic forces, for instance (physics). It's expressed on the psychological-spiritual (sometimes biological/chemical) level.

The law for us is submission to Allah's Will. Allah's Will is detailed in the Qur'an as a set of laws which humanity is to adhere to. It would be like Allah sending Scripture to the planets and telling them all to maintain their orbits. He gives us the natural and intended laws so we live in harmony with the rest of creation. If we disobey, it's akin to the moon deciding it wants to leave its orbit, smashing into the Earth, and setting off a chain reaction of chaos in the solar system. This apparent cause and effect of disobedience is just a sign or a visual manifestation of Allah's pleasure or displeasure. The real choice is in choosing to obey Allah, whether it makes "sense" or not to us (it all makes sense, but sometimes we cannot comprehend it). The moon, if given free will, could say "I submit to Allah's Will" and then Allah changes the law (as a test) and tells the moon to leave Earth's orbit and orbit only the Sun. Would the moon then say "No, I will orbit the Earth because that makes more sense"? No, because then it is disobeying Allah's Will.

And then we can continue with the example and say Allah passes judgment and lifts those who obeyed to a better and eternal existence in Heaven and sentences those who disobeyed to punishment.

In my example, there was hardly any room for reason or one's own intellect, because Allah was directly communicating with the planets. Obviously this is not the case for most humans. And it takes little effort or reason to follow the laws of nature and remain in orbit. We need reason to discern truth from falsehood, to exist in daily life, to find food, shelter, mates, to raise children, all of these, all of our acts, require our Reason so that's why we have it. Planets don't need to use Reason to obey the laws of physics so the example isn't the best.

Please note, this is not any particular Islamic belief on how gravity works or planets function. It was completely a thought experiment where I anthropomorphized some random bodies.

Humans have to live in harmony with all the rest of creation that obeys Allah's Will but we have to do it by choice. What are the laws that govern humans? Physics? Chemistry? Biology? Psychology? Getting warmer. Obviously Allah isn't going to tell us "exist and don't disintegrate". He is concerned with human behavior. Which means how we treat each other, how we view the world, how we interact with the world. Most of it is telling us to establish a personal relationship with the Creator through prayer and worship, because our purpose is to worship and love the Creator (both directly via prayer/worship and through the medium of our love for and treatment of other humans and the rest of creation).

In essence, the purpose of humanity lies in the fact that of all the living creatures, humanity is the only one which has a malleable system of behavioral law. We adopt, reject, and make up our own. No other living thing on Earth, outside of the *djinn*, does this. The new age "atheist-naturalist" (the successor of the ancient "pantheist-naturalists") might say that we are a part of the universe. One famous astrophysicist and television personality (Carl Sagan) even said that we are a way for the universe to "know itself". The overt pantheism aside, this statement directly answers the question "how can you believe in a God when the universe is so large, how could all of that be created for one insignificant species?". That's like asking how could all the countless processes going on in our bodies and brains, a universe unto itself, be created for one not-even-material thing which we call our consciousness, our Self, that which says "I want to do this" and this entire mini-verse of matter obeys. I'll return to this question again.

What this means for Islam's view of science is that any pursuit of knowledge of nature is a potential means of attaining nearness to God.

The very idea of "laws" of nature arose from an ancient view of nature that was theistic. According to the modern scientific narrative on the evolution of the universe from the Big Bang, and the evolution of life, why should there be unchanging, established "laws" at all? This violates the uniformity seen in the rest of nature. The only uniformity was the lack of uniformity as everything was constantly changing over time. Even the expansion of the universe has changed, and some theorize the universe could collapse back on itself, or expand even faster, or its rate of expansion could slow. Why has there been no metric expansion or contraction in time? It gets back to the anthropic principle problem.

Even from a religious point of view, why should we assume God's Customary Way is a set of unchanging behaviors or "laws" when we see that everything within the universe has been changing? Is it simply because it makes the suggestion of a Creator that much more obvious? Would God have been so conspicuous as to leave what can be thought to constitute direct evidence of an external law-establishing force, even a Creator? We cannot say, because we don't have any evidence for either position. But just because the status quo helps the theist position doesn't mean theists should fall into the trap of the atheists. The ultimate goal must be knowledge, not stopping at debate. Imam al-

Ghazali never intended to be a voice of science (the physical or natural sciences), he assumed the collective or communal obligation would always be fulfilled by those best suited to it. He probably never dreamed that the Muslim world would abandon pursuit of knowledge and be satisfied with philosophical debates. These debates have their purpose, but it cannot end there.

Evolution

Perhaps the most controversial application of this view of the world is its implications for the scientific theory of evolution.

Yet, there is nothing really controversial about it, for the orthodox position has been known since before Darwin began writing *On the Origin of Species*.

If evolutionary theory is correct in its practical entirety, that part of it which explains how living organisms change or evolve over time, then there's no controversy in accepting it as just another manifestation of Allah's Customary Way of creating. With one exception. That being the origin of man. The Abrahamic narrative clearly informs us that man was created separate and apart from the rest of the creation in the Heavens where he was imbued with soul and from where he was eventually cast out. The Islamic narrative is more specific, it indicates that the matter from which Adam (as) was created, in a manner depicted in hadith as something resembling modern notions of abiogenesis as was mentioned earlier in the section concerning Ibn al-Nafis' *Theologus Autodidactus*, was from this Earth. That an angel was sent to collect clay/earth from around the planet and from which Adam (as) was eventually created.

The creation of the world or this universe preceded the creation of Adam (as). The Djinn also preceded humanity. It would naturally follow that life on this world predated the creation of Adam, that he was created and set down on Earth at the proper niche, the proper time and place, as such perfection and orderly creation would be in the nature of God. It would not be befitting of the idea of an omnipotent and perfect deity that He would mistakenly set mankind down 65 million years ago only to get wiped out by the dinosaurs. The issue then transcends the theory of evolution, for the very order in the nature of things is attributed to the will of Allah in Islam.

If we view all life on Earth as belonging to a family tree then man's emergence on Earth is God sticking a branch onto that tree.

When we speak of evolution (in the sense of the evolutionary origin and course of life), what exactly do we mean? What is evolution other than a function of time? Nothing, of course. It basically describes the process of change over time. It is almost synonymous with time itself. Evolution in and of itself has no bearing on the concept of God, no more than time at least. The argument is as ancient as religion, those (Dahriyyah) who ascribe

creation to *Ad-Dahr*, or Time, versus those who believe God is [responsible for] *Ad-Dahr* (for He even says in the earlier quoted hadith that He “is *Ad-Dahr*”).

Chapter 76 of the Qur’an is another one named for time and is called *Surah Ad-Dahr*. I did not discuss it in the earlier section on the nature of Time, because it’s not specifically related to Time but rather the circumstance of mankind in the context of Time. It’s therefore also sometimes called *Surah Al-Insan* (Man or Human)

It opens with the following three verses,

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

هَلْ أَتَى عَلَى الْإِنْسَانِ حِينٌ مِّنَ الدَّهْرِ لَمْ يَكُن شَيْئًا مَّذْكُورًا

- 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? [M. Asad]
- There has come upon man a period of time in which he was nothing worth mentioning. [M. Taqi Usmani]

إِنَّا خَلَقْنَا الْإِنْسَانَ مِن نُّطْفَةٍ أَمْشَاجٍ نَّبْتَلِيهِ فَجَعَلْنَاهُ سَمِيعًا بَصِيرًا

- Verily, it is We who have created man out of a drop of sperm intermingled, so that We might try him [in his later life]: and therefore We made him a being endowed with hearing and sight. [M. Asad]
- We have created man from a mixed sperm-drop to put him to a test; then We made him able to hear, able to see. [M. Taqi Usmani]

إِنَّا هَدَيْنَاهُ السَّبِيلَ إِمَّا شَاكِرًا وَإِمَّا كَفُورًا

- Verily, We have shown him the way: [and it rests with him to prove himself] either grateful or ungrateful. [M. Asad]
- We have shown him the way to be either grateful or ungrateful. [M. Taqi Usmani]

Let me get something out of the way because of the inevitable protest from the nitpicking “skeptics”. The word *nutfah* is usually translated as “sperm” or “sperm drop”, though other words also mean specifically sperm and *nutfah* actually literally means just a small drop. In the context of these verses it refers to the first “drop” of a human embryo, the first tiny (*nutfah* implies an extremely tiny almost imperceptible drop) bit of it which is a “mixed” drop, meaning a mix of the sperm from a man and the equivalent from a woman.

The translation of the 18th century English scholar, George Sale, written in 1734:

Verily we have created man of the mingled seed of both sexes, that We might

prove him: And We have made him to hear and to see.

And the 19th century English clergyman and scholar, John Medows Rodwell, an early friend and colleague of Charles Darwin, in 1861:

We have created man from the union of the sexes that we might prove him;
and hearing, seeing, have we made him:

The *Ma'ariful Qur'an*⁴¹ commentary mentions,

The word *amshaj* is the plural of *mashj* or *mashij* which means a 'mixture'. Here obviously it refers to the male and female gametes according to most commentators...

So that should put a rest to any such nonsense. Moving on to the commentary of these verses from the same *Ma'ariful Qur'an*:

...the verse signifies that there has come upon man a period of time in which he was nothing worth mentioning. The word *hinun* with nunation [which is the sign of 'indefiniteness'] signifies 'a long indefinite period of time; The verse mentions that a long period of time came upon man. This indicates that man essentially did exist at that time in one form or another, (but he was not worth mentioning), because time could not have come upon 'man' if he was in a state of pure non-existence [*Al-'adam-ul- mahdl*]. Therefore, most commentators say that the 'period of time' here refers to the period when he was conceived in the mother's womb till his birth, which normally is nine months. This period covers all the stages of his creation, right from his being a sperm-drop up to his having a body and organs, and then his acquiring life and soul. During this time, he is thought existent, neither his gender is known to anyone, nor his name or his shape or size. Therefore, he is unmentionable.

The statement of the verse may also be taken in a wider sense. The inception of human creation takes place with the sperm that is produced by food. This food and its source and substance was existent in one or other form. If the period of that time is calculated, this long indefinite period of time can stretch into thousands of years. In any case, Allah has drawn man's attention in this

⁴¹In case it has not been elaborated elsewhere, the *Ma'ariful Qur'an* is the English translation of the Urdu commentary of Mufti Muhammad Shafi, the former Grand Mufti of Pakistan, overseen by his son, former Chief Justice of the Pakistani Supreme Court's Shariah Appellate Bench, Mufti Muhammad Taqi Usmani. It is a compilation of the major points from the most famous and most early *tafsirs* of the Qur'an including [Tafsir ibn Jarir/Tafsir al-Tabari](#), [Tafsir Ibn Kathir](#), [Tafsir al-Qurtubi](#), [Tafsir al-Kabir](#), Tafsir al-Bahr al-Muhit (Tafsir Abi Hayyan), Ahkam al-Qur'an by al-Jassas (Hanafi school), [Tafsir al-Durr al-Manthur](#), [Tafsir al-Mazhari](#), and [Ruh al-Ma'ani](#). It was written during the mid-20th century after the independence of Pakistan and India.

verse to a particular fact. If he uses his sense, he will discover his own reality. In addition, he will have no choice but to have complete faith and unshaken belief in the Allah, His Omniscience and His Omnipotence. Suppose, a person of seventy years reflects that he was unmentionable in any way about seventy-one years ago, even his grand parents had not imagined his particular existence, though they might have had a general concept of a child, then what caused his creation, what bewildering power drew together particles from different parts of the world to form a perfect human being, making him an intelligent, a hearing and seeing creature? Such a reflection will spontaneously force such a person to confirm the Persian poet who says:

*Neither we were there, nor was there any demand from us.
It is only Your mercy that listened to what we never said.*

Verse [2] describes the inception of human creation... The word *amshaj* is the plural of *mashj* or *mashij* which means a 'mixture'. Here obviously it refers to the male and female gametes according to most commentators, but some commentators say, as cited in *Ruh-ul-Ma'ani*,⁴² that *amshaj* refers to the four fluids of the body [blood, phlegm, choler and melancholy] of which the sperm is composed.⁴³

Man Is Made up of Particles from Different Parts of the World

If we reflect carefully, the cardinal fluids are made up of various kinds of nutriment. If we reflect further on man's food, it contains elements of water and air from distant parts of the globe. Thus, if we were to analyse man's present body, we will discover that it is composed of elements and particles that were scattered in every nook and corner of the world. A marvellous system set by Allah has, in a wonderful way, put them together in human structure. If this sense of *amshaj* 'mixed' is taken into account here, it allays the greatest doubt of the rejecters of Resurrection. Their main objection is that when they are dead, reduced to crumbled bones and dust, how will they be raised to life again? They thought this was impossible.⁴⁴

The interpretation of *amshaj* as 'cardinal humours/fluids' allays their doubt once and for all. At the inception, when man was created, he was composed of particles and elements from all parts of the world. Allah did not find this difficult the first time. Why should He find its recreation difficult the second

⁴²Famous Sunni *tafsir* written in the 13th century.

⁴³A reference to the ancient conception of the elements or "natures", corresponding to modern understanding of different substances, atomic elements, or chemicals. Here it would signify the different types of bodily fluids and cells.

⁴⁴Recall that the *Falāsifah*, their followers of the Peripatetic school, and the Mu'tazilah all denied bodily resurrection because they thought such a thing was impossible.

time. According to this interpretation, the addition of the word '*amshaj*' (mixed) could have a special significance of its own. And Allah knows best!

(to put him to a test.. .76:2). The Arabic verb is derived from *ibtala'* which means 'to put to test'. This phrase puts forward the Wisdom underlying human creation. Allah has created man to put him to a test. This test is defined in forthcoming verses. Allah sent Prophets and celestial Books for the purpose of showing him both ways, one leading to Paradise, and the other to Hell. Man has been given a choice to adopt any one of the two ways.

Now recall that when Adam (as) was created by Allah in Heaven, an event which can be said to constitute a divine intervention in the “natural” course of events on Earth (the Customary Way), Adam was still created from the particles of the Earth. Thus we, like the rest of the life on this world, are indeed “children of the Earth” so to speak and taken to a greater extent we are indeed “stardust”, as most of the elements on Earth were formed in the heart of a massive star somewhere which went supernova long ago (a process called stellar nucleosynthesis).

This is a common view of people these days and for some inexplicable reason such ideas (alongside evolution) are now also often used in arguments against God though the irrelevance of such an idea towards such an argument is obvious. The truth is, not only is such a position a natural extension, even a reinforcement, of traditional religious views of the universe and mankind's place within it (as has been proven from the commentary just quoted which is commenting on a *tafsir* from the 13th century), it's been used in that context even in the modern day. For instance, poetry these days in contemporary Western culture has taken a back seat to music. There was a famous song from the 1960s in America about the music festival, Woodstock,⁴⁵ after which it was named and which helped make the entire stardust idea famous in pop culture. Its lyrics included,

“I came upon a child of God / He was walking along the road / And I asked him, 'Where are you going?' [...] Well maybe it is just the time of year / Or maybe it's the time of man [...] We are stardust / Billion year old carbon / We are golden / Caught in the devil's bargain / And we've got to get ourselves back to the garden”

These days, however, you see the idea being used to further a different concept. That of kinship with the rest of creation in order to answer an existential loneliness. A concept sometimes extended to include the idea that we are one with the universe (harkening back to ancient ideas of naturalist pantheism like that of the Stoics). It's also used to emphasize our relationship with Time, of the incredibly ancient age of the particles of matter which constitute us.

⁴⁵A defining moment and event in American liberal culture. The song was by Joni Mitchell.

And yet, such answers to existential or spiritual issues cannot suffice. The first verse of chapter 76 says it all. We existed billions of years ago but it was in a state not even worth mentioning. The point is what turned us from that state to our present state. The stars, even the universe, have no will of its own. We can see this for ourselves with our very eyes. To paint a theomorphic representation of these things is less coherent than talking about a Creator. We can see for ourselves that these things do not have will and did not choose to create us or do anything of their own accord but were driven by other forces. It gets back to the story of Abraham (as) in the Qur'an who knew that stone statues or idols could not be gods. Everyone views existence through the same lens, that of an underlying will (based on our own experience of existence). Some attribute that will to a Creator, the only coherent way to posit an underlying will. Others deny it is even a will with power to begin with though they continue to theomorphize or anthropomorphize it in spite of saying this and still attribute it to things (matter, time, fundamental forces) we can otherwise see and measure as most definitely not having a will of their own which is incoherent.

Returning to the subject of biological evolution, what I have abstained from here is a critical analysis of evolutionary theory itself on philosophical/scientific grounds. I conclude with a very well written article by Shaykh Nuh Ha Mim Keller which touches on that vary subject:

<http://www.masud.co.uk/ISLAM/nuh/evolve.htm>

It is highly recommended reading before continuing here. I cannot say I endorse all of his philosophical, scientific, or even theological views. Most of the theology though is correct as far as I know. It is, however, indispensable for a discussion on Islam and evolution.

In short, the Qur'an clearly implies that Adam (as) had no father or mother. Therefore, humans could not have been descended from anything else, though humans certainly are related to everything else in that we were created in the form of the living things of this world (specifically mammals) and from the matter of this world. In this sense, not only are apes our "relatives" (it should be noted that evolutionary theory does not say we descended from apes, but from a common ancestor), but so is everything else, including the inanimate matter of the universe.

If anything, the existence of life devoid of free willed souls on this world serves as an example for us by which we can understand the nature of life, including our own, better. How life occupies an ecological web of networks, hierarchies, and orders; how it functions by a more complicated manifestation of behavioral "laws". By observing and understanding life in its "natural" state, we can also better appreciate and understand the Divine Command for mankind contained in revelation. After all, the Qur'an itself references animals in over 200 verses and 6 chapters are named after them.

There is not an animal (that lives) on the earth, nor a being that flies on its wings, but (forms part of) communities like you.

6:38

The Qur'an mentions the web of the spider in chapter 29, *Surah Al-'Ankaboot* (The Spider) as a parable for the web of lies which constitute the views of those who take gods other than Allah,

The parable of those who take protectors other than Allah is that of the spider, who builds (to itself) a house; but truly the flimsiest of houses is the spider's house;- if they but knew.

29:41

It mentions the bee specifically in chapter 16, *Surah An-Nahl* (The Bee),

And [consider how] thy Sustainer has inspired the bee: "Prepare for thyself dwellings in mountains and in trees, and in what [men] may build [for thee by way of hives]; and then eat of all manner of fruit, and follow humbly the paths ordained for thee by thy Sustainer."⁴⁶ [And lo!] there issues from within these [bees] a fluid of many hues, wherein there is health for man. In all this, behold, there is a message indeed for people who think!

16:68-69

The commentary on the bee in the *tafsirs* is enormous. Several pages in the *Ma'ariful Qur'an* are devoted to analyzing its dwellings (the organization of the hive) and social structure.

There's a saying of 'Ali (ra) in which he relates civilized human life to its worldly context,

"The finest dress of the progeny of Adam is saliva from a tiny insect and the finest of his drinks is the excrement of a bee."⁴⁷

It can even be said that evidence of ancient hominids, even if they not be humans with free willed souls like us, serves as that much better of an example for understanding our place in, and relation to, this world. After all, we have gained much better insight into our own theology and epistemology by the most recent developments in anthropology.

This was the sort of view espoused by Ibn Khaldun (who, as was mentioned earlier, was

⁴⁶While writing this, I stumbled upon this: <http://www.physorg.com/news/2010-10-complex-mathematical-problem-bees.html> (c.f. "...the paths ordained for thee by thy Sustainer")

⁴⁷Referring to silk and honey respectively. - *Ma'ariful Qur'an*, Vol. 5, p. 380

a famous Ash'arite and a supporter of al-Ghazali) in his *Muqaddimah* (written in 1377), in which he wrote (from Chapter 1),

This world with all the created things in it has a certain order and solid construction. It shows nexuses between causes and things caused, combinations of some parts of creation with others, and transformations of some existent things into others, in a pattern that is both remarkable and endless.

[...]

One should then look at the world of creation. It started out from the minerals and progressed, in an ingenious, gradual manner, to plants and animals. The last stage of minerals is connected with the first stage of plants, such as herbs and seedless plants. The last stage of plants, such as palms and vines, is connected with the first stage of animals, such as snails and shellfish which have only the power of touch. The word "connection" with regard to these created things means that the last stage of each group is fully prepared to become the first stage of the next group.

The animal world then widens, its species become numerous, and, in a gradual process of creation, it finally leads to man, who is able to think and to reflect. The higher stage of man is reached from the world of the monkeys, in which both sagacity and perception are found, but which has not reached the stage of actual reflection and thinking. At this point we come to the first stage of man after (the world of monkeys). This is as far as our (physical) observation extends.

In chapter 6,

We explained there that the whole of existence in (all) its simple and composite worlds is arranged in a natural order of ascent and descent, so that everything constitutes an uninterrupted continuum. The essences at the end of each particular stage of the worlds are by nature prepared to be transformed into the essence adjacent to them, either above or below them. This is the case with the simple material elements; it is the case with palms and vines, (which constitute) the last stage of plants, in their relation to snails and shellfish, (which constitute) the (lowest) stage of animals. It is also the case with monkeys, creatures combining in themselves cleverness and perception, in their relation to man, the being who has the ability to think and to reflect. The preparedness (for transformation) that exists on either side, at each stage of the worlds, is meant when (we speak about) their connection.

[...]

Plants do not have the same fineness and power that animals have. Therefore, the sages rarely turned to them. Animals are the last and final stage of the three permutations. Minerals turn into plants, and plants into animals, but animals cannot turn into anything finer than themselves

The environmental determinism espoused by Ibn Khaldun has made him well known to Western historians. He analyzed human traits in the context of climate and proposed that black skin was due to the different climate further south, and not some “Hamitic curse”. He further analyzed the effect of man’s environment on non-physical traits and then moved into sociological territory by analyzing these as customs and institutions in societies developed to deal with the particular needs that a particular people’s environment placed on them. Thus, he transitioned seamlessly from biological to social evolution and wrote a lot on the life cycle of civilizations and the functions of government.⁴⁸

But this amnesia is nothing compared to the lost memory of one of the first people to notice and clearly understand the role of *environment*, in this case cultural and physical, on human societal behavior. We have [recently learned](#), again thanks to the BBC, that that person was the 14th century Islamic philosopher and historian, Ibn Khaldun. (This is a program called "In Our Time", and if you don't already know of it, you might give it a try. It is a phenomenal, intelligent program, as an editorial in the [NYTimes](#) has recently said. Podcasts or online listening are available)

Khaldun was the first in western thought to develop a general theory of the processes of societal history. His main point was that there are regularities in social structure that are repeated, predictable, and explicable in terms of social environments. History, he said, should be about its essential processes, not just enumerate its unique, local events.

[...]

The same people (that is, the same genotypes) live entirely different lifestyles in all sorts of ways, depending on their physical and cultural environment. One can argue with any of his specific points, but the general picture Khaldun paints is cogent. It is simply an obvious fact that it is the environment, broadly defined, that affects so much of our behavior. The nature and relative amounts of cooperation vs competition, sharing vs sharp dealing, self-

⁴⁸From Wikipedia’s page: “The British philosopher-anthropologist Ernest Gellner considered Ibn Khaldun’s definition of government, ‘an institution which prevents injustice other than such as it commits itself’, the best in the history of political theory.” & “British historian Arnold J. Toynbee called the *Muqaddimah* ‘a philosophy of history which is undoubtedly the greatest work of its kind that has ever yet been created by any mind in any time or place.’”

protection and risk-taking, and so on are environmentally determined, even if the mix of people includes those with genotypes that may predispose them, relatively, to more or less of a given kind of behavior.⁴⁹

I will come back to Ibn Khaldun's theory of civilizational life cycles later.

A Final Note on Nature

The natural process that seems to indicate that man would inevitably evolve when he would at the time and place he would, that he is inextricably connected to the niche in which his species evolved, that he could not have spontaneously evolved earlier or later than he did, that whatever happened, happened, and couldn't have happened any other way, which for the atheist would seem to leave no room for God... is for the Muslim the very evidence of God because Allah is the source of all creation and the order in that creation. It is a misapplication of mathematical reduction; as I said earlier one can simply reason that "if everything is [by] God, then divide by God". This is implicit in all the denials of God which proceed as "there is no *need* for God...", as if God was just some redundant constant.

The development which likely most lent itself to this evolving view of nature was the view of physical laws as consequences of mathematical symmetries⁵⁰, which lends itself to the sort of knee-jerk reductionism that is used to remove God from the equation, so to speak. This results in problems reflected in contemporary philosophy of science surrounding the uniformity of nature, but these problems can be put aside and don't have immediate bearing on scientific research, so those with secular and increasingly atheistic agendas had no problem in advocating their other non-scientific philosophical positions at the expense of these. They appropriated the reputation of the very successful scientific tradition as endorsement for their views.

The truth is that those who paint a theomorphic picture of evolution by speaking of it in the sense that evolution is *giving* or *taking* from us and other species are simply following in the footsteps of the Dahriyyah. There is nothing whatsoever to distinguish the two positions.

What Ibn al-Haytham helped start so long ago, the use of mathematical models to describe and understand nature, has come to completely dominate scientific discourse. Not that this is fundamentally bad from the perspective of theists. We cannot blame mathematics for certain people's use thereof.

The truth about models is that we can come up with different descriptions for the same

⁴⁹Weiss, Ken (2010) - [*The Mermaid's Tale: A Conversation About the Nature of Genetic Causation in Evolution, Development, and Ecology*](#)

⁵⁰Perhaps best expounded by Richard Feynman in *The Character of Physical Law* (1967)

model (there was a point where geocentrism and heliocentrism were using the same mathematics, when a Muslim astronomer commented that simply flipping a vector would allow for heliocentrism and it was only a matter of perspective).

Moral or Behavioral Laws

The essence of religion is morality. Unchanging morality. Humans, it seems, are not subject to evolution.

To elaborate on that point, we've been the same for the last 10,000 years and probably much longer. Our biology hasn't changed. Evolution is so slow that it's negligible on the scale of a species like us from within the scope of our own collective experience.⁵¹

Morality corresponds to our biological state. There's no question about it. It establishes laws for behavior. Lizards don't have morality, nor do they need it. They all do the same thing. Cats all do the same thing. Lions all do the same thing. If one lion decided to pretend it was a tiger while it was in the middle of a pride, everything would soon be headed to hell in a handbasket.

Humans, it seems, have free will. The notion of free will is an example of an idea that transcends or is shared by theology, philosophy, science, etc (though one could argue for all of these being branches of knowledge in general).

"Non-living" objects behave subject to natural laws. When the natural composition of something reaches the stage of sufficient complexity to become alive, the "laws" start becoming variable but they are still there. They are just now called behaviors. These, as I just showed, are set in stone for most species not us. These are derived from their genetic makeup, their biology.

Our behavior too is derived to an extent from our biology. But our intelligence is such that we can behave in contravention to our biological urges or express them in very different ways.

Considering that humans are social creatures and absolutely depend on societies to survive (that's the only way to share knowledge and get beyond the rudimentary "discovering fire" or "inventing the wheel" phase of primate behavior), it's very, very useful to have everyone on the same page. We have all the ambition of angelic transcendent beings rising above petty flesh and matter, yet we're also the most vulnerable and helpless little mammals at birth and for quite some time afterwards. And

⁵¹The only thing which could speed up "evolution" would be some catastrophic and rapid alteration of our environment which rewrote the rules for how the fittest of our species survive. Nothing we've done to the planet even comes close. Even then we'd only be speculating on the time frames involved. "Rapid" might mean 15,000 years.

nowhere is our sensitivity to even the most minor deviation from biologically-derived behavioral norm more apparent than with children.

Morality accomplishes (but not is) that. From basic principles we call morals, are derived "laws" by which we govern ourselves. This is in addition to all the natural laws we are governed by (biology, chemistry, physics).

In this day and age many would agree that much of our behavior is determined by our biology. So why would our basic morality change? Theoretically, most moral systems should be similar and the most basic ideas should remain unchanging across societies and over time. Significant variation does develop (and thus we have wars on top of wars... one type of war is in our nature as a violent species, the other is a battle over what we call our nature though that can also be reduced to a power game where one society gets global aspirations... let's call that politics). Simply put, we have not evolved much, so neither should our morals/behaviors/laws.

All of that is the way it unquestioningly was until our progress in technology in the last two centuries. The fact of the matter is that technology does drive change in society, including in how we relate to our biology and our behavior. Thus morality *can* change (and work). But *should it*? Technological progress can easily be reversed, deviated, or completely wiped out. And if morality should change, which parts are okay to change? And why? Not to mention the newest developments in human civilization aren't accessible to much of planet earth still... ironically due to the very economic system that props up our pace of scientific/technological advancement. This creates a unique situation in which a tiny proportion of humanity lords over the rest and dictates a morality of its choosing to the rest (often without the corequisite technologies and prerequisite economic/social conditions). Whether you're a theist or an atheist there is no doubt such behavior (especially the dictating of morality to the rest with strict enforcement) is exactly what traditional societies would have called "acting as gods" (lowercase g). It's not a phenomenon unknown in modern philosophy either as it also underpins Nietzsche's existentialism. And there can be no doubt that it is fundamentally unfair as the pace and direction of technological development, and the resulting moral adaptations, are decisions left to a certain few individuals and then the rest of the world is expected to blindly follow in their lead. If they had openly claimed some absolute moral authority (as representatives of a higher power) then perhaps things could be looked at more objectively, or at least honestly, but that isn't the case. No room for decisions of any sort have been left with the large proportion of mankind which has been "left behind", forced (sometimes violently) to follow in their footsteps.

Where Do Morals Come From?

So where do these basic principles called morals come from? Are they just biologically-derived behavioral norms?

We can call morals “socially-derived behavioral norms” and ideally, they would conform to the biologically-rooted behavior perfectly. But how do we prove that any particular moral is that? The truth is that it’s very difficult. Our behavior is so wide ranging and varied that one set of behavioral norms seems to almost immediately become irrelevant outside the borders of its host culture. We are thus tied to moral relativism.

Further complicating matters is the fact that justifying any moral as a biologically-derived behavioral norm would become begging the question. The point of morality is to address those norms and account for them. These “socially-derived behavioral norms” which we can use to refer to morals are *not equivalent* to biologically-derived behavioral norms. The latter are scientifically admissible. The former can be reduced to mere philosophy. The former is held to account to the latter. It is tested, made or broken, or proven by the latter. The latter is the test for the former. Justification of any moral occurs when that moral is proven to account for or conform to a biologically-derived behavioral norm. The sheer number of different “interpretations” of morality ensures that justification *must* be done, because different moral systems are always competing, often at the point of war.

Yet if we define morality as being those biologically-rooted norms (however it is argued; usually through a reductionist approach), then we are justifying them by themselves and this is circular. So defining morality in this way becomes unjustifiable. On top of that, actually trying to pull moral laws or codes from behavior (see the circularity: how should we behave? how we behave!) necessitates inductive reasoning when we observe the set of individuals outside ourselves. For all of induction’s usefulness, using it as the basis for something as serious as morality is out of the question.

No, justification must be done by proving which moral code *best* conforms to or serves our biologically-derived behavioral norms. This is so far the only real scientific or naturalistic approach because we are grounding it in our biology, that part of it which doesn’t change even as socially-derived behaviors might change drastically (as first explored by Ibn Khaldun). This change becomes even more rapid if we account for modern developments in technology (and Ibn Khaldun’s philosophy is naturally extended to this).

The idea of moral justification also implies objectivity and make no mistake, we are attempting to aim for something objective; at least as best approximated by scientific standards.

We can rule out, temporarily at this stage, some teleological approaches such as Utilitarianism. What’s considered a desirable outcome or what’s considered utility is purely subject to whim and cannot address concerns of objectivity and justification. We will have to turn to teleology eventually, but we’re trying to stick to as scientific (or naturalist) a “final cause” as possible.

A moral code also has to account as much for the well being of the society as for the individual. We know now the true nature of *Homo sapiens* is as a social species, not unlike the ants or bees we've discussed before. We can stick to the basics which are rooted in science; the basic biological needs, including psychological. Food (sustenance), shelter, family, security. Nothing more than these can be admitted at the biological level (except perhaps the need for a societal group if the family itself does not fit that role, as it usually doesn't). "Pleasure" in and of itself as a goal is unjustifiable and subjective (not to mention not very scientific of an approach). Pleasure can only be accounted for as implicit in these needs which are already established as universal and applicable to all human beings.

The interplay between the individual and the society, the needs of the one versus the needs of the many, is a delicate affair and must be managed appropriately. We're starting to see how though we might know the answer to morality, the answer still might seem impossible to achieve.

If we take a recourse to philosophy/teleology, we can define the aims of moral law (without ruffling the feathers of any naturalist) to be mankind living in harmony with itself and its environment. This is a biological imperative of life itself. We can break it down into achieving harmony in the following relationships:

- The individual with his or her self (individual-themselves).
- The individual with other individuals (individual-society).
- The individual with his or her environment (individual-environment).
- The society with the environment (society-environment).
- The society with other societies (society-species).
- The species with the environment (species-environment).

This could have been worded more simply without mentioning species but the society-species (or society with other societies) distinction must be made, in line with modern ethics and also Islamic ethics and simply from a biological standpoint. Humanity is one species and we see harmony (a sort of ecological equilibrium) at the intraspecies level with all other life.

We have now a list of some basic conditions that a moral code has to fulfill. From here we can use these in a semi-teleological, semi-deontological method. We can compare and contrast different methods by figuring out objective measures of success.

Yet still, the problems of justification remain. Not only is a teleological approach fundamentally unjustifiable coming from another human, we had to abandon hope of rigorous logical justification way back at the beginning. This is a complicated, even muddled, answer. It sounds like an approximation. And yet this is likely the best sort of attempt that can be made.

Let's finally unchain the skeptic within us which has been growing increasingly restless over the past several paragraphs. There is nothing fundamentally justifiable in arguing for one person's view over another's. There are numerous issues with the philosophy of science which science manages to work around or in spite of. That is no longer the case when we come to moral or behavioral laws. The philosophy firmly puts its foot down and prevents science from getting anywhere. An approach to morality through naturalism is thus doomed to failure, it will never be accepted on a large scale. At most it might be picked up by one society but considering no naturalist (or other) approach to morality today even achieves many of the above conditions or points we just set out,⁵² all this will result in is a clash of societies or civilizations.

So what sort of human moral codes actually make it? Which survive, persist, become widely adopted and "successful"? The ones espoused by those who have the audacity to push forward their codes in spite of all of the above. Might essentially makes right. The measure of success has been moved away from anything scientific (the conditions we spoke of just now), and towards wide acceptance as the only measure of success. According to this type of thought, Genghis Khan was perhaps one of the more successful proponents of a moral code.

This is the philosophy of Friedrich Nietzsche and the Western existentialists. In the absence of a God, our existence is all the fundamental justification we need. The successful one is he who makes his own law and spreads it.

Ironically, the person who most closely fits his truest measure of success would have been Prophet Muhammad (saw). In Michael H. Hart's famous 1978 book, *The 100: A Ranking of the Most Influential Persons in History*, he ranks Muhammad (saw) as history's most influential personality. By any standard of Nietzsche, the prophet (saw) was indeed the ultimate Übermensch. "Ye shall know them by their fruits". The fruits of Muhammad's (saw) efforts speak for themselves and certainly did for Hart. Though Nietzsche, paradoxically, sought to set certain limits to the values of this "superman" (in order to rule out traditional religion because it did not appeal to Nietzsche... but really, who was Nietzsche to tell the Übermensch what he could or could not do?), only one person in history bore all the hallmarks of this personality. In a span of 23 years in the desert, this man from Arabia started a moral code, a way of life, converted everyone to his cause in spite of much persecution, started one of history's greatest and most advanced civilizations, which then went on to spread across the world and today leaves a legacy of nearly a fifth of humanity amongst its followers. The way of life was so robust that it survived decline and even annihilation several times over, encoded into written text in such a way as to act as the kernel or seed for a new growth so long as the basic texts exist.

The uncanny resemblance between the Prophet (saw) and (at least the signs, since

⁵²As a Muslim, I obviously believe in the Qur'an's moral code, but it can hardly be found in practical implementation today in the world.

Nietzsche excluded traditional religion) of Nietzsche's Übermensch should not be surprising. His philosophy sounds like an echo of the famous Sufi, Ibn Arabi's philosophy of "the Perfect Man" which was written several centuries earlier and which he modeled on the Prophet Muhammad (saw) of course.

Fortunately for the Western existentialists, we are dealing with philosophy here and not science. Which means one can pretty much write or rewrite whatever they feel whenever they'd like. Write up a philosophy that has all the pretensions of aspirations to objectivity, include a specific clause excluding those views you don't like (so much for objectivity), and continue modifying as necessary to keep pushing your philosophical agenda. The justification here is, of course, circular. Behave as we behave and follow what we follow simply because we behave that way. This sort of logically unjustified, hopelessly subjective, primitively confrontational, resolutely unscientific approach is reflected all the way into the 20th century in the works of Ayn Rand and her laughably titled philosophy of "Objectivism", which to the surprise of no one has garnered a huge following among the right wing war mongers of North America.

What hope is left for the philosophy of science in the unforgiving domain of moral speculation? Going by what we've just discussed it would have to be someone audacious enough to push their code at all costs without any logical or moral hindrance, depending on blind adherence and not critical scrutiny, like most other moral codes throughout history (including many religions). This would be scientism, or the new modern spin on naturalism (I have heard they refer to their ideology as "scientific naturalism"). While the naturalists try to maintain an air of respectability with regards to the philosophy of science, the adherents of scientism have no such pretensions. Perhaps "teleological naturalism" would be a more appropriate moniker. It basically involves taking the existing culture or moral values one wishes to promote then performing as many post hoc rationalizations of scientific findings as possible in order to spin one's own worldview and behavior as the obvious "final cause" of human social evolution through a mix of utilitarianism and just completely arbitrary picking. Anyone who utters anything which can be used in service of the cause is immediately admitted to the movement and the lecture circuit. Coherency of the movement is sacrificed for the wider appeal of simplicity. Thus their position often reduces not even into any moral code but to a criticism of moral codes, that of any theistic religion. Hence their inclusion with the "New Atheists" movement (so "scientism" is a misnomer, as they more regularly represent atheism than science... "atheistic naturalism" sounds more apt then).

The relationship between this extreme naturalism of the "New Atheists" and the philosophy of science reflects a common trope of the human experience. The idea that any human entity needs a "bad side" or "bad component" to do the morally questionable things necessary for survival (the ends justify the means), even at the expense of Self elements. This is the underpinning of the non-religious or non-spiritual outlook on life to the point where these days at the individual psychological level people either find themselves attracted to or aspire to be those who free themselves from the shackles of

moral accountability while serving morality's aims in the end (just look at every other character in the stories in popular media). This has been ever present in Islamic civilization since shortly after the passing of the rightly guided companions of the Prophet (saw). Far too many Muslims have gleefully embraced this idea of being the "antihero" their society needed as if the ends justified their means. This may be the case for everyone else (it certainly is true of Western civilization, in spite of their claims to the contrary) but it is fundamentally against Islamic morality. The ends do not justify the means. The entire point of life is the means. The ends are in Allah's Hands. Though it may make us feel uncomfortable to surrender what little control we might have had, that is the point, to surrender to Allah's Will and have faith in Allah's judgment. This makes unjustifiable such common tropes or clichés such as a familial matriarch or patriarch doing *anything* for their family (even saving them at the expense of other people). Being rationally inadmissible, such actions might be lessened in weight if an appeal to irrationality is made (in that in such situations our biology takes over and we are less rational). Obviously this is not meant to be an easy thing and certainly no one expects very many people to be successful but it is the ideal to which the believer aspires and the antithesis is something the believer does not tolerate in themselves or in those whom they choose to fill their life with. This paragraph I added in during my second read through and it is targeted towards the Muslim audience specifically because this behavior manifests even in the case of seeking knowledge or debating and arguing. Fair warning, such an outlook on life (when adopted by our rational minds) is antithetical to Islam and iman (faith).

Anyway, returning to the discussion at hand, what the sane are left with is a mix of inheriting existing moral traditions (usually from Roman and Christian civilization) and apologetic "secular-scientific" utilitarianism. The apologetics come in the form of what we discussed earlier, focusing on the results from a scientific perspective; the utility in utilitarianism corresponding to an expanded set of conditions that the scientific tradition might find palatable. My only argument against them is that many of their conditions are not scientifically justifiable and wade too much into philosophy. They are aware of this themselves and often raise interesting questions regarding modern ideas of morals and human rights on the one hand while affirming them on the other out of necessity. This moral code at least is not institutionalized. It predominates at the personal level among Western or Western-influenced intellectuals.

The Common Morality

What then of the non-intelligentsia? The common man? Their moral codes are basically socially-derived behavioral norms dictated to them by more powerful interests (usually corporate) which have no connection whatsoever to actual biologically-derived behavioral norms. Their moral code has in fact taken them so far from what can be considered humanity's natural/biological norm for behavior that they might not even recognize the latter if they see it. The corporate-disseminated narratives overlap at a

basic level with the intelligentsia, who act as the narrators and depend on these sources of funding. This support at the basic level (you see it in the way the media handles scientific findings and how it tries to spin them for sensationalist appeal) leaves implicit in the mind of the common man support for all the other facets of the “public culture” (which is ironically disseminated by private or corporate interests).

Just one example will suffice. What first comes to mind out of the recent news articles posted on BBC or CNN about scientific studies were the updates which claimed that women are prone to “straying” from their committed relationships at certain times of the month (due to levels of hormones) in favor of men who better represented (on an instinctively perceivable level) more desirable levels of hormones (testosterone). What the scientists think is clear, what the media says is “technically” clear, but in the manner of its reporting, the implication made to the general public is a bit more murky. It’s a reaffirmation of the predominant culture of promiscuity which has become an actual norm in Western society. It’s also completely and utterly ridiculous. These studies focus on the smell of male sweat, the shape of the jaw, the brow, and other extremely subtle indications of the levels of testosterone present during development. Last I heard, the most visually apparent sign of a man’s testosterone levels is losing hair at an early age and a thick beard. In the world of physiological markers, that’s a giant blinking neon sign. What, did evolution somehow miss this?

What’s actually going on is that physiological manifestations of behavior are being used to justify that very same behavior. If a woman’s hormonal levels shift and she becomes more sexually active at a certain time of the month, sure that’s still scientific (in its nature as a theory) and certainly no one would argue against that on principle (even if it weren’t yet proven true, since it sounds like it makes sense). The problem is then in how that is expressed. People are conditioned to look at other people and judge them for attractiveness, even whilst in committed relationships. There is no psychological barrier to preventing attraction to other than their significant others (the opposite, in fact. People are subconsciously conditioned to be thrilled at the idea going by everything they’re taking in from popular entertainment on a daily basis). Muslims will be familiar with this because the segregation of the sexes in traditional Islamic culture is built on this very principle. Show a person who is in a heightened state of receptiveness to such imagery some attractive people and they will become attracted. The protest “but the scientist never said how the results should be taken” is a moot point. The flood of comments on news sites and internet forums after the mention of such studies in mainstream news outlets speak for themselves and are precisely what you would expect of the general public. People are led to believe their existing behavior is biologically justified on the basis of physiological indications that are actually a consequence of social/cultural conditioning and the very behavior in question. In other words, people are conditioned with behavior then taught that since the conditioned behavior is instinctive (like anything one would be conditioned with), it is therefore natural and has some evolutionary relevance.

And everyone is justifying their behavior as “natural” when at this point the behavior is so far removed from any sort of biological justification that such an idea is laughable. This is completely confirmed in the outlook of popular Western culture (again, corporate-disseminated narratives in the media) in which foreign cultures, especially Islamic, are maligned for being “medieval” or “primitive”. What, you mean “natural”? The same “natural” that was just used to justify their own behavior? How in the world will a civilization living at the edge of technological and scientific development, at the top of the world in resources and political power, be even remotely closer to our “natural” state of affairs as humans than pretty much *any* other society? Even itself several centuries in the past?

The reason why this specific type of morality is disseminated is another topic unto itself but it basically results in more profits for the wealthy and a more exploitable workforce, and certainly a more pliable and distracted one which will march off to war or other tasks without putting up too much of a fuss (contrast behavior in North America with the sort of revolutionary, sometimes violent, protest against government sweeping through some European countries in recent years and in more recent months the Arab world... yet North Americans are the most exploited out of any of these people, the entire global economy runs off their exploitation).

What is the relevance of this to the issue of Moral Law? The scientific basis for a naturalist investigation of behavior isn't even there. We're no closer now to being able to objectively discern one moral code from another based on a measure of its success than we were 5000 years ago. This leaves no alternative to people either following what they believe are objective sources of morality (religions) or making up whatever they'd like. The Western scientific community has dropped the ball here. We can understand the desire not to bite the hand that feeds, or in this case pays for research/funding, but the repercussions of this inexcusably ignorant attitude towards behavioral sciences on the part of a great many Western scientists (some of whom, it seems, double as budding politicians and pseudo-philosophers...) is going to have widely detrimental effects on the state of human affairs.

Coming back to Ibn Khaldun (and I highly recommend reading [this article](#)),⁵³

We're in a genetic determinism age, when even scientists who should know better are attributing almost any human trait or aspect of society to genes. Darwinian views on the evolution of behavior are rife.

We think this is greatly overstated in two ways. First, traits that are influenced by many genes (typically called 'complex' or 'multifactorial') are also affected by environments (a generic term for all things other than gene(s) one is looking at), and the trait value of an individual is not well predicted from

⁵³Weiss, Ken (2010) - [The Mermaid's Tale](#): A Conversation About the Nature of Genetic Causation in Evolution, Development, and Ecology

genetic data. Second, many assumptions about what we're 'hard wired' to be like, that is, what we're genetically determined 'for', are short-sighted, based typically on the here-and-now back-strapolated to evolutionary time. Explanatory scenarios are (we think) too often built mainly on speculative Just-So stories.

In the 19th century, leading social scientists clearly knew that culture and society for the most part were to be accounted for in social terms, not genetic or psychological ones. However, the thrill of the evolutionary chase, in a cultural climate that has forgotten the awful determinism of eugenics and is enthralled with molecular reductionism, has led to serious under-training and amnesia in this regard. Geneticists, mainly trained to run high-throughput gear, may perhaps be excused. But not the social scientists who are jumping into bed with the geneticists (we really wouldn't want to spoil the fun of these rolls in the hay if we didn't think they could have serious ramifications).

[...]

These are lesson we should learn today: our short-term here-and-now perspective is not trustworthy when it comes to asserting what humans are programmed or evolved 'for'. We have a repertoire of responses that can lead to a wide variety of conditions that, in turn, affect our behavior and our biology.

Khaldun even makes the observation--in 1377!--that some epidemiologists seem to claim to have discovered based on fancy and expensive studies today: sedentary culture with its excess of luxury and dietary overkill leads to obesity and vulnerability to disease. That, in some ways, is a lesson geneticists, driven by vested interests, shunt to the background, despite the obvious fact that it's a major rather than minor factor in public health.

[...]

We're not lauding a 14th century scholar for having perfect insight that needs no revision today. But we would assert that short-sighted thinking is very costly these days, in terms of objectives we claim to have in regard to health. His observations about political dynasties may have lessons, too. Many would argue that the American global era is coming to an end in part because of our wasteful, lazy, sedentary, and complacent view of the world.

Islamic Morality

The Islamic view is that our holy book offers us a perfectly moderate way to live life and

meet *all* of the above conditions. The goal of man, in Islam, is to live in harmony with himself (through his relationship with his Creator), with others (harmonious social and societal relations which guard each person's fundamental biological rights), and with the environment. It goes above and beyond this in considering our other rights, such as the right to human dignity.

Perhaps the best word for morality in Arabic is *akhlaq*. There's actually a wonderful breakdown of the concept on the Wikipedia page for it,⁵⁴

Akhlaq is the plural of the word *khulq* which means disposition. "Disposition" is a faculty (*malakah*) of the soul (*nafs*) which unconsciously inspires activities. *Malakah* comes into existence through repetitive practice and is not easily destroyed. A particular *malakah* may appear because of one of the following reasons:

1. *Fitrah* (natural state): The original state in which humans are created by Allah Muslims believe Allah determined certain aspects of their lives for which they are not accountable (e.g., their place of birth and physical appearance)
2. *'āda* (Habit): Formed by continual repetition of certain acts and creates a certain disposition.
3. Practice and conscious effort: Which if persistent will eventually produce a disposition.

Although *fitra* produces certain dispositions, man can surpass nature through free will and effort. While dispositions caused by mental faculties (i.e., intelligence, memory, mental agility etc.) are not alterable, all others can change. When we speak of man's capacity to change his dispositions, we do not mean he should destroy instincts of reproduction or self-preservation. Instead, he should avoid extremes so they perform their functions properly. Abu Hurairah narrated that Prophet Muhammad has said: "Indeed I have been sent to complete the best of character (*akhlaq*)." Anas, the brother of Abu Dharr is narrated as saying: "I saw him (the Prophet), he would enjoin the people to good character and conduct." The Prophet also said, "The most complete of believers in *iman* (faith) are those who are best in character."

***'Ilm al-Akhlaq* (The Science of Ethics)**

The level of human perfection is determined by discipline and effort. Man stands between two extremes, the lowest is below beasts and the highest surpasses even the angels. The movement between these extremes is discussed by *'ilm al-akhlaq* or the science of ethics. Traditional Muslim philosophers believed that without ethics and purification (*tazkiyah*), mastery

⁵⁴<http://en.wikipedia.org/wiki/Akhlaq> - Retrieved 06/15/11

over other sciences is not only devoid of value, but would obstruct insight. That is why it has been said that, 'knowledge is the thickest of veils', which prevents man from seeing reality (*haqiqah*).

[...]

The soul is created devoid of traits. As one progresses through life, he develops *malakat* related to his lifestyle. The soul becomes accustomed to repeated behavior, which then determines actions. Noble faculties manifest moral and wise behaviour, while evil faculties manifest immorality. These faculties determine the fate in the *Akhira* (afterlife).

This introduces the Arabic word which roughly corresponds to what I mean by "biologically derived behavioral norm", which in this case means the unchangeable *malakat* derived from man's *fitrah*. Or man's natural, biologically-rooted dispositions. These have to be expressed in a healthy manner for man's well being, while taking into consideration that excess (the pursuit of pleasure and nothing more) is unhealthy for his physical and psychological well-being. For man to function well, he needs a healthy intellect or *'aql*. Humans are not like other animals in that regard.

This nature of *Shari'ah* as biologically rooted is an important concept to understand to make sense of it. For example, the fate of a child with regards to their biological rights is tied to a birth in a wedlocked or married relationship. An illegitimate child will take the name of the household in which it is born and cannot inherit (from either the biological or adoptive parents, except from a voluntary allotment by the parents from the part of the share not reserved for heirs). A child born to married parents takes the name (lineage) of its biological father, and inherits from him, regardless of any adoption status. As such, conceiving a child out of wedlock is considered an injustice on that child, robbing him or her of their biological rights. Unsurprisingly, the punishments for adultery are harsh, even when compared to fornication. This is but one example.

From here we can move to the *Maqasid al-Shari'ah*, the Aims (or Higher Objectives) of Islamic Law. The principles upon which the essence of Islamic laws rest. Not to be confused with *usul al-fiqh*, which refers to the sources of Islamic law.

Imam al-Ghazali made notable contributions on this subject but perhaps its most famous exponent was Imam al-Shatibi (d. 1388), the Andalusian Maliki scholar and jurist.

This subject aims to find the principles or aims of Islamic law from the texts, so it's not quite on the same subject as general morality (where the object of study is man and his *fitrah*), but it does help us better understand Islamic law.

It's said that the *Shari'ah* is meant to protect five things,

1. Faith (*Deen*)
2. Life
3. Family
4. Property
5. Intellect

These are from the *daruriyyah* or necessities. The previously mentioned basic biological necessities (sustenance, shelter, family, security) are all accounted for here. There are additional categories on top of this (including an equivalent to what we'd call "the pursuit of happiness"). There's a recognition that such things are more subjective and less justifiable than the things which go into *daruriyyah*.

I don't intend to delve further into this subject than this because it would take a significant amount of time and great resources already exist on the subject. These are the basics of the Islamic view of moral/behavioral laws and from this much one can understand the gist of it; that Islam accounts for our biology or natural state (our *fitrah*) perfectly.

I would expect people would be curious to know more, especially on the philosophy behind *Shari'ah*. These resources are available,

Shaykh Hamza Yusuf's lecture: [The Science of Shariah](#)⁵⁵

Dr. Mohammad Hashim Kamali's [article on Maqasid al-Shari'ah](#)⁵⁶

[An article on Imam al-Shatibi's Maqasid and the implications on consumer theory](#)⁵⁷

The title of Imam al-Shatibi's magnum opus was *Al-Muwafaqat fi Usul al-Shari'ah*. I am not aware of any complete English translations. The most famous section of it is the *Maqasid al-Shari'ah* which has been separately translated into English by Ahmad al-Raysuni. You can find it [for sale on Amazon.com](#) or [on Google Books](#).

Miracles and their Implications for Determinism

Next we come to the issue of the role of miracles. One role has been pointed out above, as evidence accompanying a Messenger of God. But are there other effects?

⁵⁵<http://www.youtube.com/watch?v=t7y5fbhz-fg>

⁵⁶<http://www.sunniforum.com/forum/showthread.php?6176-Maqasid-al-Shariah-The-Objectives-of-Islamic-Law>

⁵⁷http://www.islamic-world.net/economics/consumer_theory.htm

Now this is purely speculative but many, including scholars, feel that miracles serve other roles in their relation to humans. They feel that miracles act as a sort of barometer for the scientific/technological capability of humans. That is to say, humans will consistently try to achieve these feats themselves. This is a view held by quite a few Sufis and reflected in highly esoteric Qur'anic exegesis. It's something even mentioned in the aforementioned *al-Muwafaqat* of Imam al-Shatibi.

An example would be the Prophet's (saw) "Night Journey", or *al-Isra wal-Miraj*, the miraculous journey to Jerusalem and up to the Heavens in one night. The story can easily be found on the internet for those who are unfamiliar with it. The point here is that humans can now fly that distance to Jerusalem in a few hours, even leave the planet.

Another example is Noah's Ark. The incident of prophet Noah's (as) Ark is considered a miracle (including the flood). Some say that Noah (as) was the first man to build a ship and he did so under divine inspiration. Noah (as) was mocked not just because he was building a large ship for what seemed like no reason at all, but because no one had seen such a thing before. All of humanity thereafter who engaged in shipmaking are basically following in his footsteps.

More examples,

The Prophet's (saw) voice carrying over long distances when he addressed massive crowds, events for which there were thousands of witnesses. With modern technology, we can do the same. This is one which happened even for 'Umar (ra), the second Caliph.

Flight was another miracle granted to Solomon (Suleiman (as)) and Dhul-Qarnayn (as). Then there's the Qur'anic account of angels using cosmic objects as missiles on *djinn*. We've developed the sciences of aviation, rocketry and ballistics, turning them to military applications.

I don't know whether our ability to emulate the miracles we hear of extends to miracles repeated for pious individuals (*Sahaba*, *Awliya*, etc) or the really miraculous "top tier" events reserved for prophets.

One miracle which had far reaching consequences for humanity was Allah's promise to guard the Qur'an from corruption. This promise being contained in a verse of the Qur'an, it's one which can count as a miracle; albeit one whose mechanisms we have not only observed but been a part of (owing to how we compiled and transmitted it). Emulation of this miracle jump started the entire intellectual tradition of Islam which had far reaching consequences for humanity, especially in the domain of starting a scientific tradition and method, all of which was touched on in earlier sections. The Qur'an, promised in its own pages to be a miracle of *mutawatir*, did indeed become the first most widely transmitted and authenticated (*mutawatir*) book. Muslims might believe the fact that humans were

suddenly able to accurately preserve knowledge and inspired to build upon it was a door that was only opened with the Qur'an.

Inherent in this idea is a heavy sense of determinism. For those who believe in such an overly deterministic view of the universe, including over our free will (or lack thereof), then the idea of miracles takes on a more significant epistemological meaning.

Where Metaphysics Meets Physics

Quite a few people believe the doctrine of atomism should be abandoned. It's been superseded by developments in actual particle physics, it is argued. Ridding ourselves of it once and for all will separate the domains of science and theology/metaphysics as they should be. There have been plenty of strains of thought in Islamic theology who were "annoyed" by atomism from the outset for this very reason, of seemingly mixing science with theology. Their concerns are well founded. The further we stray from the *athar* (narrations), the more we open ourselves up to error. These concerns were mostly allayed by the dominance of the two main schools of orthodox theology, the Ash'ari and Maturidi (especially the Ash'ari). But such thinking lingers to this day and in fact has found new support in the wake of a resurgence (mostly among Western Muslims and some Gulf Arabs) of a conservative approach to *'aqedah*, based on the theology of the Hanbali *madhab* and the philosophy of not straying whatsoever from the *athar*.

Yet such an opinion might be a rush to judgment. Atomism worked splendidly from a philosophical standpoint in defending the occasionalist theology. Furthermore, it was borne out, even vindicated, by the emergence of particle physics in the last two centuries. So, has atomism served all the use it ever could?

The truth is that such thinking is a misunderstanding of the true nature of the doctrine of atomism. As was expounded earlier in the section devoted to it, atomism is a metaphysical theory or model of reality at the level of God's creating. It does not actually correspond to particle physics, but it's understood that there is a transition between the two, one we might not ever figure out. Our understanding of physics has progressed to such a point that it can give us new insights into atomism and this Islamic version of the metaphysical theory might be as good a subject as we're ever going to get where metaphysics might actually meet physics in a coherent manner.

Think of the reality that is described by Islamic atomism. A reality composed of elementary particles that are undergoing constant creation and annihilation in a vacuum. Sound familiar? All perceived power (in physical events) is reduced to this level and God, as the Creator, is the only true power at work since it is all reduced to God's creating.

Numerous attempts have been made to link some of the insights gained into nature via quantum physics and old religious traditions, particularly the Eastern ones (various sorts of mysticism). Truth be told, some of the best descriptions of reality came from the Islamic mystics (Sufis) as well. The Sufis were even scientists (such as the *Ishraqi* school). Yet a description like that, “reality is composed of elementary particles that are undergoing constant creation and annihilation in a vacuum”, is particular to Islamic atomism and there’s no controversy about it. That’s what Islamic atomism actually describes in no uncertain terms and from as far back as the 9th-10th centuries.

As we know now, the “vacuum” of space is not really empty as the name would imply.

...a region of seemingly empty space is not really empty, but is a seething froth in which every sort of fundamental particle pops in and out of empty space before annihilating with its antiparticle and disappearing—these are the so-called quantum fluctuations.

[...]

In a very real sense, quantum fluctuations would be the origin of everything we see in the universe.⁵⁸

At first glance it appears that Islamic atomism was right. The model of reality that modern physics describes fits with the metaphysical model of atomism. While this is true, things are a bit more complicated than that so we will go into a little more elaboration of the picture of reality painted by modern quantum mechanics and what Islamic theology has to say on it, if anything.

This is because the theories of quantum physics are also models of reality, not necessarily describing the actual events unfolding. As mentioned earlier, it’s a little incoherent to speak of “witnessing” events unfolding at this level because our five senses are inapplicable here. We test indirectly for things, and even the manner of how we do that testing is itself subject to the limitations of theory.

Moreover, the models of physics are under an ongoing process of change and revision. The purpose here is to show that no matter where physics goes from here, most any model from this point on will match up well to the metaphysics of Islamic atomism.

Quantum Physics

Let’s cover some of the basics of what quantum physics is about. The introduction to the

⁵⁸Kolb, Edward W. - "Planting Primordial Seeds," *Astronomy* (volume 26, February 1998), pp. 42,43.

article on Wikipedia,⁵⁹

Quantum mechanics, also known as quantum physics or quantum theory, is a branch of physics providing a mathematical description of the dual particle-like and wave-like behavior and interaction of matter and energy. Quantum mechanics describes the time evolution of physical systems via a mathematical structure called the wave function. The wave function encapsulates the probability that the system is to be found in a given state at a given time. Quantum mechanics also allows one to calculate the effect on the system of making measurements of properties of the system by defining the effect of those measurements on the wave function.

[...]

Quantum mechanics differs significantly from classical mechanics in its predictions when the scale of observations becomes comparable to the atomic and sub-atomic scale, the so-called quantum realm. However, many macroscopic properties of systems can only be fully understood and explained with the use of quantum mechanics.

[...]

The term was coined by Max Planck, and derives from the observation that some physical quantities can be changed only by discrete amounts, or quanta, as multiples of the Planck constant, rather than being capable of varying continuously or by any arbitrary amount. [...] In the context of quantum mechanics, the wave–particle duality of energy and matter and the uncertainty principle provide a unified view of the behavior of photons, electrons and other atomic-scale objects.

[...]

The mathematical formulations of quantum mechanics are abstract. Similarly, the implications are often counter-intuitive in terms of classical physics. The centerpiece of the mathematical formulation is the wavefunction (defined by Schrödinger's wave equation), which describes the probability amplitude of the position and momentum of a particle. [...] The wavefunction treats the object as a quantum harmonic oscillator and the mathematics is akin to that of acoustic resonance.

[...]

Historically, the earliest versions of quantum mechanics were formulated

⁵⁹http://en.wikipedia.org/wiki/Quantum_mechanics - Retrieved 06/17/11

in the first decade of the 20th Century, around the time that atomic theory and the corpuscular theory of light as interpreted by Einstein first came to be widely accepted as scientific fact; these later theories can be viewed as quantum theories of matter and electromagnetic radiation.

Following Schrödinger's breakthrough in deriving his wave equation in the mid-1920s, quantum theory was significantly reformulated away from the old quantum theory, towards the quantum mechanics of Werner Heisenberg, Max Born, Wolfgang Pauli and their associates, becoming a science of probabilities based upon the Copenhagen interpretation of Niels Bohr. By 1930, the reformulated theory had been further unified and formalized by the work of Paul Dirac and John von Neumann, with a greater emphasis placed on measurement, the statistical nature of our knowledge of reality, and philosophical speculations about the role of the observer.

The Copenhagen interpretation quickly became (and remains) the orthodox interpretation. However, due to the absence of conclusive experimental evidence there are also many competing interpretations.

As we can see, the essence of quantum physics is two main aspects of reality. The first is the quantization of certain physical quantities. The other is wave-particle duality; the wave-like and particle-like characteristics of matter and energy.

Wave-Particle Duality

Ibn al-Haytham, the pioneer of optics, modelled light as solid balls in his experiments; particles.⁶⁰ This is unsurprising considering Islamic atomists would think of light naturally as composed of discrete particles just like everything else.

In addition he thought that the speed of light was finite, a position later agreed upon by Ibn Sina and Al-Biruni, the latter of whom also discovered that the speed of light is much faster than the speed of sound.⁶¹

Al-Farisi (1267-1318)

The second most famous physicist/mathematician on the subject in the old Islamic tradition would be Kamal al-Din al-Farisi (d. 1318). He lived three centuries after Ibn al-Haytham and wrote an important commentary on the latter's *Book of Optics* which amounted to a revision (entitled *Tariqh al-Manazir (The Revision of the Optics)*). Al-Farisi

⁶⁰Salih, Al-Amri, & El-Gomati - UNESCO, Natural Sciences Quarterly Newsletter, *A World of Science*, Vol. 3, No. 4, Oct-Dec 2005

⁶¹George Sarton, *Introduction to the History of Science*, Vol. 1

was from the *Ishraqi* school of philosophy, a pupil of Qutb al-Din al-Shirazi. He's most known for correctly explaining a rainbow using Ibn al-Haytham's theories on refraction, as well as some contributions to number theory. He even used a camera obscura in his experiment,

His research in this regard was based on theoretical investigations in dioptrics conducted on the so-called *Burning Sphere* (*al-Kura al-muhriqa*) in the tradition of Ibn Sahl (d. ca. 1000) and Ibn al-Haytham (d. ca. 1041) after him. As he noted in his *Kitab Tanqih al-Manazir* (*The Revision of the Optics*), Farisi used a large clear vessel of glass in the shape of a sphere, which was filled with water, in order to have an experimental large-scale model of a rain drop. He then placed this model within a camera obscura that has a controlled aperture for the introduction of light. He projected light unto the sphere and ultimately deduced through several trials and detailed observations of reflections and refractions of light that the colors of the rainbow are phenomena of the decomposition of light. His research had resonances with the studies of his contemporary Theodoric of Freiberg (without any contacts between them; even though they both relied on Ibn al-Haytham's legacy), and later with the experiments of Descartes and Newton in dioptrics (for instance, Newton conducted a similar experiment at Trinity College, though using a prism rather than a sphere).^{62 63 64 65 66}

Al-Farisi, in contrast to Ibn al-Haytham, proposed the wave nature of light.⁶⁷ Thus we have two of the most famous scientists and experts on light in the old Islamic tradition, one influenced by the other, advocating both the particle and wave nature of light.

One reason al-Farisi might have allowed himself to adopt such a view, from a theological standpoint, was that he might not have even been an atomist. The theological viewpoints of the scientists of the *Ishraqi* school varied and they were heavily involved with Sufism.

⁶²http://en.wikipedia.org/wiki/Kamal_al-Din_al-Farisi - Retrieved 06/17/11

⁶³Nader El-Bizri, "Ibn al-Haytham", in *Medieval Science, Technology, and Medicine: An Encyclopedia*, eds. Thomas F. Glick, Steven J. Livesey, and Faith Wallis (New York — London: Routledge, 2005), pp. 237–240.

⁶⁴ Nader El-Bizri, "Optics", in *Medieval Islamic Civilization: An Encyclopedia*, ed. Josef W. Meri (New York – London: Routledge, 2005), Vol. II, pp. 578–580

⁶⁵Nader El-Bizri, "Al-Farisi, Kamal al-Din," in *The Biographical Encyclopaedia of Islamic Philosophy*, ed. Oliver Leaman (London — New York: Thoemmes Continuum, 2006), Vol. I, pp. 131–135

⁶⁶Nader El-Bizri, "Ibn al-Haytham, al-Hasan", in *The Biographical Encyclopaedia of Islamic Philosophy*, ed. Oliver Leaman (London — New York: Thoemmes Continuum, 2006), Vol. I, pp. 248–255.

⁶⁷Salih, Al-Amri, & El-Gomati - UNESCO, Natural Sciences Quarterly Newsletter, *A World of Science*, Vol. 3, No. 4, pp. 5, Oct-Dec 2005

How to reconcile the wave nature of light with atomism? That was the problem at the heart of the turn to quantum physics. The wave theory dominated until Einstein brought back the view of light as particles and reinvigorated Newton's theory of light as particles (the corpuscular theory of light), using it to explain the photoelectric effect, something the wave theory could not account for. Of course, the particle theory of light could not account for the wave behavior either.

Quantum Mechanics, the Wavefunction, and Mathematical Formulation

This brings us to the nineteenth century and Thomas Young (1773-1829), the famous English polymath, and his interference experiment (the original version of the modern double-slit experiment). This experiment turned the tides of opinion overwhelmingly in favor of a wave theory of light until Einstein.

You can read the details of the experiment and quotes from Young at the following page,

http://en.wikipedia.org/wiki/Young%27s_interference_experiment

The double-slit experiment has become so famous that it's the cornerstone of all approaches to introducing people to quantum mechanics. For this reason I won't try to cover it myself here since it's explained to death all over the Internet. I will link to some good sources:

http://en.wikipedia.org/wiki/Double-slit_experiment

<http://research.microsoft.com/apps/tools/tuva/index.HTML> (Lecture 6, I will refer to this lecture again quite often)

<http://www.youtube.com/watch?v=DfPeprQ7oGc> (The most simplest, shortest, and popular video on YouTube devoted to this experiment... Should not be viewed on its own but complemented by the above)

So Young's experiment basically showed that light had to be both particles and waves. Later, in his 1924 thesis, [Louis de Broglie](#) (1892-1987) extended the wave-particle duality to all matter.

Following de Broglie, [Erwin Schrödinger](#) (1887-1961) developed his "wave mechanics" mathematics. At this point quantum mechanics becomes dominated by work on mathematical formulation. It was in this context that Schrödinger developed the "Schrödinger equation" which described how the state of a quantum system evolves over time or changes in time. The state of a quantum system is synonymous with the "wavefunction", which refers to the probability amplitude describing a particle or

a system of particles. It would be best to shed any notions of the wavefunction as anything more than a mathematical formalism right now because that is how the idea of it was born. Various explanations of quantum mechanics that litter the internet or television have led many to assume that the wavefunction must not only be a real thing, but one specific thing over another, leading to much confusion. For the purposes of understanding QM let's separate, for the time being, the mathematical formalisms from the physical/philosophical interpretations.

A decent treatment of the history of the mathematical development of quantum mechanics is in the "History" section of the Wikipedia page on the [Mathematical Formulation of Quantum Mechanics](#),⁶⁸ a highly recommended read before continuing as it also mentions where the mathematical situation settled and became the jumping off point for various physical and philosophical interpretations of quantum mechanics which will be discussed later.

Quantization ("atoms") of Matter, Space, Time

The quantization of matter was already a given for the atomists. The question which remains is whether they advocated the quantization of space and/or time.

The answer is that it varied. Some did, some didn't. Many, especially from the Orientalists' tradition, thought that *all* the orthodox theologians firmly believed in atoms of space and time and had detailed doctrines regarding such a thing, but this is far from the truth. What they're doing is extrapolating from what they believe is the natural or logical extension of atomism..

The definition of time as taken from the Nasafi Creed (*Sharh al-'Aqid an-Nasafiyyah*),

With us time is an expression for something renewed by which something else renewed is measured. With the Philosophers it is the measure of motion.

It was a flexible and more philosophically oriented definition of time, needed for these views on causality. This is not to say the definition of time as a measure of motion or something else cannot be used. It's for the purposes of theological discussion that time was defined as such. In fact such a definition of time has more relevance with today's science⁶⁹ as will be discussed in further detail later.

However, practically speaking, we must treat time in some quantized manner otherwise we would not be able to measure it. It is in this sense that time is treated as quantized in the discussions of the theologians, with a unit of time corresponding to a "moment",

⁶⁸Retrieved 07/27/11

⁶⁹<http://www.physorg.com/news/2011-04-scientists-spacetime-dimension.html>

or what I sometimes prefer: “an instance” or “instant”. When the term *jawhar* is applied to time it only means this. Time was not quantized as a matter of principle so much as out of necessity in order to deal with the model of God’s creating, with each instance of creating corresponding to a “moment”.

Another thing to note is that as early as the time of the Mu’tazilah, the theologians treated God as truly “supratemporal”. Some of the earlier Mu’tazilah even objected to the term “eternal” when applied to God because they thought it implied God was subject to time or “belonged to the sphere of time”, when God was outside of it.⁷⁰

With regards to a “hard” quantization of time in which the “moments” are referred to as actual *jawhar*, systematically created by Allah, then temporal relativity is made possible simply by the way in which Allah creates (at what rate or frequency the creation is recreated or updated relative to other creation). In fact relativity is therefore implicit in the above definition of time (or where time is defined in terms of or association with entropy, a concept which will be discussed later). There doesn’t necessarily need to be a uniform rate of creation and relativity of time is also mentioned in Scripture (the most obvious example being that of the sleepers of the cave in *Surah al-Kahf* but also mentioned literally in how time passes differently in the heavens).

The “atomization” of time into *jawhar* corresponding to “instants” or “moments” winds up becoming the central part of Islamic atomism’s significance because it is this which is responsible for the appearance of time passing, of an “animated” universe. Think of the example of a [flip book](#), the most primitive form of animation. Reality can be considered to consist of “frames” of creation where the creating simultaneously acts as “playing” (there aren’t two separate phases of creation and then later animation as with a physical flip book a person might make). We can’t begin to postulate on how often creating happens, or what the “framerate” of reality is, or whether it’s even really quantifiable. We can only say it is this which is what “time” really is. Take a picture of a galaxy. There is no time involved. Now take several frames of animation of the galaxy rotating. Reality would be similar in that the galaxy was created in successive stages (according to the manner of Islamic atomism) giving the appearance of movement and time passing. If Allah stopped creating and seized it in a particular stage it would be as if time stopped. Furthermore the “rate” of creating could vary among the creation with respect to each other (going back to the definition in the Nasafi Creed, leading to the idea that time can be relative). This must be understood because even though there are many parallels between Islamic atomism and modern particle physics, Islamic atomism fundamentally describes something very different and truly metaphysical. It’s just not out of the realm of imagination that a similar process exists for time (or that metaphysics would operate similarly to physics). This poses significant problems for the issue of “physical free will” or the idea that the mechanism of free will exists in nature (because an animation is fully determined). Not surprisingly, in Islamic theology free will is tied to the nature of our metaphysical souls. The key to our free will lies beyond this physical world (and yet we

⁷⁰Simko, Ivan (2008). *Parallels of Stoicism and Kalam*, University of Vienna

can measure the effects and consequences, all of which point to its existence).

This poses the question, is time an illusion? Taking such a view of Time for non-theists or non-Muslim Occasionalists would almost necessarily lead to such a view (for the sake of reductionism and avoiding redundancy). But for Muslims, it isn't. Time, due to the willful active creating of God, is a real thing (as realism typifies the Islamic view of the world) but it is *illusory* in that God is truly responsible for what we call Time, and what we call Time is simply describing a behavior of God in creating (as is the case with other physical laws).

It should be kept in mind this is a philosophical notion of time which encompasses physical time (that used in physics) but extends beyond it. There is more to time than that observed in our universe. So the flip book example wouldn't work perfectly well for the actual observable physical universe as each page of the flip book would correspond to a three dimensional snapshot of the state of the universe but time would not be as simple as flipping the book to get spacetime. Space and time are thought to form one continuum. The concept of time will be discussed again later with a more scientific focus.

The Jawhar of Matter

The *jawhar*, or the "atom" of Islamic atomism, with regards to matter is actually a representation of the belief that the world, or this universe, is finite at least with regards to matter and time. The definitions of "infinite" and space used by physicists is a bit different from what we would use in philosophy and is a separate matter.

Matter, however, and Time, are more easily discerned in their finite sense. The universe originated at a point in time. All matter in the universe is finite. These ideas go all the way back to the Qur'an:

وَمَا مِنْ غَائِبَةٍ فِي السَّمَاءِ وَالْأَرْضِ إِلَّا فِي كِتَابٍ مُبِينٍ

There is nothing hidden in the heavens and the earth that is not (recorded) in a manifest book. (27:75)

لَا يَعْزُبُ عَنْهُ مِثْقَالُ ذَرَّةٍ فِي السَّمَاوَاتِ وَلَا فِي الْأَرْضِ وَلَا أَصْغَرُ مِنْ ذَلِكَ وَلَا أَكْبَرُ إِلَّا فِي كِتَابٍ مُبِينٍ

Nothing in the heavens and in the earth, even to the measure of a particle, can escape Him, nor is there anything smaller than that or bigger, but it is recorded in a manifest book. (34:3)

وَأَخْصَىٰ كُلَّ شَيْءٍ عَدَدًا

And He has encompassed all that is with them, and has comprehensive

knowledge of every thing by numbers. (72:28)

Therefore they adopted the idea of this *jawhar al-fardh* as the indivisible constitutive thing of substance (i.e, an elementary particle) from which all bodies are made.

The *jawhar* has no properties in itself except through accidents, or *'aradh*. This even includes the accident of existing, so a *jawhar* cannot subsist on its own through two successive instances of creation (i.e, everything is annihilated and recreated). The issue of whether the *jawhar* is itself dimensionless or occupies space is one upon which there have been some differences. Most Ash'arites agreed that the *jawhar* occupies space on its own while some (including the Mu'tazilah) believed taking up space constitutes an *'aradh*. Though debates did occur on this matter, there really isn't any theological significance for either stance in itself, only in its implications for other philosophical arguments (since the arguments between the philosophers and theologians tended to be based around geometry, and it was through such arguments that the theologians often trumped their opponents, so it might have been necessary to posit an inherent magnitude to the *jawhar* at the time... but such arguments are no longer needed and the nature of the geometry used in physics has changed, so such positions no longer need hold any contradictions).

Still, one will find many Ash'arites today will ardently deny that the *jawhar* can be dimensionless for fear of positing an infinite amount of matter which would be a contradiction. Though as I just said, it's possible to formulate dimensionless conceptions of a *jawhar* without straying into the infinite. If the *jawhar* cannot subsist without an *'aradh* (that of existing) then a finite number of *'aradh* mandates a finite number of *jawhar*, and the *jawhar* in and of itself devoid of *'aradh* does not actually exist except as an abstract concept (or perhaps as a potential). This is a point (derived from the particular Maturidi take on atomism) worth noting in order to relate to newer interpretations of physics such as quantum field theory, though it could still be understood even with the traditional Ash'arite understanding, albeit perhaps not as intuitively.

Ibrahim an-Nazzam (775-845)

With regards to the quantization of space, one personality stands out. An-Nazzam was a Mu'tazilite from the early period, well before the rise of the Ash'arites.

An-Nazzam was an avowed opponent of atomism, which brought him into conflict with his fellow Mu'tazilites, who followed varying forms of atomism themselves. He believed bodies were continuous and that the only accident was motion (an interesting theory if you consider our present understanding of quantum states).

This left An-Nazzam vulnerable to Zeno-style paradoxes. His novel solution was the

tafra or “leap”.

The general idea was that a moving body could cover a continuous space by making a finite number of leaps and that during each leap the moving body is not in the intervening spaces. In other words, a moving body leaps from some first place to a third place on a continuous magnitude without having passed through any second place between the two.⁷¹

An-Nazzam argued that even the atomists must be committed to the idea of leaps,

Despite the counterintuitive nature of an-Nazzam's suggestion, he argued that even the atomists had to posit leaps as well. He had one imagine the rotation of a millstone. Now in a single rotation an atom at the outer edge of the wheel would traverse a distance equal to the circumference of the wheel, whereas an atom at the hub would traverse a shorter distance equal to the circumference of the hub. Since the atom at the outer edge is traversing a greater distance in an equal time as the atom at the hub, the atom at the outer edge must be moving faster than the atom at the hub. An-Nazzam next observed that there is only one of two ways to explain this phenomenon: either the atom at the outer edge leaps over some of the intervening atomic cells, or the atom at the hub rests at some of the atomic cells for a few moments while the atom at the outer edge catches up. The preferred atomist solution to differences in velocity was to posit that slower moving objects have a greater number of intervallic rests than faster moving objects; however, an-Nazzam disallowed this solution with respect to the rotating millstone on the grounds that in that case the millstone would fragment as certain atoms rest while others keep moving. In other words, some atoms that at the beginning of the motion had been next to other atoms would have moved away from each other as the ones nearer the rim kept moving in order to cover the greater distance and the ones nearer the hub rested in order to cover only their respective distance, and so by the atom's moving away from each other, the millstone as a whole would fragment and break up. Yet, argued an-Nazzam, it is directly observable that the stone does not fragment, and thus even the atomists must be committed to leaps.⁷²

Max Jammer, the prominent 20th century Israeli physicist, considered this the oldest realization of quantum motion: ⁷³

”In fact Al-Nazzam’s notion of leap, his designation of an analyzable inter-phenomenon, may be regarded as an early forerunner of Bohr’s conception

⁷¹McGinnis, Jon, "Arabic and Islamic Natural Philosophy and Natural Science", *The Stanford Encyclopedia of Philosophy (Fall 2008 Edition)*, Edward N. Zalta (ed.)

⁷² *Ibid.*

⁷³Altaie, M.B. (2005) - *Daqiq al-Kalam: The Islamic Approach to Natural Philosophy*

of quantum jumps.”⁷⁴

While an-Nazzam was not an atomist, he did set out to prove that his theory of *tafra* extended to atomism.

The Planck Scale

The most current ideas of discreteness of space and time center around the Planck scale. The Planck scale is an energy scale at which the quantum effects of gravity become strong. Our existing theories of quantum mechanics, such as quantum field theory, break down here. Basically, at scales with this high an energy level, gravity cannot be explained by existing theories. A new theory of quantum gravity is needed. The leading candidate is String Theory.⁷⁵

This Planck energy level can translate into a Planck length, Planck mass, and Planck time all corresponding to the point where current quantum theory breaks down. Otherwise called “Planck units”, these units of measurement are based on five universal physical constants: the Gravitational constant, the Planck constant, the speed of light in a vacuum, the Coulomb constant, and Boltzmann’s constant.

One approach to deal with this problem of quantum gravity, and perhaps the most tempting option due to the natural implication of these Planck units, is to discretize (quantize) spacetime into “space atoms” and “time atoms” in a similar manner to the theological discussions of old. Perhaps the most famous such theory is [loop quantum gravity](#).

Some other authors on the subject of old Islamic metaphysics have pointed out that discretized spacetime still has relevance for physics today in theories such as that one. While this is certainly true, as I said earlier not all Islamic atomists were quick to conclude that spacetime is discrete or discrete in a way that is relevant to us. For instance, the natural theological unit of discrete time would be from the instance of one creation to the next, which might be constant (lending itself to a discrete time interpretation) or might be changing and relative amongst different creations. Either way, it’s something only God would know the true measure of, or whether it even can be measured. So we do quantize or treat discretely spacetime in physics as necessary to solve problems because it’s convenient, but most physicists do not jump to a universal understanding of quantized spacetime simply based off that.

With regards to modern philosophical interpretations of spacetime, Max Jammer⁷⁶

⁷⁴Jammer, Max - *The Philosophy of Quantum Theory*, (New York: John Wiley, 1976), p. 259.

⁷⁵http://en.wikipedia.org/wiki/Planck_scale - Retrieved 07/06/11

⁷⁶Jammer, Max - *Concepts of Space: The History of Theories of Space in Physics*, Harvard Univ. Press 1969

showed that Leibniz was inspired for his *Monadology*⁷⁷ by the *Guide for the Perplexed* of Moses Maimonides, in which the latter also discussed Islamic atomism (from where the explanation is taken in the introduction to the English translation of the previously discussed Nasafi Creed). Wolfhart Pannenberg also pointed out the influence of Arab philosophy on Leibniz's atomic theory of time.⁷⁸

Such theories of discrete spacetime seemingly received their biggest blow recently when, according to how it was portrayed in the media and on many internet sites, researchers from the European Space Agency (ESA) carrying out experiments at their Integral gamma ray observatory allegedly concluded that the upper bound on any possible discrete unit of space must be almost 13 orders of magnitude *smaller* than the Planck scale.⁷⁹

This made some waves because many had begun to think of the Planck scale as literally representing discrete spacetime when the fact of the matter is the Planck energy scale merely represents the point where General Relativity (GR) and quantum mechanics intersect and not in and of itself any fundamental characteristic of "the fabric" of spacetime.

Regardless, such interpretations of these results aren't entirely correct. The actual paper, which can be found [here](#)⁸⁰, concerned specific constraints on Lorentz invariance violations. Lorentz covariance or invariance describe a key property (a symmetry) of spacetime that follows from the special theory of relativity.⁸¹ The symmetry is termed "Lorentz symmetry" and is "the feature of nature that says experimental results are independent of the orientation or the boost velocity of the laboratory through space". The terms used in a quantum field theory must be Lorentz invariant. Naturally, any discrete spacetime theories would break Lorentz invariance (since symmetry is broken in a discrete treatment). All this paper talks about is lowering the measure of the lengths at which Lorentz symmetry would be violated. It's still certainly possible for discrete spacetime theories to be written in a way such that they are Lorentz invariant at larger lengths while the discretization happens at much smaller lengths. So, for example, both String Theory and Loop Quantum Gravity are Lorentz invariant and aren't affected by these results. There aren't really any popular discrete spacetime theories which were affected by these results.

To truly investigate phenomena at the Planck scale, we require energy levels (equivalent to the Planck mass) that are not currently achievable. Even the Large Hadron Collider is something like 15 orders of magnitude less powerful than what we would need.

⁷⁷And previously his *Initia rerum mathematicarum Metaphysica*

⁷⁸Pannenberg, Wolfhart - *Systematische Theologie*, T & T Clark, 1988-1994

⁷⁹<http://www.physorg.com/news/2011-06-physics-einstein.html>

⁸⁰http://arxiv.org/PS_cache/arxiv/pdf/1106/1106.1068v1.pdf

⁸¹http://en.wikipedia.org/wiki/Lorentz_covariance - Retrieved 07/11/11

Speaking in a more intuitive sense, any quantum theory of gravity would essentially be giving gravity the quantized treatment. Yet gravity is, according to Einstein's general theory of relativity, a consequence of the curvature of spacetime. So when you're quantizing gravity, you're pretty much going to be attempting some sort of quantized/discrete treatment of spacetime no matter how indirect. As such, a quantized view of spacetime in some capacity is perhaps inevitable.

The Uncertainty Principle

The Heisenberg Uncertainty Principle lies at the heart of "quantum philosophy" or the discussions of ontology centered around the newest findings of quantum physics. When we speak of a "quantum view of the world", what we're likely referring to boils down to what this principle is, what it means, and what the implications of it are.

It was formulated by Werner Heisenberg (1901-1976), the famous German physicist, in 1927. His extensive biography is covered at [his Wikipedia page](#) and is worth a perusal.

Intuition and Natural Causation

Wherever one goes to learn about quantum physics one runs into people who try to emphasize how quantum mechanics turns intuition on its head and intuition can no longer be trusted. What this is being used to directly imply is a preference for anti-realism over the more intuitive "realism" and by realism I mean here essentially counterfactual definiteness.

All it really means, however, is that the reality contained within our own minds, our subjective reality, is being questioned. We have to question our intuition. Our intuition is merely our view of the world. So we have to question our view of the world (such as *how* we view the world), not necessarily the world itself. Some might say if we have to question our view of the world, then how do we know the world is even there if we have not viewed it? The fact of the matter is that we do have a view of the world at all, which does suggest that there is a world to view. Our skepticism of our intuition, scientifically speaking, does not extend to philosophical skepticism which is the realm in which such conjectures arise. We don't make the jump, as Hume or some Berkeley-esque Idealists did, to questioning ourselves or the ability to view at all. We merely conclude that our attempt to view objective reality, due to it being subject to whatever particulars or laws of the very same nature we attempt to observe, is thus flawed, or perhaps filtered in a way (easier to understand when we think of how our physical eyeballs only capture a narrow spectrum of light), but at the very least it is a thing to be viewed abstractly (rationally thought about) in and of itself. We have to "view" our viewing. And what I mean by "rationally thought about" is that we rationally compensate for it or work around

it as best we can, such as in deciding what experiments to run, how to set them up and where to look for possible errors.

"Someone has said it this way, 'Nature herself doesn't know which way the electron is going to go'..."

-Richard Feynman⁸²

Going back to the critics' claims that skepticism of natural causation (and the principle of uniformity) is an attack on science, Feynman said the following,

"A philosopher once said (a pompous one): 'It is necessary for the very existence of science that the same conditions always produce the same result. [...] They don't-and yet the science goes on in spite of him. [...] What is necessary for the very existence of science is just the ability to experiment, the honesty in reporting results-the results must be reported without someone saying what they'd like the results to have had been-and finally, an important thing, is the intelligence to interpret the results, but important point about this intelligence is: that it must not-it should not-be sure ahead of time about what must be. Now, it can be prejudiced, and say, 'That's very unlikely-I don't like that.' Prejudice is different than absolute certainty. [...] In fact, it is necessary for the very existence of science that minds exist, which do not allow that nature must satisfy some preconceived conditions like those of our philosophers."⁸³

He also said in the same lecture,

"To take an example is the relativity theory, in which, for instance, the proposition is that if you think that two things occur at the same time, that's just a subjective opinion: someone else could conclude that those two events, one was before the other, and that simultaneity is merely a subjective impression."⁸⁴

And sure enough, Albert Einstein credited the work of David Hume as an inspiration when formulating his Special Theory of Relativity.⁸⁵ The very same skepticism of natural causation which Hume took from the occasionalists.

Probability

⁸²Feynman, Richard (1964) - *Probability and Uncertainty - The Quantum Mechanical View of Nature* - The Messenger Lectures, Cornell University, NY

⁸³ *Ibid.*

⁸⁴ *Ibid.*

⁸⁵ http://en.wikipedia.org/wiki/David_Hume#cite_note-87 - Retrieved 07/25/11

When discussing the double slit experiment the physicist Richard Feynman described probability essentially as this,

"What we measure, then, is the probability of arrival, which is a technical measure, the probability of arrival. It is a technical term, really, for the average number that arrive in a given length of time."⁸⁶

In other words, based on observing the frequency of a certain result, we predict that it will hold in the future. It's not necessary to conceive of probability as some mysterious, even tangible, "thing" that's involved here; that stuff is made of probabilities, that particles ride waves of probabilities or any other figure of speech you might have heard used to describe quantum mechanics for the layperson.

We don't know the "determining machinery" at work there, or whether there even is any. As Feynman said in the same lecture,

"...which we call a probability amplitude, because we don't know what it means..."⁸⁷

He also said regarding the idea of knowing about any more amount of physics,

"...if I knew enough about that electron-it has internal wheels, internal gears, and so forth-and that is what determines through which hole it goes. [...] Well, that's not possible. It is not due to a lack of detailed knowledge that we cannot make a prediction... [...] If I have a circumstance in which I get that interference pattern, then it is impossible to analyze it in terms of saying, it goes through here or here, because that curve is so simple, mathematically-a different thing..."⁸⁸

Probabilities are predictions, generally we think of them in the form of an error %. When you hear that there is an 80% chance of something happening, it would be more proper to think not in terms of our ability to know the future but rather simply the error in the prediction. Our prediction is off by nearly 20%. Where quantum physics goes beyond our intuition is to imply that there is no such thing as 100% certainty or probability in an outcome; there will always be an error % in our prediction (not to imply there is somehow error in the world because that would be fallaciously assuming our models are more "right" than what they are attempting to model). In other words any mathematical model of reality will have this uncertainty. We have to reanalyze our expectations.

⁸⁶Feynman, Richard (1964) - *Probability and Uncertainty - The Quantum Mechanical View of Nature* - The Messenger Lectures, Cornell University, NY

⁸⁷ *Ibid.*

⁸⁸ *Ibid.*

This might be unintuitive for some, but it's not too different from what any theologian in the Islamic tradition has said for over a thousand years or even what many other philosophers have said about the nature of truth and knowledge.

This also does not necessarily imply a shortcoming in mathematics itself or a disconnect between mathematics and reality. The "disconnect", if there is one, emerges when we try to model the future based on what's happened in the past. Traditionally there would be 100% accuracy when observing events that have occurred and similarly in the active act of viewing or observing, but the certainty goes away when predicting the future. In this new view of the world (based on this principle of uncertainty) the uncertainty is no longer only in the future but also in the present (since we cannot both know a particle's current position and momentum at the same time).

Certainty gives way to the terminology of "determinacy".

Determinacy

The best way to understand the philosophical confusion that sometimes results from the scientific usage of the word "determinacy" (or conversely, "indeterminacy") is to understand what we are trying to determine.

If we are trying to determine the path of a particle in the double slit experiment, what does that mean? It's a peculiarity of speech because... what is actually determining the path of the particle? Certainly not us! We are, at best, trying to ascertain the path the particle takes.

When we are unable to determine the path of the particle without disturbing the particle and collapsing the interference pattern that would normally result, then Heisenberg's principle of indeterminacy comes in and makes sense.

Heisenberg, however, took this to mean that the path of the particle is actually being determined by us in a most literal fashion. That determining the path of the particle corresponded with "creating" the path of the particle. The only determinants are us. One can now see how Heisenberg got into this sort of thinking or view. Heisenberg went on to have a very anti-realist bias in his work. He argued for his "indeterminacy principle" (as he himself called it, though it is now more aptly and popularly called the Uncertainty Principle) as being like a law of nature.

Is it, however, a law? Is anything a law? Such an assertion shall always stand on shaky ground when everything rests on a philosophical problem, the uniformity of nature, and why we can rely on nature to be uniform without any justification whatsoever. Somewhat counterintuitively it seems Heisenberg is postulating as law... a law which undermines the foundation for all laws (determinism and the uniformity or predictability of nature).

Even in contrast to other laws of nature the Uncertainty Principle perhaps best holds the potential to be "broken", both philosophically because everyone can easily imagine that and is likely imagining it now even as they read this (one might go on to say that by default we imagine this law to be broken as the real matter of law) and in reality because it is a principle built on the shortcomings of our subjectively handicapped attempts at experimenting with the objective reality. For now though, there's no reason to suspect it as anything other than a deserving member of the pantheon of natural laws, so long as we put it in the proper philosophical context, void of any of Heisenberg's philosophical/ontological biases.

Prediction

What the Heisenberg Uncertainty Principle is all about, then, is predictability. The "uncertainty" in question basically means it is impossible for us to predict what happens with the particle. There is an inherent uncertainty which does not allow us to predict, through any law or equation, the momentum of a particle if its initial position is known, or vice-versa. I use the word "impossible" because this means it's not even possible for us to know what will happen with more equipment or a better understanding of physics. It would be impossible for even, let's say, some hypothetical advanced alien race with a complete mastery of physics. No one knows (but the creator of the particle and its path as we would say).

At this point, perhaps the best article I've found on the principle is the one from *The Stanford Encyclopedia of Philosophy*. If you wish to understand the philosophical implications of the principle (or even just the scientific concepts behind it), then this is a must read and I would recommend everyone do so, no matter their background in physics or familiarity with the subject matter:

Hilgevoord, Jan and Uffink, Jos, "The Uncertainty Principle", *The Stanford Encyclopedia of Philosophy (Spring 2011 Edition)*, Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/spr2011/entries/qt-uncertainty/>

Interpretations of Quantum Mechanics

This leads us to the various popular interpretations of quantum mechanics and their favored ontological views.

Once again the Wikipedia page on the subject more than suffices (their pages on science subjects are usually quite good),

http://en.wikipedia.org/wiki/Interpretation_of_quantum_mechanics

An interpretation of quantum mechanics is a set of statements which attempt to explain how quantum mechanics informs our understanding of nature. Although quantum mechanics has held up to rigorous and thorough experimental testing, many of these experiments are open to different interpretations. There exist a number of contending schools of thought, differing over whether quantum mechanics can be understood to be deterministic, which elements of quantum mechanics can be considered "real", and other matters.

This question is of special interest to philosophers of physics, as physicists continue to show a strong interest in the subject. They usually consider an interpretation of quantum mechanics as an interpretation of the mathematical formalism of quantum mechanics, specifying the physical meaning of the mathematical entities of the theory.

[...]

What interpretations are interpretations of is a formalism — a set of equations and formulae for generating results and predictions — and a phenomenology, a set of observations, including both those obtained by empirical research, and more informal subjective ones (the fact that humans invariably observe an unequivocal world is important in the interpretation of quantum mechanics). These are the more-or-less fixed ingredients of an interpretation. The ingredients that vary between interpretations are the ontology and the epistemology, which are concerned with what, if anything, the interpreted theory is "really about". The same phenomenon may be given an ontological reading under one interpretation, and an epistemological one under another. For instance, indeterminism may be attributed to the real existence of a "maybe" in the universe (ontology) or to limitations of an observer's information and predictive abilities (epistemology). Interpretations may be broadly classed as leaning more towards ontology, i.e. realism, or towards anti-realism.

Some approaches tend to avoid giving any interpretation of phenomena or formalism. These can be described as instrumentalist.⁸⁹

Please read that page before continuing.

I will cover these interpretations as they relate to Islamic theology. Before I begin, let me make it clear that the preferred Islamic theological stance need not be one. There are multiple interpretations of quantum mechanics that would be in line with Islamic theology. Moreover, it's not necessary that we prefer the realist interpretation because our theological definition of realism and the philosophical one used in physics are not

⁸⁹Retrieved 07/27/11

exactly the same. The *only* things which Islamic theology would be concerned with is that a picture is painted of a reality in which the necessary cause(s) are not identified within nature. Going on this alone, quantum mechanics or at least the basic “problems” posed by it are exactly what Muslims have been looking for. The only place where Islamic theologians and physicists part ways from one another is where those physicists become philosophers and start philosophizing about their own ideas of reality based on the same mathematics and experiments. As long as we agree on the experimental results and the mathematical formulations, the rest is a matter of philosophy.

The *epistemological* rather than ontological interpretations or interpretations of interpretations lend themselves most well to the Islamic theological worldview. Meaning, even an interpretation which seems to violate Islamic theology could be made more palatable if rethought as an epistemological interpretation rather than an ontological one.

The Instrumentalist Position

The “instrumentalist position” (summarized as “shut up and calculate”) is, obviously enough, the most compatible position with theology and what should likely be preferred in most cases concerned with science and not theology... *for now*. In other words, not as an indefinite or permanent position but until more can be known scientifically (or even theologically, in case the theological community comes to a consensus on new or updated approaches to metaphysics). This is, however, not an actual interpretation of quantum mechanics but rather the lack of one.

The Copenhagen Interpretation

The oldest and most well known approach, the Copenhagen interpretation was built on the work of Bohr, Heisenberg, and others in the 1920s. It is perhaps the least well fit to Islamic theology of all the mainstream interpretations. Its share of popular opinion in the physics community has steadily fallen with time. The issues with it are too numerous to get into here (from any angle, not just theological) and easily found via a Google search however its anti-realist stance is what most makes it unpalatable to our theological sensibilities.

After that, the central role of an observer, construed by some as the observer “creating” by observing (causing the collapse of wavefunctions) is also theologically unacceptable. This is, however, no longer the Copenhagen interpretation but now what’s more typically associated with the Eugene Wigler-Von Neumann “consciousness causes collapse” interpretation which has *very few* followers and is typically not given much thought by the physics community (but which has become a hit in pop culture science). There’s evidence that Heisenberg himself personally believed in something like this though he was unable to use his own uncertainty principle to justify such beliefs.

That's not to say some facets of this interpretation are not relevant to the Islamic view of reality. For example, the idea that a description of a quantum system (as in an experiment) must take into account the observer and measurement apparatus as a part of that system is a perfect reflection of fundamental Islamic epistemology.

Or the work of recent adherents of the Wigner-Von Neumann interpretation such as Henry Stapp, Roger Penrose and Stuart Hameroff (Hameroff is a physician while the others are physicists) who have done quite a bit of work on investigating a supposed quantum nature of the brain and how the latter can possibly act on a quantum level. Their work lends itself well to the sort of naturalist view of the brain or mind which is quite compatible, even favored, by Islamic theology.

The view of the wavefunction in the Copenhagen interpretation might also be relevant to any interpretation which similarly views the wavefunction in the context of its use as a mathematical tool and not some real entity unto itself (or which says we simply don't know what the wavefunction actually represents in reality, similar to Feynman's statement about the probability amplitude).

And lastly, the idea of "wavefunction collapse" (being caused by interference from measurement whether by a conscious observer or simply interaction with any apparatus) can also be relevant to other interpretations of quantum mechanics

The Many-Worlds Interpretation (MWI)

Credited to Hugh Everett in the 1950s, the MWI is a more pure "mechanistic" interpretation of quantum mechanics in which reality is considered a literal representation of the mathematics. Instead of a wavefunction collapsing, Everett theorized "quantum decoherence", that at every juncture the universe branched into multiple universes... that all possibilities corresponded to possible universes.

According to many-worlds all the possible outcomes of a quantum interaction are realised. The wavefunction, instead of collapsing at the moment of observation, carries on evolving in a deterministic fashion, embracing all possibilities embedded within it. All outcomes exist simultaneously but do not interfere further with each other, each single prior world having split into mutually unobservable but equally real worlds.⁹⁰

There are two glaring issues with Everett's theory from the viewpoint of Islamic theology. First and foremost is Everett's assertion that only the wavefunction is real. In short, he means that everything is the universal wavefunction and there are no such things as particles. He justifies this with nothing more than Occam's Razor indicating that particles

⁹⁰ <http://www.hedweb.com/manworld.htm#what> - Retrieved 07/31/11

aren't necessary for the math, only the wavefunction is, therefore they're redundant and unnecessary. He falls victim to the same sort of extremist reductionism that plagues many philosophers of physics. Occam's Razor isn't a law or even a principle, it's merely a guideline and in no way can justify such complete departures in our basic view of reality, especially in light of all the empirical evidence we have for particle physics which cannot be superseded by just what the physicist thinks is nice or elegant mathematics. However, the "particle" can be "put back" just as easily as it was discarded. In our view of the world Occam's Razor is not a justification for making claims about reality, only a guideline in helping develop theories to eventually test. The universe is what it is. As Richard Feynman (who has been reputed to have been a believer in MWI himself though I can in no way vouch for the truthfulness of such claims) himself put it in a famous quote (ironically in the context of him explaining his atheist views),

People say to me, "Are you looking for the ultimate laws of physics?" No I am not. I am just looking to find out more about the world. And if it turns out there is a simple ultimate law that explains everything so be it. That would be very nice discovery. If it turns out it's like an onion with millions of layers and we just sick and tired of looking at the layers then that's the way it is! But whatever way it comes out it's nature, it's there, and she's going to come out the way she is. And therefore when we go to investigate we shouldn't pre-decide what it is we are trying to do except to find out more about it.⁹¹

Going by many of Feynman's statements, he sounds like more of an instrumentalist than a follower of any of these interpretations which are probably ignored by most physicists who are usually more concerned with doing physics rather than philosophy (which is what these interpretations really amount to in the opinions of many of them).

Then there's the notion of infinite universes which may also seem completely antithetical to Islamic theology. In truth the idea that there exist an infinite number of real and separate "worlds" does seem to run counter to Islam however the theory can be adapted to form perhaps the best fit to some of the most predominant views of creation in the Islamic tradition. Let's consider several things,

1. A "Many-Worlds" theory is different from a "Multiverse". The former can be the latter, but not all notions of a multiverse are derived from the MWI. A multiverse could also be entirely separate universes who have no connected histories whatsoever and each branching chain of universes evolve from entirely separate starting points. In such a multiverse there wouldn't be multiple versions of "you". That notion, that there exist multiple versions of the same things in different universes, is "Many-Worlds" or MWI. Another way of stating it is that the "multiverse" invoked by the MWI is one universe evolving into multiple universes all in [superposition](#). Or you could say (though it may not be accurate, it makes the idea more intuitive and easy to grasp) it's "one" universe vibrating at different frequencies, each corresponding to a different version of the same

⁹¹Feynman, Richard -*The Pleasure of Finding Things Out*

universe (again, this is just to illustrate an example... there are no frequencies to speak of as far as I know).

2. It's certainly possible that the theory is true as is, despite its seemingly counterintuitive nature. The famous Ash'arite theologian and scholar, Fakhr al-Din al-Razi (1150-1210), criticized the idea of the Earth's centrality within the universe and theorized about a multiverse in his commentary of *Surah al-Fatiha*, the opening chapter of the Qur'an which says "All praise belongs to Allah, Lord of the Worlds":

It is established by evidence that there exists beyond the world a void without a terminal limit (*khala' la nihayata laha*), and it is established as well by evidence that God Most High has power over all contingent beings (*al-mumkinat*). Therefore He the Most High has the power (*qadir*) to create a thousand thousand worlds (*alfa alfi 'awalim*) beyond this world such that each one of those worlds be bigger and more massive than this world as well as having the like of what this world has of the throne (*al-arsh*), the chair (*al-kursiyy*), the heavens (*al-samawat*) and the earth (*al-ard*), and the sun (*al-shams*) and the moon (*al-qamar*). The arguments of the philosophers (*dala'il al-falasifah*) for establishing that the world is one are weak, flimsy arguments founded upon feeble premises.⁹²

Note that he combines the concept of a multiverse and the notion better reflected in the MWI (multiple versions of the same things, implying a branching chain of worlds or histories from one starting point arising due to quantum decoherence). The idea behind MWI, namely quantum decoherence, was obviously not understood until the modern day. So even though we know now that what he alludes to is a MWI-type interpretation, he was strictly focusing on the idea of a multiverse and not the mechanistic manner of God's creation.

Al-Razi explored three possible meanings of a multiverse. Multiple worlds (i.e, planets) within a single universe, multiple universes within an overall universe, or a multiverse beyond the universe. With regards to the idea of a multiverse within a universe (the middle of the three), his preferred theory it seems, his idea can be better understood as conforming to the idea of "bubble universes" from [chaotic inflation theory](#) in which there are multiple universes within one universe which is identified with the vacuum. Al-Razi himself argued as the basis for his multiverse theory the idea that there is an infinite space beyond the known world which was a vacuum or void⁹³ (which is derived from standard Ash'arite atomic theory) and that God had the power to fill the vacuum with an

⁹² Vol. 4 of his *Matalib* as quoted by Adi Setia (2004), "[Fakhr Al-Din Al-Razi on Physics and the Nature of the Physical World: A Preliminary Survey](#)", *Islam & Science* 2, retrieved 07/31/11

⁹³ Muammer İskenderoğlu (2002), *Fakhr al-Dīn al-Rāzī and Thomas Aquinas on the question of the eternity of the world*, [Brill Publishers](#), p. 79, ISBN 9004124802

infinite number of universes.⁹⁴ Both Al-Razi's idea of a multiverse and such theories of inflationary cosmology hinge on the vacuum.

3. There is direct theological support in the *hadith* canon for the idea of a MWI-type multiverse. The famous narration of Ibn 'Abbas (ra),

“Verily Allah created seven earths. Upon each earth is an Adam like your Adam, a Nuh like your Nuh, a Ibrahim like your Ibrahim, Isa like your Isa and a prophet like your Prophet.”⁹⁵

Controversy over its interpretations and implications has raged for a long time in the circles of Islamic theologians, though that isn't relevant to the subject at hand. Where such controversy broaches the issue of its authenticity, [here](#)⁹⁶ is an article to address that (might not make much sense to those not familiar with Islamic scholarship and the fields of hadith study).

What the hadith describes here can either be taken to refer to the relative chronological positions of the prophets (and not the individuals themselves) in which case it might be a proper multiverse, or it can be taken to mean multiple versions of the same people in which case it evokes the quantum decoherence of the MWI (the branching of multiple worlds from one).

One important thing to note is that God would not *necessarily* need to create “parallel universes” through the process of quantum decoherence in a mechanism similar to the Many-Worlds interpretation. We are simply drawing that parallel based on the emergence and popularity of the Many-Worlds interpretation in QM but it could just as easily become defunct or fall out of favor among the scientific community and therefore be irrelevant with respect to theology as well. That's the problem at the heart of any attempt to unite metaphysics with physics.

4. The literal mechanism of creation has been described in the past by Sufis or mystics in terms very similar to that of the MWI. Though only Sufis and esoteric theologians ever really delved into these matters, they do represent the answer of the mainstream Sunni orthodoxy when it comes to the question of how exactly does Allah create. Atomism lent itself to this view very well which is somewhat ironic since Everett was rather “anti-particle” in his expression of the theory.

This view can best be described as a version of MWI where instead of branching into real worlds, there is a branching of *possible* universes and God simply decides which to

⁹⁴ John Cooper (1998), "[al-Razi, Fakhr al-Din \(1149–1209\)](#)", *Routledge Encyclopedia of Philosophy* (Routledge), retrieved 07/31/11

⁹⁵ As narrated in *Dur al-Manthur* of Imam Suyuti

⁹⁶ <http://www.deoband.org/2010/08/hadith/principles-of-hadith/reprimanding-men-for-denying-the-athar-of-ibn-%E2%80%98abbas/>

create. The relationship between *possibility* and *reality* are unclear, so we don't know if Allah actually manifests possibilities in some unexplainable physical form (which could explain quantum phenomena) or if it's just one or several classical universes that are constantly recreated according to a path similar to that laid out by a MWI-type of view (which more or less is probably the same thing... the wavefunction). I have heard of this kind of interpretation of quantum mechanics described as "Alternate Histories" (not to be confused with the "Consistent Histories" interpretation which is much different). The main gist of this idea (for those concerned with the science) is that there isn't an infinite number of universes, only as many as God decrees (although He could decree an infinite number of them).

The way it's been described in old Sufi literature is best exemplified by Shaykh Ibn Arabi (1165-1240). Here's a brief description of the process,

The world or existence flows from one state to another non-stop, as our existence 'ascends' towards God. And God 'descends' towards our existence in the form of the states which are the 'descending' self-expressions of God. The world is lost and regained at every moment as God self-manifests Himself (His divine attributes or Names) in the form of the Divine archetypes (potentialities for the essences of all things, fixed before time). Imagine it like a kaleidoscope-kind of effect. These archetypes or 'potential states of things' manifest themselves first as infinite possibilities in our existence, which then become actual creation (*al-khalq-ul-jadid*), which then breaks into the next cycle.

[...]

God (Ultimate Unity, *ahadiya*) -> His Oneness (*wahidya*, His Divine Names or Attributes) -> fixed archetypes (*thabita*) ->

[(all possible things (*mumkinat*) correlates with all the universes in the Multiverse or the worlds of the Many-Worlds idea in quantum mechanics/ physics... basically the infinite, and the border of our reality...) -> in this mess, God's *qada* or judgements, corresponding to the fixed archetypes are 'made', which corresponds to a quantum decoherence of a superposition of possibilities or which world of the many-worlds comes about (multiple states existing at once resolving itself into one state) -> *qadar* (the outcome of the judgement, the new creation)]

<-> *al-khalq-ul-jadid* (the new existence created at the occurrence of any event, a.k.a. branching of the Worlds from the Many-Worlds theory... the constantly moving/shifting reality which we inhabit)⁹⁷

⁹⁷ <http://maarifah0.blogspot.com/2007/01/spiritual-intelligence-spirituality.html>

This is the most established, sound, and orthodox of the esoteric views of the universe from Islamic theology. It is the view I myself am inclined to (within reasonable uncertainty). This is also the scientifically second-most “safest” choice (after the instrumentalist position) due to the added weight of the scientific community’s increasing support for a MWI-type interpretation yet without any of the foibles of MWI. I should mention, however, that evidence indicating increasing support among the physics community for MWI is either scant or controversial so by no means can we definitively say that MWI is the most popular interpretation (the most popular interpretation is probably no interpretation!). Though as we know, human knowledge is fallible, so everything is subject to revision. There’s yet another theory which seems like it would be a good fit for Islamic theology.

The de Broglie-Bohm Interpretation (Pilot Wave Theory)

At first glance, the de Broglie-Bohm theory seems perfect. It advocates determinism, counterfactual definiteness (realism... it doesn’t throw the realness of particles out like Everett did but also postulates that the guiding wavefunction is real like MWI), no observer role, non-local hidden variables (which could easily be taken to mean God or something mystical and evidence exists that was the case for Bohm’s personal views). This sounds great from a theological perspective and it is certainly a contender were it not for the facts about Islamic theology laid out in the previous section on the MWI.

This theory says that there is a single wavefunction governing the motion of all of the particles in the universe. The motion of one particle depends on the positions of all of the other particles in the universe.⁹⁸ This guiding wavefunction is essentially the “hidden” variable the theory is known for (although popular belief is that the particles are the hidden variables when, in fact, they’re obviously not hidden at all as we can see and interact with them in our daily lives).

The de Broglie-Bohm theory has considerably less support in the physics community than either the Copenhagen interpretation or MWI but it has nonetheless chugged along and its proponents have continued working on it and it still does remain relevant.

The proponents of MWI (and critics of this theory) point out that because it also has the “real universal wavefunction” like MWI, it’s therefore a more convoluted (and hence, unnecessary) form of the same theory. We can actually reconcile MWI with the de Broglie-Bohm theory from the perspective of theology quite easily. The “guiding wavefunction” correlates more or less to what we discussed as “God’s decree” on which of the possible universes that branch from the MWI would become the real created universe(s). So it does seem like this is the theory that best fits Islamic theology insofar as any of these interpretations can really “fit” the theology at all (at best each interpretation has some pros and cons relative to our worldview).

⁹⁸ http://en.wikipedia.org/wiki/De_Broglie%E2%80%93Bohm_theory - Retrieved 07/31/11

This brings up interesting questions about the nature of the wavefunction. While some of these interpretations are quick to say that the wavefunction is real (or that it's the only real thing), the truth is we don't *really* know what it represents. Even though we should do our best to avoid falling into the "God of the gaps" trap, I do believe that this is fundamentally more than just a "gap". If we see this "guiding" wavefunction as ultimately corresponding in some way to "God's decree", from the inception of the universe until now, then it reconciles this theory with MWI in a form similar to what the traditional view of creation had already been in Islamic theology.

Some support for this exists within the theory itself.

Dr. de Broglie presented his pilot wave theory at the 1927 Solvay Conference, after close collaboration with Schrödinger, who developed his wave equation for de Broglie's theory. At the end of the presentation, Wolfgang Pauli pointed out that it was not compatible with a semi-classical technique Fermi had previously adopted in the case of inelastic scattering. Contrary to a popular legend, de Broglie actually gave the correct rebuttal that the particular technique could not be generalized for Pauli's purpose, although the audience might have been lost in the technical details and de Broglie's mild mannerism left the impression that Pauli's objection was valid. He was eventually persuaded to abandon this theory nonetheless in 1932 due to both the Copenhagen school's more successful P.R. efforts and his own inability to understand quantum decoherence. Also in 1932, John von Neumann published a paper, claiming to prove that all hidden-variable theories are impossible. This sealed the fate of de Broglie's theory for the next two decades. In truth, von Neumann's proof is based on invalid assumptions, such as quantum physics can be made local, and it does not really disprove the pilot-wave theory.

De Broglie's theory already applies to multiple spin-less particles, but lacks an adequate theory of measurement as no one understood quantum decoherence at the time. An analysis of de Broglie's presentation is given in Bacciagaluppi et al.

Around this time Erwin Madelung also developed a hydrodynamic version of Schrödinger's equation which is incorrectly considered as a basis for the density current derivation of the de Broglie–Bohm theory. The Madelung equations, being quantum Euler equations (fluid dynamics), differ philosophically from the de Broglie–Bohm mechanics and are the basis of the hydrodynamic interpretation of quantum mechanics (quantum hydrodynamics).

Peter R. Holland has pointed out that, in 1927, Einstein had submitted a

preprint with a related proposal but, not convinced, had withdrawn it before publication. According to Holland, failure to appreciate key points of the de Broglie–Bohm theory has led to confusion, the key point being “that the trajectories of a many-body quantum system are correlated not because the particles exert a direct force on one another (à la Coulomb) but because all are acted upon by an entity – mathematically described by the wavefunction or functions of it – that lies beyond them.” This entity is the [quantum potential](#).⁹⁹

The “quantum potential”, in turn, is also called the *information potential*. It is so called because, “it carries information about the whole experimental arrangement in which the particle finds itself.”¹⁰⁰

As we discussed in the section on the argument for occasionalism, one of the arguments for God was causality and more specifically the information aspect of it (an entity which specifies the information concerning events). I'll discuss the impact of information in physics more in the following sections.

Quantum Field Theory

Where quantum mechanics truly departs from traditional ideas of particle physics is with quantum field theory. QFT is a way to construct a quantum mechanical model of a field from classical physics, such as the electromagnetic field. Particles are then treated as excitations or “ripples” in the field (or you could say if we quantize a field, then particles are the field quanta). The constant rippling of a field would correspond to the creation/annihilation of elementary particles, otherwise known as quantum fluctuations (sometimes called vacuum fluctuations when referring to the vacuum which is the ground state of all the fields in space).

The classical visualisation of “everything is particles and field”, in quantum field theory, resolves into “everything is particles”, which then resolves into “everything is fields”.¹⁰¹

In perturbative treatments of QFT, the fundamental forces are mediated by particles as well. For example, photons, in addition to being the real observable quanta of light are also the force carriers for the electromagnetic force/field. These force carrier photons arise from the mathematics of [perturbation theory](#) and hence, not being real or observable particles, are termed “virtual particles” or “virtual photons” (as opposed to “real photons”). In physics, it is these “virtual particles” which are undergoing

⁹⁹ http://en.wikipedia.org/wiki/De_Broglie-Bohm_theory - Retrieved 08/01/11

¹⁰⁰ http://en.wikipedia.org/wiki/Quantum_potential - Retrieved 08/01/11

¹⁰¹ http://en.wikipedia.org/wiki/Quantum_field_theory - Retrieved 06/17/11

seemingly spontaneous creation and annihilation, even out of the vacuum of space. The “vacuum field” then is simply the ground state of all the fields in space, so there really is no “empty” space.¹⁰²

Are fields real? I am certainly in no position to answer that. But the answer to that question has no direct bearing on Islamic theology since a “fields-centric” theory would accomplish the same thing that Islamic atomism did in previous centuries. The point of Islamic metaphysics is to explain the basic Islamic theological idea of God’s constant creating and re-creating of the universe such that all which is in existence is constantly and ever dependent on Him for remaining so (as all effective causality points towards God since all power and “change” is through Him). The basic theological model of atomism accomplished this for the purposes of philosophical expression in the past. These days such expression has to be in more scientific terms so if a field-based theory best expresses that principle then so be it.

The philosophical implications of such a view bring up the issue of pantheism. It remains, however, a non-issue so long as one keeps in mind that all of creation (in this universe at least) being described by a field theory says nothing about God or the distinction/separation between Creator and creation. Even if we and everything around us are all “woven” out of the same “fabric” of spatial-temporal existence, God is something else altogether.

Gravity

Gravity was discussed earlier in the section on quantized time. There’s not much more to say about it from a philosophical standpoint.

Gravity remains the elusive key to a comprehensive theory of everything which explains all the visible mechanisms of this universe’s inherent order in a holistic paradigm.

Because of the ambiguity surrounding it, gravity has been a lightning rod for philosophy. Everyone has used gravity to ground their philosophical musings, whether it’s those who are proponents of quantized time theories or whether it’s those who paint a picture of gravity as the “negative energy” which balances the equation of the universe and answers the problematic questions of origin (usually pushed by those with an atheistic agenda).

The latter are a direct answer to the basic logic that lies at the heart of well reasoned theologies (including occasionalism) which use causality to argue for God. It takes the convenient unpredictability inherent in quantum mechanics and applies it on a grand scale to the universe itself, which is why gravity is described in terms of negative energy

¹⁰²See: [Vacuum state](#) and [Zero-point energy](#)

(there are laws describing symmetry between gravity and mass, so here matter is described as positive energy and gravity as negative). The fact is that such assertions are not completely in the realm of science but reach into philosophy and have so little going for them in the way of actual scientific backing that they amount to little more than alternative philosophies based on finding any sort of balanced mathematical description possible.

Before anyone tries to sell you on such theories by talking about how matter and gravity seem to so perfectly match up, remember that we've already known this for a long time, since Einstein. Gravity is, according to his general theory of relativity, the curvature of spacetime in relation to mass. So *of course* gravity and matter are going to "cancel out" (since we've defined them in terms of each other) and so long as there's nothing new hidden in physics somewhere, *of course* the universe *should* appear flat overall. The significance of whether we live in a flat universe is that if there's no other natural law lurking about then the relationship between gravity and mass should describe an overall flat universe. As such claims go, if the universe is completely or perfectly flat, then the "energy" (treating gravity as negative energy) is low enough that if we're treating the entire thing in terms of a quantum fluctuation, it's one that can last forever. This brings us back to an infinite universe, infinite in time (a potential infinite at least, something which can theoretically go on forever in the future) and space (its flatness meaning it goes on forever since it doesn't form a closed shape).

This is then used as an attack on the traditional basis of theism/theology which is to say the causal origin of the finite universe in time. First off, it's still a huge leap to go from the potential infinite described by "a quantum fluctuation that can last forever" to an actual infinite. The former still describes a point in time as the origin of the universe, it just argues that such a thing could come about or start at that point in time spontaneously as quantum fluctuations do. It is an assumption which rests on the idea that quantum phenomena happen of their own accord... the same age old idea of inhering effective or primary causes in nature despite having no suitable explanations of how exactly this occurs (don't look to our ambiguous definitions of ideas like "power", "work", or "energy"). Though theology (occasionalist at least) and science have consistently shot down such efforts throughout the ages, some try to force a return to the old way of perceiving nature and natural causality by just going to the furthest extents of where our scientific knowledge stops and essentially saying "okay, so the [natural] cause starts beyond this point", ironically mirroring the arguments of the theists. Right now this happens to be at the level of quantum phenomena like quantum fluctuations.

String Theory

String theory deserves special mention out of all the candidates for "theories of everything" which try to give gravity the quantum treatment (in combining general relativity with quantum mechanics). So far it has been the candidate with the most

support although it's not nearly enough to be considered the favorite because there simply isn't a favorite.

String theory basically says that the elementary particles are not dimensionless objects or "points" but are actually made of 1-dimensional vibrating strings of approximately the Planck length in size. The "*jawhar*" (substance) here is the string. The "*aradh*" (accident) is the specific vibration or oscillation of the string due to tension and kinetic energy which describes the sort of elementary particle (quarks, electrons, etc) it is seen as. The strings vibrate in several additional "compactified" spatial dimensions required by the theory (the current most popular flavor of string theory, M-Theory, has 11 dimensions)

One of these elementary particles is the elusive graviton, thus making string theory a theory of quantum gravity.

Another product of string theory is the "brane", or membrane. A multidimensional object which exists across all spatial dimensions. In the earliest forms of the theory strings were simply "1-branes" or 1 dimensional membranes. In current M-Theory, strings are 1 dimensional "slices" of 2 dimensional membranes.

The interaction of heavy multidimensional branes has been postulated as a possible precursor of the Big Bang and the universe (any such collision could lead to the birth of a universe). These theories are collectively called "brane cosmology".

What matters here is that no aspect of this theory fundamentally conflicts with anything regarding Islamic theology. Or at least of the current most popular forms of the theory (as there are several variants most of which are not fully developed). It's highly theoretical and the jury is still out on it for many physicists so it's not something grounded in solid empirical basis which theology has to care about. On the other hand, it seems like a very good fit and there's no lack of Muslims who are eager to bring string theory into Islamic theology and metaphysics. This is not advisable because theology should be restricted to necessary truths whether derived from empirical truth, rationality held to account by logic and scripture (and string theory has not yet passed this test of rational necessity otherwise it would be accepted far more widely than it is) or derived purely from scripture. Speculation, as has been discussed in detail here, should be left out of theology lest a mess is made of things.

Cosmology

Though one would expect the subject of quantum mechanics to be the more difficult to discuss conceptually it's actually not so. The discussion above on quantum phenomena were relatively straightforward and short. This is because there is a clear demarcation between "standard model" quantum mechanics, theoretical models (string theory, etc), and metaphysical interpretations of quantum mechanics.

In cosmology this isn't the case. There are multiple models used for different things which sometimes conflict with each other and the field itself is potentially evolving in multiple different directions. Plus the issue has been conflated with metaphysics for quite some time and is a fiercer battleground of philosophies leading to the propagation of all manner of misinformation.

My goal here is to describe the common cosmological arguments advanced in anti-theistic philosophies and describe, conceptually, their basis in actual cosmology as well as standard cosmological models and their interpretations and how they conflict, if at all, with any aspect of Islamic metaphysics.

To accomplish this I tackle the same issue several different times from multiple angles so there is a high degree of redundancy here. But in an effort to leave no stone unturned in providing a mathematics-free conceptualization of basic cosmological ideas I felt I had no other choice. Thus instead of 2 or 3 pages the length is literally several times that. The discussion of the physics here is by no means authoritative, at best it points the reader in a direction to seek more information.

Big Bang

Before anything else something needs to be cleared up regarding the Big Bang. The Big Bang was not an explosion in the strict sense of the word. It was a sudden (relative to our passage of time) expansion *of* space (if we could even call that form it was in "space"), not an expansion *in* space. It was metric expansion. The definitions of how we mark the passage of distance in space changed. Space itself increased in size everywhere. Clumps of matter, due to other forces, didn't but were pushed far apart as a result (despite "standing still" relative to the space around it). This happened faster than the speed of light which only applies to matter, not space itself. This is why galaxies appear to be moving further apart from each other so quickly. There were varying phases of expansion including current expansion today due to dark energy.

The common analogy used is flawed but serves to illustrate the relation of metric expansion of space to matter. Imagine two insects on the surface of a balloon as it's inflated. They will be pushed apart despite not moving relative to the space around them. They would have the same latitude and longitude as before but distance between them would increase and this is what is known as "comoving coordinates".

The name "Big Bang" is a misnomer and was actually coined by an opponent of the theory to mock and marginalize it.

The Universe: Infinite or Finite?

Another concern for some may be the widely accepted idea in the current scientific community that the universe is infinite in size. While most theologians like Al-Ghazali concerned themselves with the idea of the universe's origin in time, the issue of space isn't so directly addressed.

The concern usually arises from the aforementioned excerpts of scripture testifying to the finite nature of the universe. What should be kept in mind is that these verses are most applicable to the matter or energy in the universe and not necessarily space itself. An "infinite" space is a tolerable idea, even theologians like Fakhr al-Din al-Razi theorized about an infinite vacuum. But the vacuum is not "nothing", so, would a theory of "infinite space" really also be touting infinite matter or energy and therefore be contradicting Islamic theology?

If interpreted in this way, then yes, it would. It doesn't conflict with theology in principle (i.e, it's something within God's power), it just contradicts the aforementioned verses which past scholars have interpreted to mean the universe is finite (in terms of matter). Therefore we do not have to accept the notion of an infinite universe (in space) if we're interpreting space in this manner. Let's be clear, however, that plenty of scientists do not believe possibly infinite geometry of the universe also necessarily means infinite mass, energy, or time.

Our objection is possible because first of all the idea of the universe being infinite in size isn't truly scientific as much as it is philosophical. It's an assumption (whether they state it as such or not). It can never be directly empirically verified. Just as easily as they can say "we assume the universe is infinite" we can say "we assume it's not", and it really could just end there. But the goal here is to understand the reasoning behind such claims.

It's the natural consequence of the way we see the universe. When, for complicated reasons I'll touch on, we define the idea of an "edge" to the universe as incoherent, then the universe must go on forever. And if it's infinite then, it's infinite now and always has been infinite (going by our logic and how we conceive of infinities). This is, succinctly, the entire argument you will receive. Already we lose even a few non-Muslim observers because such logic begins to fly in the face of common sense. It's playing around with definitions. An infinite universe shortly after the Big Bang existed in the size of a golf ball then expanded for 13+ billion years and remained infinite? Something sounds off there to the non-mathematician.

This entire argument comes about from the discussion on the universe's "flatness". As GR (general relativity) theorizes, spacetime *curves*. We see this happen wherever there is gravity (for instance, in how the planets orbit the Sun). When we decided to see whether there is such curvature at a large scale across the universe (which general relativity allows for, which is the reason it became a possibility in our minds to

begin with) using observations and measurements of distant stars, galaxies, cosmic radiation, etc, we found that the universe on a large scale is mostly void of curvature. Not *completely* but enough to suggest that it probably is and we're just hitting the limits of our measurement ability.

This is where the first issue comes up. There's no real reason to think a very slight positive curvature as presently measured is anything but the actual case. The universe is very, very, big. If it's a sphere to boot then we'd expect the positive curvature to be very slight, owing to its enormous size. It would appear to us as close to flat (not unlike the debate among ancient humans about a flat or round Earth), but not quite there.

Plus there's the matter of [cosmological inflation](#) which has become popularly associated with Big Bang cosmology. According to this idea inflation is what has driven the universe to its current "nearly flat" shape but it does not necessarily stay that way. I will come back to inflation later in this section.

Secondly, even *if* the universe is flat, so what? Why does a flat universe (no curvature) imply an infinite universe? Again, because of the unbounded nature of it. The "infinite" has crept in here as another way of referring to the unbounded, "borderless" nature of the universe because for reasons I won't go into which seem quite reasonable, the universe is assumed to be isotropic and homogeneous. This is called the "cosmological principle" and it's an assumption which is the foundation of modern cosmology. This alone confers a substantial degree of uncertainty on any theory coming out of cosmology regardless of empirical predictive power.

An "open" universe (the open saddle (hyperbolic) shape or flat shape) is problematic because it can (usually) imply that there is a border. So to avoid that we say it's infinite. Which forces the conclusion that it's always been infinite and the only thing which has changed is the *scale factor* as the universe expanded. This still doesn't clear up the confusion regarding how "infinite" could be packed into a singularity (as Big Bang cosmology implies) and then expand. Physicists in this field have convinced themselves that there is no confusion but anyone else can admit the counterintuitiveness of such a model.

The main reason we jump to the infinite model is because the model we use for the universe is a flat Euclidean space which is infinite. Instead of making a new model, physicists used the ancient Greek idea which functions fine enough. Though this means picking up the philosophical baggage of an "infinite". Yet some physicists will insist that not only does the amount of *actual* or *real* matter in the *actual* or *real* universe add up to a number that is neither even, odd, or even real, they will insist that questioning this apparently ridiculous idea is the real philosophical baggage! On the surface this sounds less like science and more like religion. As we see it, when they depart from empirical truth then there's no reason to trust their musings as unquestionably true. The source of the problem (and which exonerates such physicists from being considered irrational) is

the differing definitions or ideas of “infinity”.

The mathematical definition of infinity to which physicists also refer is stated thus,

Infinity (symbol: ∞) refers to something without any limit, and is a concept relevant in a number of fields, predominantly mathematics and physics. Having a recognizable history in these disciplines reaching back into the time of ancient Greek civilization, the term in the English language derives from Latin *infinitas*, which is translated as "unboundedness".¹⁰³

So one can see the clear correlation between “unbounded” or “endless” and the idea of a flat universe. From this simple and logical premise, however, follow some necessary conclusions... like that the universe must then also be filled with an infinite amount of energy and mass. That is where things start to become incoherent if one believes in realism (that the universe and everything in it really exists, as opposed to various flavors of anti-realism).

The infinity that most people think about is usually a concept derived from the philosophical term which can refer to “without constraint”, and this includes being without dimensional constraints. This is clearly not anything admissible in any physical study of the world. Other synonymous ideas include “unlimited” (even beyond dimensional limitations). In other philosophical disciplines it can also mean something akin to “cannot be defined”.

The idea of God is usually associated with this latter view,

In Judeo-Christian theology, for example in the work of theologians such as Duns Scotus, the infinite nature of God invokes a sense of being without constraint, rather than a sense of being unlimited in quantity.¹⁰⁴

Early Indian civilization had a very robust philosophy of infinity which is enlightening even today,

The Indian mathematical text *Surya Prajnapti* (c. 400 BC) classifies all numbers into three sets: enumerable, innumerable, and infinite. Each of these was further subdivided into three orders:

- Enumerable: lowest, intermediate and highest
- Innumerable: nearly innumerable, truly innumerable and innumerably innumerable
- Infinite: nearly infinite, truly infinite, infinitely infinite

¹⁰³ <http://en.wikipedia.org/wiki/Infinite> - Retrieved 04/06/12

¹⁰⁴ [http://en.wikipedia.org/wiki/Infinity_\(philosophy\)](http://en.wikipedia.org/wiki/Infinity_(philosophy)) - Retrieved 04/06/12

The Jains were the first to discard the idea that all infinities were the same or equal. They recognized different types of infinities: infinite in length (one dimension), infinite in area (two dimensions), infinite in volume (three dimensions), and infinite perpetually (infinite number of dimensions).

[...]

In the Jaina work on the theory of sets, two basic types of infinite numbers are distinguished. On both physical and ontological grounds, a distinction was made between *asaṃkhyāta* ("countless, innumerable") and *ananta* ("endless, unlimited"), between rigidly bounded and loosely bounded infinities.¹⁰⁵

It is for this reason that there is a knee jerk reaction to any mention of infinity. In this respect an infinity is impossible (i.e, absurd) if posited of anything other than God. However, in the mathematical respect such a dimensionally constrained infinity (even if multidimensional) is not theologically beyond the power of Allah for as Fakhr al-Din al-Razi posited, Allah could create an infinite number of universes in an infinitely large void. This is referring to "endless". How? It is beyond our minds to comprehend how exactly, though we can (and do) comprehend manipulating dimensional constraints for the very possible existence of an actual "endless" mathematical infinite quantity (which, however, would not meet the requirement for the transcendental philosophical infinity). The main reason that we shun even the "endless" definition in favor of simply "countless" is due to the aforementioned Qur'anic verses which have been interpreted by the early scholars to refer to the finite nature of the universe (in quantity of content). Keep in mind this was an instrumental building block of the Islamic metaphysics of atomism (as mentioned in the earlier section on *jawhar*). Could our interpretations be wrong, whether in totality or partially to a degree? Of course, since Allah is the omniscient and knows best. But lacking hard authoritative physical evidence, there is no reason to depart from the obvious literal interpretation.

Returning to the issue of the universe there are, on the other hand, flat and *closed* models,

In a flat universe, all of the local curvature and local geometry is flat. It is generally assumed that it is described by a Euclidean space, although there are some spatial geometries that are flat and bounded in one or more directions (like the surface of a cylinder, for example).

The alternative two-dimensional spaces with a Euclidean metric are the cylinder and the Möbius strip, which are bounded in one direction but not the other, and the torus and Klein bottle, which are compact.

In three dimensions, there are 10 finite closed flat 3-manifolds, of which 6 are

¹⁰⁵ *Ibid.*

orientable and 4 are non-orientable. The most familiar is the 3-Torus. See the doughnut theory of the universe.¹⁰⁶

The only reason these alternative shapes aren't more widely accepted is purely philosophical and speculative. The infinite Euclidean space is considered "simpler" and therefore most popular with Western physicists. Most will acknowledge that we will likely never be able to know if the universe does indeed have any significant global topology. The 3-Torus or doughnut model is perhaps the most popular of the alternatives and the one you might have already heard of.

Allow me to interrupt this train of thought with an objection. The physics community long ago abandoned hope of simplicity with the development of complicated models like general relativity and later quantum mechanics. To insist upon Occam's Razor as some guiding influence after these developments is disingenuous, its usage becomes completely arbitrary. It serves as an excuse to follow your personal feelings and not any real philosophical principle. The situation has only become exacerbated in recent times with half the answer of any physicist to a layman's question consisting of talking about how enormously difficult the models of current physics are to conceptualize (and the other half being a regurgitation of math the physicist doesn't fully know how to interpret themselves). There should be no doubt about it. Occam's Razor (in physics at least) is dead. Be suspicious of anyone who invokes the simplicity argument in physics today.

Other problems with philosophy in the matter of interpreting the mathematics include becoming overly reliant on the "hypersphere" model of the universe. A hypersphere is a 3 dimensional sphere embedded in a 4-dimensional Euclidean space. These 4 dimensions do not refer to the 4-dimensional spacetime of the universe but rather 4 spatial dimensions (as opposed to the actual 3 of the real universe). This model is used for modelling the intrinsic curvature of the universe (a result of the total mass-energy density of the universe in General Relativity). Intrinsic curvature does not require a 4th spatial dimension but modeling it in this way, in the manner of extrinsic curvature, does make things easier on paper. Some people (either not well versed in physics or who are out to mislead those who aren't well versed in physics) get carried away and put the carriage before the horse. Since the universe is "supposed to be" flat and the universe "is" a hypersphere (it actually isn't, in case I didn't make that clear), that means there has to be an infinite-sized radius along the 4th spatial dimension which is then somehow interpreted to correlate to the theoretical infinite size of a flat universe (nevermind that you can just remove curvature altogether to get the flat universe). There are so many things wrong with this approach that it would be obvious to any serious student of physics. If you run into anyone making any kind of claim of this nature just turn away from them or try to get them to contact a knowledgeable physicist. If I had not run into such people myself I would not have mentioned it here.

Yet another related problem due to incorrect or too much "visualizing" related to the

¹⁰⁶ http://en.wikipedia.org/wiki/Shape_of_the_universe#Flat_universe - Retrieved 04/06/12

hypersphere is confusing 4D Euclidean space with something like 4D Minkowski spacetime (the latter used in special relativity). In the latter there are 3 dimensions of space and 1 of time (and it's "flat" in that there is no intrinsic curvature). In the former there are 4 dimensions of space. Sometimes people convert between the two for the purposes of making math easier (especially when working with general relativity which posits curvature of spacetime) and sometimes forget to "convert back" (at least conceptually). An extreme and warped version of this mistake happens often with non-physicists, physicists in training, or physicists who speak a lot on philosophy and metaphysics. They confuse the 4th spatial dimension of the Euclidean space with the dimension of time. This is because they model the 4th spacelike dimension in Euclidean space as corresponding to "imaginary" time and then think it represents reality forgetting that the dimension is actually supposed to be "timelike" in reality (as it is modeled in Minkowski spacetime), not spacelike. The problem here is modeling a Euclidean *space* as a *spacetime* (discussion on the definitions of these words will be forthcoming). When this 4th spacelike dimension of time in Euclidean space is taken to represent the elapse of infinite cosmic time, the critical density (which is literally defined as "the mass density of the universe which just stops the expansion of space, after infinite cosmic time has elapsed") represents the flat curvature of the resulting shape (the hypersphere) because if the hypersphere's radius goes to infinity (the mistake carrying over from the previous example), it must be flat. What we have here is a coalescing of conceptual problems (specifically the problem of boundaries which drives physicists to seek an "open universe" solution). But let us be clear... there is no *actual* "geometry" of an *actual* spacetime. There is only the mathematics of geometry (which do reflect on reality in the behavior of matter). The mathematics of geometry were developed to describe shapes so we automatically make the assumption that they always must be describing real physical shapes. The curvature of spacetime in general relativity is *intrinsic*, it's not a hypersphere. It can't really be truly visualized. And again, physics is not following some Platonic ideal (according to the realists like us as well as any empiricists or naturalists), it is representing the *behavior* of nature. The behavior can be described as the curvature of spacetime. Any notion of further spatial dimensions requires moving to something like string theory.

What is intrinsic curvature? From Wolfram MathWorld:

A curvature such as Gaussian curvature which is detectable to the "inhabitants" of a surface and not just outside observers. An extrinsic curvature, on the other hand, is not detectable to someone who can't study the three-dimensional space surrounding the surface on which he resides.¹⁰⁷

And from the Wiki page on Gaussian curvature,

It is an intrinsic measure of curvature, i.e., its value depends only on how distances are measured on the surface, not on the way it is isometrically

¹⁰⁷ <http://mathworld.wolfram.com/IntrinsicCurvature.html>

embedded in space.

This should sound about right because the expansion of space is a metric expansion as mentioned earlier. At various points of time the scale factor (usually given as $a(t)$) varies giving us different measures of distance which results in curvature of the function (by the way these functions of defining distance are called “metrics”). The scale factor corresponds to the radius of the hypersphere. This can be modeled using Riemannian geometry (the curvature is defined at each point in a Riemannian manifold).

Intrinsic curvature is a property of something such that it is independent of embedding. Still this does not fully shed the idea of being attached to another dimension or the idea that the curve is physical in some way. Remember, the curvature of spacetime represents a *behavior*. In reality, time is not a static object, we can barely even define what it is or how it passes and there are, in fact, models of physics which try to forego time altogether. If time is not an actual, physical object then functions of time cannot be modeled physically (or spatially) and remain physically applicable to reality. It gives us a decent geometry to visualize and play around with but that geometry doesn't literally describe static reality. What is the use of such math? It helps us make predictions about the behavior of nature.

So what is the shape the math is describing? First of all, the RW (or FRW or FLRW) metric is describing the shape *of the expansion* of the universe with time. The expansion is a function of time. It is a shape *of that function*. Not the shape of the universe though it does affect that.

What do we mean by shape of the expansion? For instance, we can apply a “spherical expansion” function to a non-spherical object. What results? The object's shape would deform but not necessarily become a sphere. Similarly we can apply a “flattening expansion” to a sphere and it would flatten to some degree but not necessarily become completely flat (an example of a “flattening expansion” is inflation which is discussed in the next section).

What do we mean by the expansion being a function of time or the phrase “expansion *in time*” or “expansion *with time*”? It means the result isn't just spatial, it's temporal. If the expansion was an open one (if the shape of the function was hyperbolic) that means it would *continue expanding forever*. If the expansion was a closed one (if the shape of the function was spherical) that means it would eventually stop expanding and end in a Big Crunch. If the shape of this is flat it means the universe would continue expanding until it stops after an infinite amount of cosmic time has elapsed. The “shape” here is predicting the future behavior of the universe. The only way to observe this as a physical geometric shape would be if time itself became spacelike instead of timelike. This is an impossible scenario for humans to function in let alone observe anything. This view of spacetime can be modeled using the Robertson-Walker metric (and hence called Robertson-Walker spacetime, similar to the posters you see of the universe's history in time where

it starts off from a small point, sharply expands during inflation, and then continues a slow expansion, [looking like a misshapen cone](#)).

Think of it this way, can you see the gravitational wells which conceptually form the orbits of heavenly bodies? No, all you see are the bodies (matter) “running” in their orbits. The space (assuming no light from background sources) would *look* identical with or without the gravity. Because space is invisible (i.e, nothing as far as we’re concerned) and so is gravity (and of course, time). Of course gravitational distortion (gravitational lensing) of light is possible so it can affect what we see (in that light is a physical thing and is affected much like matter but the gravity itself is not seen). So how could we ever “see” the shape of the universe’s intrinsic curvature on a global scale if we can’t on a local scale?

Also keep in mind we cannot see time. For us time is pretty much a measure of change, the rate at which things happen. So if time distorts or bends that would only manifest as a change in the behavior of other things (i.e, space). It’s something that cannot even be observed unless you could magically simultaneously observe two different events in the universe together each in their local reference frame (defying all the laws of physics).

So what is the actual shape of the universe? We don’t know. In 3 dimensions it’s probably spherical or close to it since the Big Bang would have occurred in all 360 degrees. The word “shape” loses it’s meaning when taken beyond spacelike dimensions. Even in 4 or more spacelike dimensions it becomes abstract as it wouldn’t correlate to what we can actually see. The point is even if the universe were shaped spatially like a 3D cone (unbeknownst to us), the shape of the expansion of the universe in time would still be, for example, flat.

And lastly, the second part of the previous question, what is the shape of *spacetime* itself at the global level? Keeping in mind from the previous paragraph that “shape” here is not a real shape due to the timelike nature of the fourth dimension.

Well, what is spacetime? The “real” answer is that it’s nothing. The physics answer is that it is mathematics. Since Einstein’s general relativity the popular perception has been to think of spacetime as a fluid or rubbery substance that “fills” the universe (since gravity seems to make “it” behave that way) though it’s reputed that Einstein said only 12 people understood general relativity conceptually in his time and since then everyone’s said understanding physics conceptually is a monumentally difficult task. I do not believe it is fundamentally difficult but it is difficult for information to propagate among people when it started off among so few and disseminating it is a different conceptual problem altogether (how to communicate).

Spacetime is a way to measure the distance (in space and time) between events.

Wikipedia says,¹⁰⁸

Mathematically it is a manifold consisting of "events" which are described by some type of coordinate system.

Space can be said to be a way to measure the distance between two masses. An event, on the other hand, is more like an *action*. Something that *happens* (in time). Space happens not to be empty (it is filled by the vacuum field, the ground state of all fields) but it is itself not a *thing* (the vacuum field can be said to be a thing).

It goes on to say,

Spacetimes are the arenas in which all physical events take place—an event is a point in spacetime specified by its time and place. For example, the motion of planets around the sun may be described in a particular type of spacetime, or the motion of light around a rotating star may be described in another type of spacetime. The basic elements of spacetime are events. In any given spacetime, an event is a unique position at a unique time. Because events are spacetime points, an example of an event in classical relativistic physics is (x, y, z, t) , the location of an elementary (point-like) particle at a particular time. A spacetime itself can be viewed as the union of all events in the same way that a line is the union of all of its points, formally organized into a manifold, a space which can be described at small scales using coordinates systems.

A spacetime is independent of any observer. However, in describing physical phenomena (which occur at certain moments of time in a given region of space), each observer chooses a convenient metrical coordinate system. Events are specified by four real numbers in any such coordinate system. The trajectories of elementary (point-like) particles through space and time are thus a continuum of events called the world line of the particle. Extended or composite objects (consisting of many elementary particles) are thus a union of many world lines twisted together by virtue of their interactions through spacetime into a "world-braid"...

However, in physics, it is common to treat an extended object as a "particle" or "field" with its own unique (e.g. center of mass) position at any given time, so that the world line of a particle or light beam is the path that this particle or beam takes in the spacetime and represents the history of the particle or beam. The world line of the orbit of the Earth (in such a description) is depicted in two spatial dimensions x and y (the plane of the Earth's orbit) and a time dimension orthogonal to x and y . The orbit of the Earth is an ellipse in

¹⁰⁸ <http://en.wikipedia.org/wiki/Spacetime> - Retrieved 04/10/12

space alone, but its world line is a helix in spacetime.

The first way we can take it is to essentially reduce it to a coordinate system. What do we mean when we say spacetime “bends”? The coordinate system used to measure the events *changes with those events*. Which can simply be interpreted to mean (naturalistically) that events act upon one another through the fundamental forces and “default” spacetime (i.e, flat, with no intrinsic curvature) is a coordinate system devoid of these effects.

That’s not to say they are both entirely abstract because in the case of time a very good argument can be made that it is an actual *thing* which we experience. That it has a *behavior* (the arrow of time). Though it can also be argued in anti-realist contexts that the behavior is an illusion though that leaves unanswered the question of what exactly is driving the illusion of animation (even though the doctrine was designed to avoid having to answer the question what was driving time in reality in the first place). When time bends it means more than saying “space” bends because our experience of time is so intuitive and fundamentally tied in with all experiences.

When we say something affects the “geometry” of spacetime what we’re saying is that the geometry of the abstract coordinate system we’re using to measure events in the universe is being affected. This isn’t the only way to describe it though. This is the way it’s been popularly described in physics since the time of Einstein. We could say, though, that the coordinate system remains unaffected and the forces themselves are manifesting physically (i.e, gravity is a “thing” screwing with events in spacetime). And why not? If gravity is to be propagated by a force carrier, the graviton, then that could potentially free our abstract coordinate system from being deformed. This is the fundamental problem with reconciling general relativity (the idea that gravity is the curvature of spacetime) with quantum mechanics (the idea that forces are mediated by elementary particles). On the surface it would appear that reconciling the two means a graviton which affects the structure of spacetime. But if one thinks about it, this is incoherent. Spacetime is an abstract coordinate system in our minds describing what we see. How could gravitons be affecting that? Gravitons, as force carrier particles are wont to do, are affecting events, the behavior of matter. It’s just that this force behaves so counterintuitively and weakly and over such great distances or scales that in Einstein’s time it was easier to think of it as some fundamental alteration in spacetime (which is how the math described it, thus it’s called a “geometric theory of gravitation”). Since we have not moved on from general relativity yet (there is no unanimous quantum theory of gravity) we are stuck with Einstein’s view (though he probably understood what he was describing a lot better than we might give him credit for). However, should we be able to move beyond general relativity the potential remains for discrediting the very idea that spacetime can have curvature at all. On the other hand we have to fully acknowledge the possibility that this may elude us. Perhaps gravity really is a curvature of spacetime

after all (implying that spacetime is, indeed, a thing¹⁰⁹) and cannot be described by quantum mechanics as a force mediated by virtual particles. Nonetheless gravity and physics itself is still describing the behavior of nature (as mentioned in earlier paragraphs). Even with the general relativity notion of gravity we cannot be persuaded to believe that spacetime is a thing which behaves sometimes like a fluid or a sheet or whatever else since we know all of our equations of physics are describing the behavior of things, in other words, describing events which occur in the universe in relation to one another.

The other less philosophically and logically stringent way to take spacetime is as a union of all events (re: "*A spacetime itself can be viewed as the union of all events in the same way that a line is the union of all of its points...*"). This is a slightly dubious interpretation at first because it is clearly in the realm of metaphysics. Yet it's widely agreed upon by the scientific community (who meanwhile pride themselves on their alleged naturalism yet treat GR as a foregone conclusion while still lacking the most direct empirical evidence). Supposing general relativity is fully empirically verified, however, it would be a foregone conclusion to accept this method of taking the universe holistically. At the very least it serves as a minor blow to the unchecked reductionism that typifies science and metaphysics today. Speaking in terms of Islamic metaphysics there is no reason not to either. It's perfectly compatible. I took the time to lay out a more skeptical view first just to aid in the conceptualization process or rather to prevent it from going astray too quickly. The solution really isn't that conceptually easy. Spacetime is the collection of all events but it is also the coordinate system used to map those events? In actuality there are abstract *spaces* or *spacetimes* which are models of the real thing which is the union of all events (re: "*...a manifold, a space which can be described at small scales using coordinates systems...*"). A manifold is an abstract mathematical space. We once again run into the problem of figuring out what the mathematics represent in reality. Is spacetime actually curving? Or is the curvature simply a property of the model used to describe the behavior of actual spacetime (taken here to mean all events)? That blasted philosophy rears its ugly head again! Does it matter as much as I make it out to be? In physics, not at all. But in metaphysics, certainly. Is curvature of spacetime such a huge issue even in metaphysics? Not at all but it's the mistreatment of that idea which leads people into all sorts of metaphysical quandaries when they try to describe physical reality. So, relax, Islamic theology does not encourage a rabid skepticism of general relativity! Rather it does encourage a healthy amount of skepticism about all sources of knowledge which does act as a preventative measure against absurdities. Anyhow, we can say spacetime is a (mathematical) model of the behavior of all events in the universe. Some things from the model are popularly extrapolated to reality, such as the notion that space and time are inextricably linked or woven together into a "fabric" of spacetime. Some people will believe it to be real but we still cannot say with certainty whether this is the actual case in reality (at the very least it's a good metaphor).

¹⁰⁹ Which rules out the notion of time being a complete illusion. Though not the idea of the passage of time being an illusion. The reason why I mention this will be discussed in a later section.

Returning to the issue of manifolds and abstract models called spacetimes, the aforementioned Robertson-Walker metric is used to describe the universe (here universe can refer to the reality and spacetime to the model of it) on a cosmological scale (accounting for expansion). At every interval of time a slice is taken of all *events* defined in 3 dimensional Euclidean space at that particular instant of time *and* this is done taking into account the scale factor for the expansion of space.

This leads to the question of what an “event” is,

In physics, and in particular relativity, an event indicates a physical situation or occurrence, located at a specific point in space and time. For example, a glass breaking on the floor is an event; it occurs at a unique place and a unique time, in a given frame of reference.

Strictly speaking, the notion of an event is an idealization, in the sense that it specifies a definite time and place, whereas any actual event is bound to have a finite extent, both in time and in space. One of the goals of relativity is to specify the possibility of one event influencing another. This is done by means of the metric tensor, which allows for determining the causal structure of spacetime. The difference (or interval) between two events can be classified into spacelike, lightlike and timelike separations. Only if two events are separated by a lightlike or timelike interval can one influence the other.¹¹⁰

In this sense general relativity gets the job done the only question is a matter of *how* it gets the job done. Gravity, taken to the logical extension of GR, turns spacetime into a pseudo-event itself (in that it curves) rather than strictly being defined as the influence of one event upon another. This necessarily leads to taking a holistic picture of events to define “spacetime” (since the global topology undoubtedly influences many events). Although either way it does do the job of describing the influence of one event upon another.

One of the key empirical tests of general relativity is the evidence of gravitational waves (defined as ripples in the curvature of spacetime) which have yet to be observed. Evidence observed so far indicates there’s some truth to the math behind gravitational waves but they have not been directly detected. This would be a pretty big moment (for those who remain unconvinced of the notion of a real “spacetime”).

Suppose that gravity is indeed the curvature of “spacetime”. What would then be needed to reconcile it with quantum mechanics is a proper conceptualization of space and time (which might be the barrier to it not having happened yet since physics is high on math and low on concept these days which restrains the sort of creativity necessary

¹¹⁰ [http://en.wikipedia.org/wiki/Event_\(relativity\)](http://en.wikipedia.org/wiki/Event_(relativity)) - Retrieved 04/10/12

for such a development). So far the notion of spacetime as a real thing (with properties like a fluid or sheet) hasn't been cutting it. Possible alternatives lie in how we conceive of time and will be discussed in later sections.

So, returning to the issue of the "shape" of "spacetime"... The model describing our observable universe is close to flat at global scales and varies at local scales according to local topology (gravity). An illusion (or a metaphorical "shadow" if you wish to confer some realism to it) of an actual shape is created by the behavior of matter in space and over time (depending on the degree to which space and time are "warped"). For example, the orbits of the Moon, Earth, and Sun seem to point to an actual shape (Google for images of "gravitational well").

So, in effect, there are three "shapes" of the universe that are referred to in discussions among people (whether physicists or not).

The first is the shape of the universe in 3 spatial dimensions at any given instant of time (like right now). This is probably spherical (since the Big Bang would've presumably expanded in all directions and we assume isotropy). This is the "shape" of the "space" of the universe in the current moment of time *in 3 spatial dimensions*. This is what we would actually see with our eyes if we could take a god's-eye view of the universe. So this is the actual shape that people are looking for when they ask "what is the shape of the universe?".

The second type of shape is the *topology* of the spatial part of the universe in a given moment of time (or you can say the topology of the geometry of space or the topology of the geometry of spacetime in a given moment of time). This is a question resulting from an understanding of general relativity. In other words, the intrinsic curvature of space. Even though this is referring to intrinsic curvature we have no way of describing this as an actual shape without turning it, for the sake of modeling, into extrinsic curvature (meaning, we model the universe in *4 spatial dimensions*). We flatten one of the spatial dimensions and the 4th spatial dimension describes the curvature according to the mass-energy density of the universe (which determines global curvature). This is telling us how space *bends* (like due to gravity). This technically isn't a shape at all. Remember, can we see space bending around the Sun? No. We just observe the behavior of the matter in that space. The key point to remember here is that ***we do not know the global topology of the universe, we only know its curvature*** (we can make attempts at measuring this). So the real answer to this question is "we don't know". This is because a certain type of curvature can correspond to multiple shapes (i.e, flat curvature can correspond to a plane or a torus). We will likely have no way of knowing the global topology of the universe. This will always be a guess. Anyway, with regards to curvature, this is very close to flat or flat (whether it is flat and open, resulting in a boundary problem or flat and closed like a 3-Torus, we don't know). This, however, could vary with time. For some reason physicists insist it won't but we know expansion of the universe draws out slight variations in curvature from the early period of the universe.

Furthermore, the the topology of the spacetime of our observable universe (whatever we theorize it to be) doesn't necessarily imply anything for the unobservable universe beyond (which may as well have nontrivial global topology, perhaps spherical, who knows). Whatever the case the importance of this measure of shape is the effect of crossing the universe's "boundaries" or whether it even has boundaries. The topology of spacetime referred to here means the equations for measuring distances depend on where you are in space and it depends on the energy density (general relativity). Though I'm using "space" and "spacetime" interchangeably here this is describing the spatial dimensions of the universe only (because it is taken at one interval of time) albeit with intrinsic curvature.

The third kind is the shape described by the manifold used for modeling spacetime in an *expanding universe* (i.e, Robertson-Walker, adding up all the slices of the second kind of shape listed here for each time interval). This is sort of like the "worldline" of the universe itself (just to help you conceptualize it). The concept to understand here is that the curvature from the second kind of shape discussed in the previous paragraph is extrapolated to the rest of the universe (assuming the cosmological principle). And then *extrapolated through time* to make predictions about the universe's behavior. Because curvature of spacetime affects behavior. Remember, ***spacetime does not have a shape just as time does not have a shape.*** Imagine a plot on a graph with an x and y axis. The graph results in a shape. There is no label for either axis. Thus all we wind up with is a shape. But suppose you change the x-axis to indicate time? Then the graph isn't giving you a shape, it's giving you a description of behavior (history of the past and prediction of the future). With regards to the curvature of spacetime, having a timelike dimension means this is giving us a model of *behavior* (not a static shape we can see). The shape derived from the equations is the same as the previous: flat, spherical, or hyperbolic but what this refers to isn't only the intrinsic global curvature but the ultimate fate of the universe (its evolution over time). This is talking about gravity. A flat curvature here corresponds to a universe which stops expanding after the elapse of infinite cosmic time. Spherical (which just means positive curvature) means a Big Crunch (the force of gravity pulls everything back together, the mass-energy in the universe is too high). Hyperbolic (negative curvature) means a heat death of the universe (there isn't enough mass-energy so gravity doesn't pull everything back in, everything just flies apart). This is referring to the universe's *history of shape*, specifically the change in space due to metric expansion with time and under the influence of the physical force that predominates at cosmological scales (gravity whose behavior is provided by general relativity). The topology of spacetime referred to here means the equations for measuring distances depend on *when* you are and it depends on the scale factor (a function of time describing the expansion of the universe).

To briefly go on a tangent, it is this last type of metric which predicts a Big Bang singularity in our past. And as you can see, gravity isn't the only force acting on things. Other forces are driving the expansion (one of which will be discussed in the next section). Gravity will make itself felt "at the end of time" by determining whether it can

overcome the other forces responsible for the universe's expansion and collapse it or simply keep the expansion steady for the rest of time. This tells us local intrinsic curvature (gravity), extrapolates it to global, and tells us how curvature affects expansion and vice-versa (expansion affects curvature in that it will amplify slight curvature over time). Additionally the "behavior" predicted by "intrinsic curvature" in spacetime can be visualized thus: If space has a negative intrinsic curvature it can hold a volume greater than you would expect plus it pushes things apart (like "anti-gravity" if you will). General relativity tells us that the density of mass curves spacetime and this acts as a force. Negative intrinsic curvature gives us a repulsive force (therefore a hyperbolic curve here means the expansion becomes *accelerated* by an anti-gravity-like force). We can possibly see such negative curvature around black hole singularities or, according to some theories, perhaps in a void (an empty region of spacetime). Time also passes quicker in areas of lesser curvature (and slower in areas with greater positive curvature, like strong gravitational fields). Positive curvature on the other hand gives us a traditional gravitational force/field (attractive). To avoid confusion, such an "anti-gravity" like force was not responsible for the Big Bang since gravity did not exist as a separate force then (nor did our concepts of space and time).

How all this relates to the boundary problem becomes a little less clear. First of all let's define what the "boundary problem" is because I'm not referring to the horizon problem. It's the conflict of the cosmological principle with any notion of borders or boundaries to the universe which drives people to assume infinities in size (often by picking those solutions with post hoc reasoning). This is a problem. First of all the universe (or rather, spacetime) doesn't have extrinsic curvature that we know of or that's posited by general relativity (what would even be causing such a curvature?). It can't end back on itself as depicted by a 3-Sphere or 3-Torus or the other such shapes. Those model extrinsic curvature (but we use them for intrinsic curvature to make the math easier). Secondly, it cannot even have flat extrinsic curvature (the flat curvature is intrinsic). So we can't say it's "open" spatially or "infinite" in size either. It isn't. It has a boundary (ignoring bubble universe models which posit infinity within finite boundaries). That boundary is the cosmological horizon. The unobservable universe also has a cosmological horizon of sorts although it might be a conglomerate of the cosmological horizons of inflating universes at its spatial periphery (since such inflating sub-universes would come to dominate the overall universe) and such horizons might not even be defined or characterized by the travel of light. The periphery of the unobservable universe might be entirely "dark" (no light). Whether the unobservable universe is flat or not, it also does not possess extrinsic curvature according to GR. It cannot be spatially open (this requires extrinsic flatness or extrinsic hyperbolic curvature). Extrinsic curvature implies a higher dimensional embedding space (a "space" into which the universe is expanding). Saying the universe is "open" in reality means its timelike dimension is open-ended (when moving into the future) because no force will stop it (the curvature precludes gravity rearing its head) *and it is not dimensionally constrained or bound by the spatial dimensions therefore it will run on forever*. The spatial dimensions, on the other hand, are dimensionally constrained by the timelike dimension (space derived from our Big

Bang has values going from 0 to infinity *depending on time* (it is a function of time) which means the universe must experience *timelike infinity* in order to get spacelike infinity (infinity in the spatial dimensions). If you paused time right now the unobservable universe would have a boundary (a horizon). What's beyond it? Presumably nothing according to standard cosmology (ignoring brane cosmology). What this means is that the cosmological principle cannot possibly be true at all times and places. It would be true everywhere and at all times... except beyond the cosmological horizon(s). So using the cosmological principle in cosmology is fine, but not in metaphysics (what's outside our cosmological horizon which represent the limits of causal connections between events which make up this universe and its spacetime). The idea that the unobservable universe beyond our cosmological horizon runs on forever has no grounding in anything (except an assumption of the universe being "past eternal", that an infinite amount of time came before us and if someone wants to go down that beaten path refer to Al-Ghazali's *Incoherence*). There's no reason to believe a theoretical unobservable universe of the chaotic inflationary model didn't also start off via a Big Bang (this is sticking to the gray area between current cosmology and newer theories which posit multidimensional mechanisms for Big Bangs... they don't want to be held to account by newer theories but don't want to stick to accepted standard model cosmology either, they need the middle area for their ambiguity).

The logic that the universe is without boundaries, therefore "open" and *therefore* infinite depends on how the manifold being used to model the universe is being defined **a priori**. There are three choices of manifolds. Compact manifold: Finite with boundary (or pseudo-boundary, an empty boundary). Closed manifold: Finite without boundary. Open manifold: Infinite without boundary. Even if we were to convince the physicists that they should want to assume spatial boundaries, we still would want to model the time dimension without boundary. So that doesn't get us anywhere at the moment. Due to modeling the universe on a Euclidean space with 4 spacelike dimensions (imaginary time), all 4 dimensions are treated equally leaving a *potential infinite* along the 3 spatial dimensions. The first important point to note is that this is picked rather arbitrarily in a *priori* fashion. A closed manifold would do the job since the math only requires that there be no boundaries. So the universe could be without boundaries yet still closed (as mentioned several times here already, in the case of a 3-Torus). The only provided reason to not pick that solution is one we've already thrown out (the simplicity argument). Secondly, even with that treatment the potential infinite in the spatial dimensions cannot become *actualized* without first going to infinity in the time dimension. *The extent of space (in terms of size or volume) is defined as a function of time*. Treating time as imaginary and drawing some shape reflecting the full evolution of the universe according to the critical density is often used to justify time being infinite and therefore space also as infinite. The fundamental error being made here is something refuted by Aristotle long ago. A potential infinite is not the same thing as an actual infinite.

This often leads to the even more incoherent idea that the universe is now, and always has been, spatially infinite (even at the Big Bang). This is another absurdity and one I

only see put forward by those with atheistic metaphysical agendas (i.e, universe from nothing theories or universe from no beginning theories plus needing a multiverse for the anthropic principle) or those influenced by such people. They're essentially describing a "phantom" universe for the Big Bang to expand into. There are a few rationalizations behind such a claim,

The first is simply thinking of the universe as being embedded in an external space. In our math, it's treated this way and the external space is an infinite Euclidean space which is used as a coordinate system (i.e, *space*). They apply this to reality and assume the actual universe (which starts off with zero volume) is expanding into an infinite perfect Euclidean space. A pre-existing coordinate system, how convenient! So they say "space" is always infinite and the universe, despite starting from 0 volume or size, is also always infinite. They don't need this to make conceptual sense.

The second is going back to the very beginning of this chapter. "Infinite" for them is defined as everything there is (the same as the universe). So in that sense even at the Big Bang the universe was "infinite" in that it was all there was. This can happen through multiple lines of reasoning. First, the dimensions themselves (which are defined *a priori* as potentially infinite) are seen as expanding rather than spacetime. Actualizing the dimensions as spacetime automatically actualizes the infinite. Or to put it a better way, the dimensions *are* spacetime rather than something which *describes* spacetime but they inherit the "infinite"-like property of the definition of dimension which is then added to the idea of spacetime (so they are clearly combining two different things). Remember, space is described by a dimensional coordinate system. They propose *a priori* that there can be no point on this coordinate system which can act as a limit (isotropy). Therefore this dimensional coordinate system is infinite (it is, it's infinite Euclidean space, what we use to describe the universe) because it cannot have borders (because they defined it as being unable to have borders either explicitly or implicitly by choosing Euclidean space). These dimensional properties are thus given to actual space by assuming that this dimensional coordinate system is not merely describing the behavior of the system but is the actual system (in other words the dimension is the real thing we call space... obviously before this they first conferred real existence to space itself even though space was defined in physics as being no more than this abstract coordinate system to measure distances between objects and events).

Another brief interruption here to talk about the philosophy at play here. A belief about ontology is made regarding the mathematics of physics. There are varying degrees of belief.

The first is that the math is describing the behavior of a system. It is a description created in our heads to describe what we observe. The belief in the real existence of the system is not relevant but could go either way.

The second is that the math is "reflecting" the system. That the math is a perfect

reflection or we could say that reality casts a shadow and mathematics is the shadow which perfectly represents that which casted it. The key assumption here is the default view which treats the math as a perfect descriptor of reality. Even when the math is wrong, then they arbitrarily blame themselves and find another theory and then treat that as perfect all over again. This inconsistent position is one into which many students of physics are shoehorned due to the nature of the curriculum being heavy on math and light on concept.

The next degree is to believe that the math is “projecting” the system (or taken to its anti-realist extreme, that the math *is* the system). That the math dictates reality. This is kind of a sidestep in the progression here. It can be associated with a kind of essentialism similar to Plato’s Forms, but one which we, somehow, have access to. Or it could be describing some kind of belief in an anti-realist, purely mathematical view of the world (holographic universe is one such conclusion). Or it can simply be a belief in the power of mathematics. This last is historically rare because it is irrational and strange but not uncommon today in the age of philosophical and metaphysical illiteracy, it is a belief that subsists not in rational thoughts which can be put to paper but in whatever comprises their vaguely defined motivations including emotion and instinct (plus influence from other anti-realist metaphysical doctrines). When it is put into words these people will often use the terminology “the math determines the system” (because it just sounds ridiculous to say outright that there is any “power” inherent in math so they keep that implicit logical extension of the belief to themselves). This is more popular among senior members of the physics community (whereas the previous was more popular among students). That’s not to say that it is widespread among them but the few times it does occur it tends to occur “higher up”.

So, returning to the discussion at hand, the universe always remains infinite even as the size/volume decreases to 0 (when going back along its history to the Big Bang). What is basically going on is that the dimensional coordinate system is defined *a priori* as infinite and it, given some kind of reality through metaphysical belief, initially becomes this “phantom universe” in which the Big Bang happens (the first stage of this belief, when one is first studying these phenomena). This is an “unstable” belief (cognitive dissonance). The next stage results in fully combining the two ideas as described. Another line of reasoning alters the definitions of universe and infinite together. They are not even defining the universe as “everything that is”, they are actually defining it as “everything”, period. Meaning, everything there is (overtly implied) plus everything there *could be* (covertly implied). They might not even be aware of the this implication but it is implicitly necessary for the logic behind positing an infinite universe. It removes modality from the notion of infinite so a potential infinite is treated the same as an actual infinite. It is usually associated with geometric manipulations of imaginary time (so the belief is entered into in the final stage of this logical process and its rational foundations are not scrutinized).

The more knowledgeable will claim to adopt the eternal inflation (chaotic inflationary

theory) model which will be discussed in the next section (in which case our Big Bang isn't the "first" Big Bang and our universe isn't the first universe). A tactic I've noticed is that they will mention the preconditions for our Big Bang posited by the chaotic inflationary model (infinite space/time) but neglect to mention any other aspect of it, even its name, just to try and pass it off as accepted cosmology (presumably because they think the bubble universe model would sound absurd to most people). Keep in mind this isn't a criticism of physics, physicists, or the physics community so much as it is a criticism of a few specific people talking about physics outside the realm of physics (in philosophy).

The next issue is the irrational attachment to the cosmological principle at all metaphysical cost. It results in convoluted answers to the "boundary problem" put forward by some (usually students who can't tell an absurd scenario from a legitimate one) which involve models of the expansion of the universe when confronted by specific and pointed (but absurd) questions about the universe's "shape" (this happens on the internet often). These situations reflect, however, the ridiculousness of claiming the evidence supports the notion of an infinite universe. Though curvature of spacetime can be understood to be "real" (really exist) without much fuss (though it's still a belief at this stage), it is still only an intrinsic curvature. At global levels it is influenced by the expansion of the universe (which affects the energy density). What would the expansion of the universe have to do with boundaries? Even if the universe had borders (violating the cosmological principle) expansion could continue as predicted. The problem is, again, one of behavior. What were to happen if we could cross the universe's cosmological horizon? The posing of this theoretical question threatens some who feel they had to address such absurdities, neglecting that in doing so they absorb the absurdity into physics. Sure you could answer "you couldn't escape the universe's gravity well, kind of like a black hole" but what if the silly person asking the question just gave you another "what if"? "What if we could?" So the answer then put forth is that time and space bend such that you find yourself eventually coming back around to where you started. This answer doesn't even make real sense because it's assuming the universe is a hypersphere when it isn't (by any evidence we have). Moreover it's supposing the universe is a hypersphere of 4 spatial dimensions (plus a time one, so 5 dimensions!) with positive extrinsic curvature (what happened to all the "flat universe" hullabaloo? though it's possible for flat curvature to be multiply connected in various shapes such as a 3-Torus as mentioned earlier). This answer (hypersphere of positive curvature) makes somewhat more sense when applied to movement through time as the dimension of time loses its timelike property and becomes spacelike (so we still stick to 4 dimensions) such as periods near the Big Bang or a hypothetical Big Crunch but that will be discussed in a later section (the "no boundary proposal"). The reason this answer doesn't make sense here is because this is actually an answer to the question "what happens after you reach the boundary of the universe's expansion in time, after the elapse of infinite cosmic time?" Which is an absurd scenario. And not at all what the original question means (that's the wrong boundary of the wrong shape). The fool's question must be taken in the context of the foolishness which posed it (the boundary

problem is irrational, it shouldn't be a problem at all). This question is actually and literally asking what happens if you cross the cosmological horizon *right now*. The answer? You leave the universe. If there's a bigger unobservable universe or some other universe there, that's where you find yourself. If not, you've magically traveled out of bound of reality, congratulations.

If one doesn't like that answer then pick the 3-Torus. You can't leave, you stay in the universe forever. Of course that's ignoring the fact that universe has intrinsic curvature, not extrinsic (that we know of), so it can't be a 3-Torus. Or a 3-Sphere. Or anything which requires embedding in a higher dimensional Euclidean space. Those model extrinsic curvature. Or rather, if the universe does have some kind of such extrinsic shape it's impossible for us to know.

The remaining option is, of course, to say that the universe is infinitely large without borders. Which is an unjustifiable statement. Intrinsic flatness doesn't actually imply anything about the spatial boundaries of the universe. It does make predictions about the behavior of the universe's expansion and whether it might ever reach the potential infinite limit of those spatial boundaries (hinging on timelike infinity) but it says nothing about whether there are boundaries right now. If we assume there was one Big Bang, that which birthed our universe and leave out all metaphysical assumptions then the border is our cosmological horizon and the cosmological principle potentially fails when you hypothetically cross it (which in reality you couldn't do). Even if we bring in a modicum of metaphysical assumptions, that due to expansion there is a region of the universe which is unobservable, there would still have to be boundaries. It is not possible to "leave" through physical means because time and space stop and you will need to invoke a new universe to cross into. So, it can be modified to read "the universe is potentially infinitely large so you would never leave because the further you go, so too goes (expands) the universe. You would be extending spacetime with your magic trip, potentially to infinity if you traveled for an infinite amount of time."

Lastly, even positing an infinite space at the Big Bang is incoherent with current physics and cosmology because spacetime as we know it could only appear after the Planck era, when spontaneous symmetry breaking of supergravity birthed spacetime and the decoupled force of gravity (leaving the grand unified force). Symmetry breaking will be discussed in the next section in more detail. Before this it's incoherent to speak of either space or time in the traditional sense. It would absolutely require a commitment to a theory of quantum gravity to even try to coherently make such a claim about the behavior of the universe during that period.

What is kind of remarkable here is that we see some of the same conceptual errors made by the natural philosophers of old as described in detail in works like Imam al-Ghazali's *Incoherence of the Philosophers* repeated in similar or sometimes new ways by today's "natural philosophers" (i.e, physicists who spend too much time on these issues which straddle the fence between metaphysics and physics).

The root cause is the mathematical nature of physics today. You see physicists sometimes refer to them as “mathematical physicists”. These are physicists whose conceptual understanding has not developed to the degree necessary to fully understand what the math they are doing is describing. Getting an education in physics today does not require one to be tested for conceptual understanding because many of its seniors lack it themselves! All you need to be able to do is the math. Which serves the aims of the physics community at large but can leave many groups barking up the wrong tree in terms of which avenue to pursue in theoretical physics. This is also partly why I’ve completely foregone mentioning math in all discussions here (aside from some geometrical diagrams). You can recognize such physicists because when asked questions, they respond with math because they don’t know how to conceptualize the mathematics into ideas describable by words. These people, often students, are by no means malevolent with an intent to mislead (though the few physicists who do push philosophical agendas can be held suspect for that). Nor do I feel they should be discouraged from pursuing their passion. The situation is what it is and we need more vigilant introspection on the part of the physics community to enlighten its constituents on the border between scientific and philosophical discussion. If at all I take a condescending tone it is towards these new age “natural philosophers” who happen to be physicists, not physicists as a whole and not even physicists who dabble in philosophy while trying to conceptualize the abstract mathematics of their field in some meaningful and relevant way to our experience of reality. Another characteristic of the “philosopher” physicists is that they are hesitant to jump into string theory or other models which bring multidimensional physics to the fore because they don’t want their metaphysical maneuverings to be held to any scrutiny (they will conversely be quite critical of string theory because they prefer gray area in which to make their assertions, this belies their intentions).

There are additional psychological factors (from the influence of philosophy) which are constantly acting upon the minds of physicists predisposing them to certain conceptual views of reality (a brief mention was already made of anti-realism and quantum physics in a previous section for example). Philosophical education in the West is lagging behind everything else. Philosophy is shunned and not taught properly if at all, but avoiding it in any field of study in the human experience is next to impossible. This is kind of like the debate in America over “abstinence only education” versus “safe sex education” where kids who aren’t taught about safe sex but only abstinence wind up engaging in sex anyway without any precautions (resulting in a greater number of pregnancies, abortions, diseases, etc). I will discuss the historical (and continuing) influence of Western philosophy on its metaphysics in further detail in a later section. What I can say at the moment is that outside of Islamic theology realism is a very desirable but tough pill to swallow. The sort of skepticism that science requires overturned realism in Europe. It’s only in Islamic theology where you get the union of skepticism with an unwavering loyalty to realism. It’s gotten so bad that people have been accepting on the authority of scientists anti-realist descriptions of reality for over a hundred years and to display

any skepticism of that is reacted to very harshly or even seen as “anti-science” (since science, the method, has now been conflated with the metaphysics... as happened before so long ago with Neoplatonism and classical Western civilization).

From here on out I'll return to a haphazard wielding of “spacetime” interchangeably with “universe” and other such metaphysical language (for the sake of brevity).

Inflation and the Problem of “Fine Tuning”

I touched on the issue of inflation earlier. Inflation in cosmology solves the problem of what physicists call “fine tuning”. In other words certain aspects of the universe appear finely tuned to produce specifically our kind of universe that we have today and no other. For instance, the universe appears close to flat today as was just discussed. But this, extrapolated into the past, means that the universe must have been even closer to flat in its earlier moments than it is today. So close as to make curvature exponentially small. This is because as the universe expands the curvature becomes amplified. So for it to have expanded into its currently “almost flat” state, it must have been practically flat to begin with. As we've discussed the density of the mass-energy in the universe can be used to measure the curvature. There is a theoretical value of density called the “critical density” which is the density required for a perfectly flat universe. A term called “omega” is the ratio of the actual density to the critical density. The value of this term can be seen to describe the geometry of the universe. If it is greater than 1, it describes a closed universe (i.e, spherical). If it is less than one it describes an open universe (i.e, hyperbolic). If it is exactly 1 then the actual density is equal to the critical density and the universe would be perfectly flat. With current empirical measurements omega is calculated to be 0.01 which implies it must have been less than 10^{-62} at the Planck era (when the universe was 10^{-43} seconds old). This is very, very (and one might say, arbitrarily) close to this theoretical critical density. If the density varied even a little from this in the positive direction then the universe would have stopped expanding and collapsed back into itself. And if in the negative direction then the universe would have expanded too quickly and become too spread out for gravity's effects to become noticeable (and stars, galaxies, planets, etc would not form).¹¹¹

What can explain why the value was “just right” to form the universe in which we live today? There was the obvious philosophical solution. The anthropic principle, as was touched on earlier, is basically the notion that if the universe wasn't exactly as it is now, we wouldn't be here to observe it. The fact we're here and observing it at all means it must be as it is (conducive to life and all that). The anthropic principle however must rest on either a theological or philosophical foundation. The obvious one is the theological one, that God made it that way (as discussed in the work of Fakhr al-Din al-Razi). The philosophical agnostic foundation (favored by atheists) is that all possible worlds must also exist as ours does. The problems with this view have already been discussed (the

¹¹¹ http://en.wikipedia.org/wiki/Flatness_problem - Retrieved 04/08/12

most unquestionable being that it's impossible to prove empirically and there's nothing even approaching a consensus on the idea in the scientific community).

Additionally, according to the cosmological principle the universe is assumed to be isotropic, homogeneous, and in thermal equilibrium. But this doesn't seem to add up if we consider normal expansion of space (a metric expansion which decelerates over time due to gravity being attractive). First let's mention what a cosmological horizon is. It's the boundary of the observable universe (that we can see, due to the speed of light being slower than the speed of the universe's expansion). To put it in a more physics-oriented definition, it represents a causally connected patch of universe (in a larger universe with unobservable regions). As the cosmological horizon moves out (due to expansion of the overall universe) our patch of the universe should intersect with others that now come into view for the first time. The problem here is that, according to the cosmological principle¹¹² and what we've observed so far, everything appears to be of similar curvature and temperature. How would one patch know what the other looked like? They weren't causally connected. How could they all develop along identical lines? How could they be in thermal equilibrium? Empirically, we used patches of the observable universe which were both within observable range of us but not each other. Furthermore, there was the [magnetic-monopole](#) or exotic-relics problem (why we don't see any such hypothetical exotic relics of the universe's early period).¹¹³

To answer all these issues cosmic inflation was postulated as a possible explanation.

It was first put forth in 1980 by Alan Guth who postulated a mechanism to trigger inflation, the decaying of "false vacuum" into "bubbles" of "true vacuum" that expanded at the speed of light. This simply means a region of space whose energy was in an unstable (or "metastable") excited state which then, through quantum fluctuations (quantum-mechanical tunneling), decays into to a lower energy state, like the ground state ("true vacuum"). There were several problems with this theory (related to bubble collision) and it is now known as "old inflation". It gave way to "new inflation", or the current favored model of inflation.

In this model, "instead of tunneling out of a false vacuum state, inflation occurred by a scalar field rolling down a potential energy hill. When the field rolls very slowly compared to the expansion of the universe, inflation occurs. However, when the hill becomes steeper, inflation ends and reheating can occur."¹¹⁴ A picture is provided of this in the next couple of pages.

¹¹² The cosmological principle is traced back to the work of Isaac Newton in formulating his principle of universal gravitation. It basically meant that we, the observers on Earth, are located in no special or particular part of the universe (building on heliocentrism).

¹¹³ Unless you're specifically interested in the physics you don't need to know much more about it from a philosophical standpoint so no further mention of this will be made.

¹¹⁴ [http://en.wikipedia.org/wiki/Inflation_\(cosmology\)](http://en.wikipedia.org/wiki/Inflation_(cosmology)) - Retrieved 04/08/12

In standard inflation, inflationary expansion occurred while the universe was in a false vacuum state, halting when the universe decayed to a true vacuum state becoming a general and inclusive phenomenon with homogeneity throughout, yielding a single expanding universe which is "our general reality" wherein the laws of physics are consistent throughout. In this case, the physical laws "just happen" to be compatible with the evolution of life.¹¹⁵

The bubble universe model lived on through the aforementioned chaotic inflation theory which corrected Guth's model. This was mentioned earlier with talk of multiverses.

The bubble universe model proposes that different regions of this inflationary universe (termed a multiverse) decayed to a true vacuum state at different times, with decaying regions corresponding to "sub"- universes not in causal contact with each other and resulting in different physical laws in different regions which are then subject to "selection" which determine each region's components based upon (dependent on) the survivability of the quantum components within that region. The end result will be a finite number of universes with physical laws consistent within each region of spacetime.¹¹⁶

Each of these universes could have different physical laws, some potentially suitable for life (at least one of which, ours, actually being so).

As it stands today the eternal inflation or chaotic inflation (bubble universe/multiverse) model is also associated with the notion of an eternally existing universe ("eternal inflation") which, as it is somehow rationalized by some, does not "require" a "unique beginning"¹¹⁷ (in other words, a non-scientific copout that is a sorry excuse for philosophy).¹¹⁸ This notion of the universe being "past eternal" runs counter to the belief of most physicists.¹¹⁹

Returning to the standard new inflation model,

Cosmological inflation has the important effect of smoothing out inhomogeneities... and the curvature of space. This pushes the universe into a very simple state, in which it is completely dominated by the *inflaton field*, the source of the cosmological constant, and the only significant inhomogeneities are the tiny quantum fluctuations in the *inflaton*.

¹¹⁵ http://en.wikipedia.org/wiki/Eternal_inflation - Retrieved 04/08/12

¹¹⁶ *Ibid.*

¹¹⁷ *Ibid.*

¹¹⁸ It reduces to the thought that "*the universe could continue inflating forever, therefore it probably already has and might as well have existed forever so there was no beginning*". Purely conjectural.

¹¹⁹ [http://en.wikipedia.org/wiki/Inflation_\(cosmology\)#Eternal_inflation](http://en.wikipedia.org/wiki/Inflation_(cosmology)#Eternal_inflation) - Retrieved 04/09/12

[...]

New inflation does not produce a perfectly symmetric universe; tiny quantum fluctuations in the *inflaton* are created. These tiny fluctuations form the primordial seeds for all structure created in the later universe.

[...]

...inflation predicts that the structures visible in the universe today formed through the gravitational collapse of perturbations which were formed as quantum mechanical fluctuations in the inflationary epoch.¹²⁰

The inflaton is,

...the generic name of the hypothetical and hitherto unidentified scalar field (and its associated particle) that may be responsible for the hypothetical inflation in the very early universe. According to inflation theory, the inflaton field provided the mechanism to drive a period of rapid expansion from 10^{-35} to 10^{-34} seconds after the initial expansion that formed the universe.

The inflaton field's lowest energy state may or may not be a zero energy state. This depends on the chosen potential energy density of the field. Prior to the expansion period, the inflaton field was at a higher energy state. Random quantum fluctuations triggered a phase transition whereby the inflaton field released its potential energy as matter and radiation as it settled to its lowest energy state. This action generated a repulsive force that drove the portion of the universe that is observable to us today to expand from approximately 10^{-50} metres in radius at 10^{-35} seconds to almost 1 metre in radius at 10^{-34} seconds.

Inflaton conforms to the convention for field names, and joins such terms as photon and gluon. The process is "inflation"; the particle is the "inflaton".

As you can see, despite the success of the inflationary model as an addition to Big Bang cosmology in explaining and even predicting some empirical phenomena the underpinnings (what caused it) are still very much theoretical and highly speculative (thus calling into question whether such theoretical physics are even admissible by theology for metaphysical discussion, at the very least they stand on far too little empirical foundation to justify their assumed metaphysical authority or superiority).

Returning to the issue of curvature, as was mentioned above inflation drives the universe to a flat state and answers the flatness problem. We don't know what, if any,

¹²⁰ [http://en.wikipedia.org/wiki/Inflation_\(cosmology\)](http://en.wikipedia.org/wiki/Inflation_(cosmology)) - Retrieved 04/08/12

curvature the universe started off with (so the possibility of starting off with curvature remains) but due to inflation the universe came out of the inflationary epoch extremely close to flat (as well as being homogeneous and mostly empty). From that point on due to continued normal metric expansion the universe has become progressively *less flat* (assuming it wasn't perfectly flat to begin with since the math indicates it was only very close) as curvature has been amplified. That it's still nearly flat today indicates just how close to flat it was at the end of the inflationary epoch.

The universe emerged from the inflationary epoch mostly empty (and relatively "cold") but with a lot of potential energy which was released and filled the universe with a dense, hot mixture of elementary particles (the quark-gluon plasma) as it entered the [electroweak epoch](#).¹²¹ This is referred to as "reheating" and started the radiation-dominated era of the universe (followed by the matter-dominated era and eventually the dark-energy-dominated era). This process is still poorly understood.¹²²

So what is essentially being said is that the early universe's vacuum¹²³ (dominated by the inflaton field) was in a high energy state and then the inflaton field decayed to a lower (and more stable) energy state. The high energy state resulted in a massive repulsion (i.e, inflation) stretched out over the period of time it took for the decay process to happen along with the energy being released as thermal radiation (quark-gluon plasma) as the vacuum settled into its lower energy state.

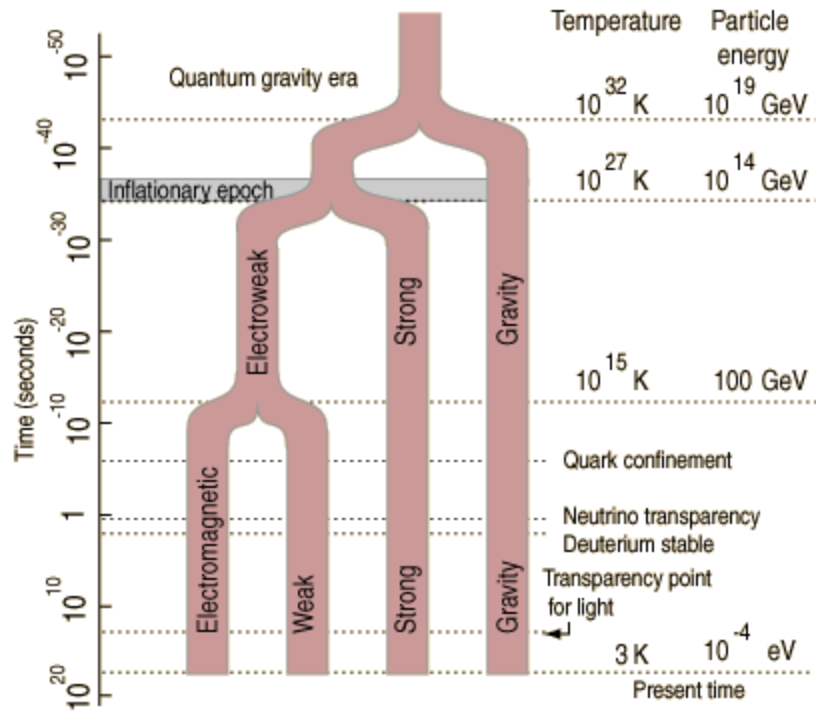
The most popular posited mechanism for this initiation of inflation is a phase change due to symmetry breaking in the grand unified theory (GUT). A grand unified theory is a theoretical high energy model which combines (or symmetrically "couples") three fundamental forces (electromagnetic, weak, and strong) into one interaction (adding gravity is problematic but if accomplished would lead to a TOE or theory of everything). The further back into the universe's history we go, the more important such theories become due to the Big Bang. The universe in its early age was in a highly symmetrical (low entropy), high energy, high density state. At around the Planck time (10^{-43} seconds) the era of quantum gravity ended as there was spontaneous symmetry breaking and gravity decoupled from the other forces, birthing spacetime as we know it today and marking a major phase transition (a phase change being a systemic change in the internal order of something like when ice melts or water vaporizes). This is one reason you hear people say that the modern concept of time was incoherent before the Planck time. Another spontaneous symmetry breaking happened at the GUT level where the strong force and electroweak force were decoupled. This marked another phase transition which is theorized to be inflation. The idea is that this symmetry breaking marked the birth of matter from spacetime (the quark-gluon plasma). As stated above this mechanism for the start of inflation is still poorly understood and much debated.

¹²¹ http://en.wikipedia.org/wiki/Inflationary_epoch - Retrieved 04/08/12

¹²² [http://en.wikipedia.org/wiki/Inflation_\(cosmology\)#Reheating](http://en.wikipedia.org/wiki/Inflation_(cosmology)#Reheating) - Retrieved 04/09/12

¹²³ "The Vacuum" (as a proper noun) is the ground state (vacuum state) of all fields in space.

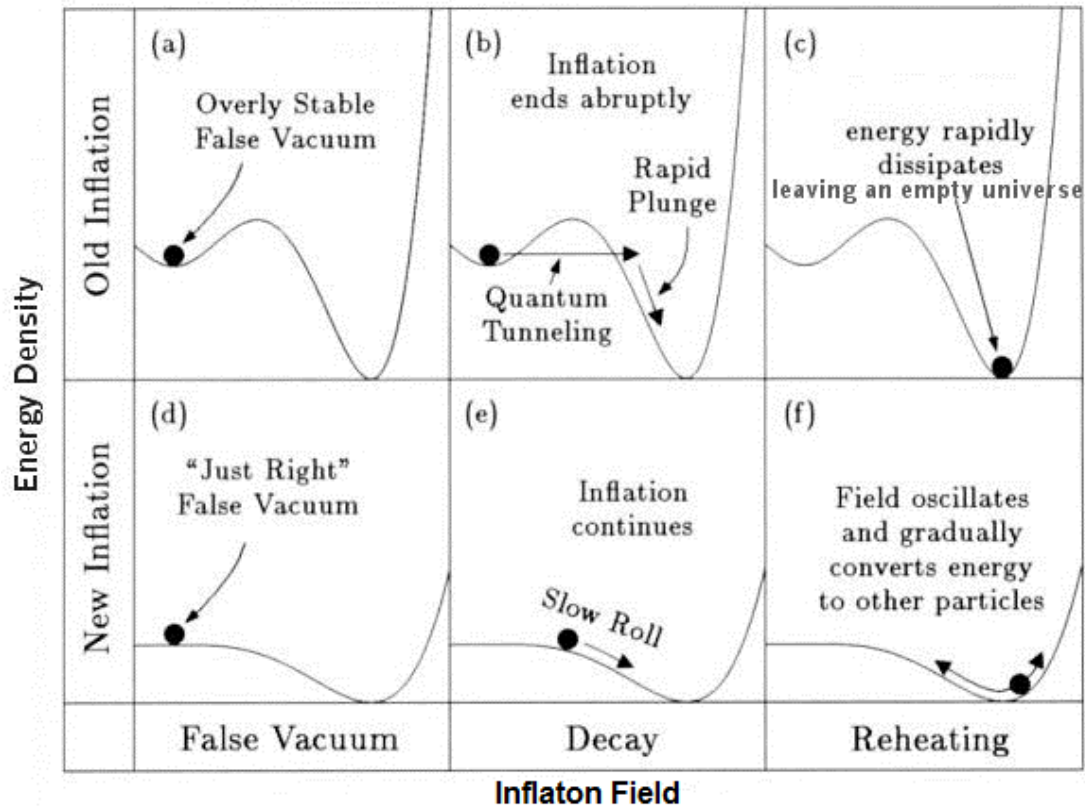
Here is a graphical timeline of spontaneous symmetry breaking in the universe's development:¹²⁴



Here's a picture of this transition from the false vacuum to the true vacuum in both old and new models of inflation:¹²⁵

¹²⁴ <http://hyperphysics.phy-astr.gsu.edu/hbase/astro/unify.html#c1>

¹²⁵ From <http://universe-review.ca/R02-13-inflation.htm> - Retrieved 04/09/12



As alluded to just a moment ago, there are plenty of critics of the theory,¹²⁶

Since its introduction by Alan Guth in 1980, the inflationary paradigm has become widely accepted. Nevertheless, several physicists, mathematicians and philosophers of science have voiced criticisms, claiming unfulfilled promises and lack of serious empirical support. In 1999, John Earman and Jesús Mosterín published a thorough critical review of inflationary cosmology, concluding that “we do not think that there are, as yet, good grounds for admitting any of the models of inflation into the standard core of cosmology”.¹²⁷ Since 1999 the results of the WMAP mission in 2006 made the empirical case for cosmic inflation very compelling.

In order to work, and as pointed out by Roger Penrose from 1986 on, inflation requires extremely specific initial conditions of its own, so that the problem (or pseudoproblem) of initial conditions is not solved: “There is something fundamentally misconceived about trying to explain the uniformity of the early universe as resulting from a thermalization process. [...] For, if the thermalization is actually doing anything [...] then it represents a definite

¹²⁶ [http://en.wikipedia.org/wiki/Inflation_\(cosmology\)#Criticisms](http://en.wikipedia.org/wiki/Inflation_(cosmology)#Criticisms) - Retrieved 04/09/12

¹²⁷ Earman, John and Jesús Mosterín (1999). “A Critical Look at Inflationary Cosmology”. *Philosophy of Science*, 66 (March), pp. 1-49.

increasing of the entropy. Thus, the universe would have been even more special before the thermalization than after.”¹²⁸ The problem of specific or “fine-tuned” initial conditions would not have been solved; it would have gotten worse.

A recurrent criticism of inflation is that the invoked inflation field does not correspond to any known physical field, and that its potential energy curve seems to be an ad hoc contrivance to accommodate almost any data we could get. It is significant that Paul J. Steinhardt, one of the founding fathers of inflationary cosmology, has recently become one of its sharpest critics. He calls ‘bad inflation’ a period of accelerated expansion whose outcome conflicts with observations, and ‘good inflation’ one compatible with them: “Not only is bad inflation more likely than good inflation, but no inflation is more likely than either. ... Roger Penrose considered all the possible configurations of the inflaton and gravitational fields. Some of these configurations lead to inflation ... Other configurations lead to a uniform, flat universe directly –without inflation. Obtaining a flat universe is unlikely overall. Penrose’s shocking conclusion, though, was that obtaining a flat universe without inflation is much more likely than with inflation –by a factor of 10 to the googol (10 to the 100) power!”¹²⁹

There are still quite a few alternatives to the standard new inflation model and even alternatives or adjuncts to inflation itself (including such fringe ideas as theories of a varying speed of light¹³⁰). Steinhardt’s preferred alternative is a cyclic universe model based on [superstring theory](#) and brane cosmology in which the Big Bang is brought about by a collision of branes and evolution of the universe proceeds along existing standard cosmological models except dark energy will decay into a high pressure form forcing the universe to contract into a Big Crunch, which is then sparked into another Big Bang by another collision of branes. A picture regarding Steinhardt’s criticisms of the inflationary model can be found [here](#).

As theists ourselves it might be tempting to see physicists running in circles trying to avoid the “fine tuning” problem as desperate actions of people clinging to belief in the non-existence of God. It would be the easiest thing in the world to say “because God made it that way”. But this isn’t a scientific answer. “God” isn’t an answer to the question “How?”. The atheist might ask “what [happened]?” but the theist asks “how?”. We already believe God created all things which exist, what we would like to find out is

¹²⁸ Penrose, Roger (2004). *The Road to Reality: A Complete Guide to the Laws of the Universe*. London: Vintage Books, p. 755. See also Penrose, Roger (1989). “Difficulties with Inflationary Cosmology”. *Annals of the New York Academy of Sciences*, 271, pp. 249-264.

¹²⁹ Steinhardt, Paul J. (2011). “The inflation debate: Is the theory at the heart of modern cosmology deeply flawed?” (*Scientific American*, April; pp. 18-25). See also: Steinhardt, Paul J. and Neil Turok (2007). *Endless Universe: Beyond the Big Bang*. Doubleday, 2007.

¹³⁰ http://en.wikipedia.org/wiki/Varying_speed_of_light#The_varying_speed_of_light_cosmology

how. After all, the one thing we can say about the Customary Way of Allah's creating is that it has been consistent (nature is uniform and as we can see exquisitely in balance) and departures (miracles) only served a higher metaphysical order (regarding the purpose of humanity here and how our destiny ultimately lies in a different place). So why would God "show Himself", so to speak, here? Our working assumption has to be that if there's no special reason for Allah to depart from the Customary Way then there's more about nature still to be learned. The speculation of physicists, even those influenced by various metaphysical biases, is still valuable information so long as it's grounded in solid science. For the most part physicists have done an admirable job of keeping themselves out of philosophical trouble.

One more word on curvature: Since all evidence, empirical and mathematical, indicates the universe, our observable universe (our causal patch in a potentially bigger unobservable universe), is only close to flat then that can just as easily mean the unobservable universe is immeasurably large and curved (and therefore, finite in geometry) instead of flat and open. This is a possibility acknowledged by other physicists as well. Hiding your metaphysical agenda in the unobservable universe can work against you as well as it can for you.

A Universe From Nothing

This phrase evokes the book by physicist Lawrence Krauss. There are also some lectures by him on the subject floating around on YouTube.

The Wikipedia brief on it states,¹³¹

...a book by physicist Lawrence M. Krauss first published in 2012, with an afterword by Richard Dawkins. Christopher Hitchens had agreed to write a foreword for the book prior to his death but was too ill to complete it. To write the book, Krauss expanded material from a popular lecture on the cosmological implications of a flat expanding universe he gave to the Richard Dawkins Foundation at the 2009 Atheist Alliance International conference. The book appeared on The New York Times bestseller list on January 29.

[...]

Michael Brooks for New Scientist writes "Krauss will be preaching only to the converted. That said, we should be happy to be preached to so intelligently. The same can't be said about the Dawkins afterword, which is both superfluous and silly."

The book is geared towards the "new atheist" crowd. It has a metaphysical agenda

¹³¹ http://en.wikipedia.org/wiki/A_Universe_from_Nothing - Retrieved 04/13/12

(promoting his brand of naturalism). The endorsement of Dawkins (and Hitchens) clues one in as to the non-scientific nature of it. It's pop science, not on the level of actual published scientific theories.

The basic science of the claim has already been covered in previous sections. This is called a "zero energy universe" theory, which states that the mass of the universe counts as positive energy and the gravitational energy counts as negative, which balances out exactly to zero (necessary due to conservation of energy it is rationalized), a flat universe, which could then have arisen as a vacuum fluctuation (a quantum fluctuation of the vacuum field).

Metaphysical flaws in the argument

The metaphysical essence of this argument is kind of strange in that it's saying that if energy is conserved, then it cannot be created or destroyed (obviously). So if it can't be created then it must have always been there. The goal here is to attack the notion of anything being "created" because that, it is reasoned, is what (mostly Christian) theologians use to start talking about a "Creator". This is a notion often first attributed in the field of physics to Stephen Hawking.¹³²

Except according to current physics, energy is *not* conserved in general relativity (in cosmology). If you'll recall from the previous section the inflationary epoch was characterized by the *addition* of energy to the universe in exponential quantity (to match the exponentially increasing volume to preserve the density as a (cosmological) constant¹³³). If inflation is true then energy was being literally created from nothing without any fuss (of course we don't even know whether it was created or that it came from somewhere else that we don't know about, that goes beyond standard model physics).

This seems peculiar because one would think a better atheistic metaphysical argument would be that energy can be spontaneously created in nature by nature. Perhaps they were looking ahead and realized that proving what was creating the energy and how was an impossible task (as if proving natural causality already wasn't impossible enough).

A very well written article about "why and how energy is not conserved in cosmology" can be found on the blog of a Czech physicist here,

¹³² Another physicist who sometimes writes on atheistic philosophy but whose science stands on less shaky ground as you would expect from such a renown personality.

¹³³ The theoretical inflaton field is posited to be a scalar field. Scalars remain unchanged by translations/transformations in the metric or coordinate system (Lorentz invariance). The transition between false and true vacuum states therefore keeps the metric proportional to the stress-energy tensor (energy density). This results in a "negative pressure" applied to the metric because the false vacuum has positive energy density.

<http://motls.blogspot.com/2010/08/why-and-how-energy-is-not-conserved-in.html>

The discussion there actually highlights some scientific errors in the argument too.

Scientific flaws in the argument

It's perhaps ironic that what I mean here by scientific is the interpretation of the math.

Very briefly,

In the equations of general relativity (Einstein Field Equations or EFE), the curvature of spacetime is given by the Einstein tensor which is actually a measure of the change in the metric (how the metric changes from point to point), which is referring to our coordinate system for measuring things in spacetime. This is (in the equation) related to the stress-energy tensor which represents the matter/energy content of spacetime (and is the expression on the opposite side of the equal sign). So the concept here is that the matter/energy content of spacetime relates to the curvature of spacetime.

Now, on to the problems with this zero energy universe idea.

First, energy of a gravitational field isn't even clearly defined in accepted physics.

The way it's defined here has to do with [Noether's theorem](#) which is used for deriving conservation laws. Since what they (Krauss & co.) are looking for is a conserved nature for energy this is what is used.

This theorem states that,

...any differentiable symmetry of the action of a physical system has a corresponding conservation law.¹³⁴

As mentioned in the blog post linked above, "*For ordinary field theories, it reduces to the "kinetic plus potential" terms and so on*", which is an intuitive and easy example of what differentiable symmetry means. And it's similar to the claim made in this argument, that the mass presumably counts as kinetic and the gravitational energy presumably counts as negative potential energy.

In special relativity which is based on Minkowski spacetime (flat), energy (and momentum) are exactly conserved. If you deal with such a flat spacetime in GR you could theoretically conserve energy too. So the assumption is made that spacetime "*asymptotically (at infinity, very far from all the matter) converges to a flat Minkowski space*". Even though the entire argument rests on this completely conjectural

¹³⁴ http://en.wikipedia.org/wiki/Noether's_theorem - Retrieved 04/13/12

assumption that does not match our universe (as that physicist says in their blog and as many others will tell you), Krauss proceeds flippantly.

As the blog post goes on to say,

In special relativistic field theories, there exists a simple general way to derive the energy density or, more accurately, the whole stress-energy tensor: it can be calculated as the derivative of the Lagrangian density with respect to the metric tensor.

The Lagrangian is a function that summarizes the dynamics of the system (action) and which can be used to derive the equations of motion of the system.¹³⁵ In short, you vary the action with respect to the metric.

In general relativity, however, the metric itself is dynamic. Remember, the metric (the coordinate system used to measure things in spacetime) itself varies with the curving of spacetime. The metric itself becomes part of the action. So it's as if nothing was done, the answer is zero (it "vanishes" as the blog post said). The action must remain stationary with respect to the dynamical degrees of freedom, which means the metric, so you purposely go looking for a term that goes to zero and has no significance whatsoever.

This is what's meant by the energy "adding up to zero", which is a dubious way to describe what's actually being done as you can see.

Furthermore, going back to Noether's theorem, when applied to a Minkowski-type spacetime in GR (Minkowski-*type* meaning asymptotically converging to a flat space at infinity as opposed to Minkowski space itself which is just flat as is), *does* give you a conserved energy term. It's the ADM energy which is mentioned in the post.

ADM energy is a special way to define the energy in general relativity which is only applicable to some special geometries of spacetime that asymptotically approach a well-defined metric tensor at infinity — for example a spacetime that asymptotically approaches Minkowski space. The ADM energy in these cases is defined as a function of the deviation of the metric tensor from its prescribed asymptotic form. In other words, the ADM energy is computed as the strength of the gravitational field at infinity.¹³⁶

More significantly, it was proven already that the ADM energy *must be positive* in such a scenario (positive in the asymptotically-converging-to-Minkowski-space scenario or zero only in truly flat-Minkowski-spacetime) according to the [positive energy theorem](#). It can never be negative (as Krauss claims). It was proven by Schoen and Yau in 1979 and

¹³⁵ <http://en.wikipedia.org/wiki/Lagrangian> - Retrieved 04/13/12

¹³⁶ http://en.wikipedia.org/wiki/ADM_formalism#ADM_Energy - Retrieved 04/13/12

further elaborated upon by Edward Witten in 1981. Here's the abstract of Schoen and Yau's paper,

Let M be a space-time whose local mass density is non-negative everywhere. Then we prove that the total mass of M as viewed from spatial infinity (the ADM mass) must be positive unless M is the flat Minkowski space-time. (So far we are making the reasonable assumption of the existence of a maximal spacelike hypersurface. We will treat this topic separately.) We can generalize our result to admit wormholes in the initial-data set. In fact, we show that the total mass associated with each asymptotic regime is non-negative with equality only if the space-time is flat.

You can find it online [here](#). Witten's method can be found in his paper [here](#). A cursory search of Google turned up yet another way [here](#). This is a rigorously reviewed and widely accepted conclusion and it makes Krauss' argument transparently nonsensical.

Philosophical and logical flaws in the argument

The philosophy behind it is even less coherent. A very well written critique of the book by David Albert was in The New York Times' Sunday Book Review:

<http://www.nytimes.com/2012/03/25/books/review/a-universe-from-nothing-by-lawrence-m-krauss.html>

He pretty much hits the nail on the head. Krauss' argument comes down to arguing with theologians on semantics. He wants the vacuum to count as the absolute nothing philosophers and theologians speak of when they say creation *ex nihilo* because before we realized the vacuum field was not actually nothing, we associated space with the same absolute nothing spoken of in philosophy (the same way Fakhr al-Din al-Razi characterized his "void" as an infinite absolutely empty nothingness). It's a category error to confuse the two wildly different ideas. A universe from the vacuum is not a universe from nothing. When you take into account how standard model Big Bang cosmology describes the behavior of the vacuum that should be readily apparent (and leaves Krauss no excuse though he himself admits his goal is to simply argue against religious people).

The No-Boundary Proposal and Quantum Cosmology

This is usually a reference to the [Hartle-Hawking state](#) in quantum cosmology. It is a theory about an "infinitely finite" universe. Basically it refers to a finite and closed universe with no beginning or end in time.

How is this possible? Spacetime as we know it emerged at the Planck era. Before then,

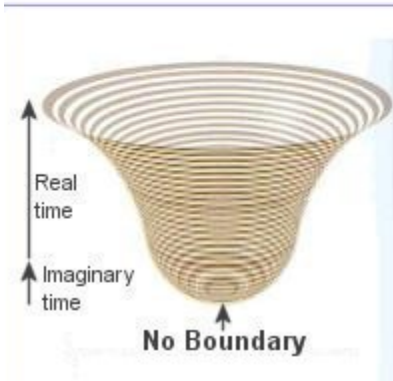
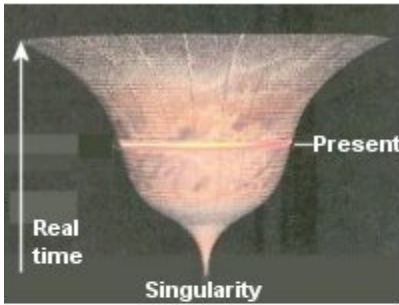
in the particular high energy conditions associated with the Big Bang singularity, time is treated as imaginary which means time was not the way it is today so it could have been a *spacelike* dimension. This means time wouldn't be proceeding in one direction (a timelike dimension that we experience today). It would be spacelike and thus you could have more degrees of freedom. The actual direction of imaginary time is described as at right angles to the common arrow of real time.

So, it is reasoned (this is mostly credited to Stephen Hawking), there is a “boundary problem” (as I called it earlier) with regards to the dimension of time. What happens when you try to leave a closed universe? Space curves back on itself and you wind up back in the universe. So what happens as you go backwards through time to the Big Bang singularity? Time curves back on itself (like a spacelike dimension in a closed hyperspherical universe) so you wind up coming back forward through time. It's often compared to the North Pole of the Earth. As you walk towards the North Pole you are mostly proceeding “North” and the closer you get, the more spatial deviation can occur in your path, and when you eventually reach it, if you keep walking you will now be headed South. This is the nature of a spacelike dimension and it is argued time was like this.

So Hawking believes there was no actual singularity at the Big Bang. We extrapolate to a singularity based on how we know time but since time before the Planck era is “imaginary” and can be treated as a spacelike dimension perhaps there's just no boundary to the time dimension (it curves back on itself).

Here's a picture to make it more intuitive,¹³⁷

¹³⁷ <http://universe-review.ca/R15-17-relativity.htm>



That's a very simplified view of the idea (and as it is related among the public) which is about to become a little more complicated. In order to explain the proposal and the philosophical significance we will need to go further into the details of quantum cosmology.

Quantum cosmology is an answer to the problem of “initial conditions” in cosmology. The inflation model was a decent attempt to explain the horizon problem and perceived homogeneity of the universe. But the initial conditions problem remains. Why would the field begin in a false vacuum state? Or if one does not subscribe to that interpretation, why would it begin in a state that wasn't already at the minimum (the bottom of the energy potential hill)?

One such answer was discussed already, chaotic inflation theory, which posited that our universe could have been born as a bubble universe in an unknowably large (and therefore infinite in space and time past) unobservable universe. It seems the physics community in general is also dissatisfied with it (Hawking called it “misguided and without predictive power”).

I'm going to quote Hawking here from his chapter on quantum cosmology in *The Nature of Space and Time*, a book containing a debate between Hawking and Roger

Penrose¹³⁸:

Cosmology used to be considered a pseudo-science and the preserve of physicists who may have done useful work in their earlier years but who had gone mystic in their dotage. There were two reasons for this. The first was that there was an almost total absence of reliable observations. Indeed, until the 1920s about the only important cosmological observation was that the sky at night is dark. But people didn't appreciate the significance of this. However, in recent years the range and quality of cosmological observations has improved enormously with developments in technology. So this objection against regarding cosmology as a science, that it doesn't have an observational basis is no longer valid.

There is, however, a second and more serious objection. Cosmology can not predict anything about the universe unless it makes some assumption about the initial conditions. Without such an assumption, all one can say is that things are as they are now because they were as they were at an earlier stage. Yet many people believe that science should be concerned only with the local laws which govern how the universe evolves in time. They would feel that the boundary conditions for the universe that determine how the universe began were a question for metaphysics or religion rather than science.

The situation was made worse by the theorems that Roger and I proved. These showed that according to general relativity there should be a singularity in our past. At this singularity the field equations could not be defined. Thus classical general relativity brings about its own downfall: it predicts that it can't predict the universe.

Although many people welcomed this conclusion, it has always profoundly disturbed me. If the laws of physics could break down at the beginning of the universe, why couldn't they break down any where. In quantum theory it is a principle that anything can happen if it is not absolutely forbidden. Once one allows that singular histories could take part in the path integral they could occur any where and predictability would disappear completely. If the laws of physics break down at singularities, they could break down any where.

The only way to have a scientific theory is if the laws of physics hold everywhere including at the beginning of the universe. One can regard this as a triumph for the principles of democracy: Why should the beginning of the universe be exempt from the laws that apply to other points. If all points are equal one can't allow some to be more equal than others.

¹³⁸ Another famous atheist physicist but with sharply varying ideas of how quantum mechanics and general relativity should interact.

To implement the idea that the laws of physics hold everywhere, one should take the path integral only over non-singular metrics.

Before we continue, regarding what path integrals are and why they're used in quantum cosmology,

In non-gravitational physics the approach to quantum theory that has proved most successful involves mathematical objects known as path integrals. Path integrals were introduced by the Nobel prizewinner Richard Feynman, of CalTech. In the path integral approach, the probability that a system in an initial state A will evolve to a final state B is given by adding up a contribution from every possible history of the system that starts in A and ends in B . For this reason a path integral is often referred to as a 'sum over histories'. For large systems, contributions from similar histories cancel each other in the sum and only one history is important. This history is the history that classical physics would predict.¹³⁹

Why apply this approach to quantum mechanics to general relativity? Because as we discussed earlier quantum effects take over when one goes below the Planck scale, in this case past the first Planck unit of time (10^{-43} seconds). The state of the universe at this time should have been dominated by quantum effects.

Before we continue with quantum cosmology let's discuss the path integral approach to quantum mechanics in a little further detail. There are three main formulations, wave mechanics (Schrodinger), matrix mechanics (Heisenberg and Dirac) which is now called canonical quantization and based mostly on Dirac's work, and Feynman's sum over histories.

The Feynman formulation of Quantum Mechanics builds three central ideas from the de Broglie hypothesis into the computation of quantum amplitudes: the probabilistic aspect of nature, superposition, and the classical limit. This is done by making the following three postulates:¹⁴⁰

1. Events in nature are probabilistic with predictable probabilities P .
2. The probability P for an event to occur is given by the square of the complex magnitude of a quantum amplitude for the event, Q . The quantum amplitude Q associated with an event is the sum of the amplitudes associated with every history leading to the event.

¹³⁹ http://www.damtp.cam.ac.uk/research/gr/public/gg_qc.html

¹⁴⁰ http://people.ccmr.cornell.edu/~muchomas/8.04/Lecs/lec_FeynmanDiagrams/node3.html

3. The quantum amplitude associated with a given history is the product of the amplitudes associated with each fundamental process in the history.

Postulate (1) states the fundamental probabilistic nature of our world, and opens the way for computing these probabilities.

Postulate (2) specifies how probabilities are to be computed. This item builds the concept of superposition, and thus the possibility of quantum interference, directly into the formulation. Specifying that the probability for an event is given as the magnitude-squared of a sum made from complex numbers, allows for negative, positive and intermediate interference effects. This part of the formulation thus builds the description of experiments such as the two-slit experiment directly into the formulation. A *history* is a *sequence* of fundamental processes leading to the the event in question. We now have an explicit formulation for calculating the probabilities for events in terms of the, quantum amplitudes for individual histories, which the third postulate will now specify.

Postulate (3) specifies the quantum amplitude associated with individual histories in terms of *fundamental processes*. A fundamental process is any process which cannot be interrupted by another fundamental process. The fundamental processes are thus indivisible "atomic units" of history. With this constraint of the choice of fundamental processes, individual histories may always be divided unambiguously into ordered sequences of fundamental events, which is key to making a consistent prescription for computing the amplitudes of individual histories from fundamental processes. The fact that the definition of fundamental processes is not very specific is actually one of the strongest aspects of the Feynman approach. As we will see, we may sometimes discover that we may lump fundamental processes together into larger units which make up new fundamental processes. This procedure is known as renormalization and is one the the great central ideas in managing the infinities in quantum field theory.

The third postulate builds in the classical limit by allowing recovery of the classical physics notion that the probability of an *independent* sequence of events is the product of the probabilities for each event in the sequence. If we know the sequence of fundamental processes leading to an event, the only contributing history is that sequence of processes.

[...]

What remains unspecified by these postulates is the specification of a valid set of fundamental processes and corresponding quantum amplitudes for

the phenomena we wish to describe. For this information, we must rely upon experimental observations. It is at this point that experimental information is input into the Feynman formulation...¹⁴¹

To relate it to what we've discussed here you can view it (conceptually) as quantizing possibilities or to take it even further, quantizing histories. The possible trajectory of a particle from one point to another (or the evolution of a system from one state to another) is not some continuous vague notion that is typical when we think of "possibilities" but consists of discrete, distinct trajectories each representing an alternate possible path or history. Furthermore the histories vary about a few unalterable points representing critical events described here as fundamental processes. We can view it (philosophically speaking, at least!) as the quantized treatment of history and possibility. This allows us to calculate a probability.

In order to find the overall probability amplitude for a given process, then, one adds up, or integrates, the amplitude of postulate 3 over the space of *all* possible histories of the system in between the initial and final states, including histories that are absurd by classical standards. In calculating the amplitude for a single particle to go from one place to another in a given time, it would be correct to include histories in which the particle describes elaborate curlicues, histories in which the particle shoots off into outer space and flies back again, and so forth. The path integral assigns all of these histories amplitudes of *equal magnitude* but with *varying phase*, or argument of the complex number. The contributions that are wildly different from the classical history are suppressed only by the interference of similar, canceling histories.

Feynman showed that this formulation of quantum mechanics is equivalent to the canonical approach to quantum mechanics, when the Hamiltonian is quadratic in the momentum. An amplitude computed according to Feynman's principles will also obey the Schrödinger equation for the Hamiltonian corresponding to the given action.

Classical action principles are puzzling because of their seemingly teleological quality: given a set of initial and final conditions one is able to find a unique path connecting them, as if the system somehow knows where it's going to end up and how it's going to get there. The path integral explains why this works in terms of quantum superposition. The system doesn't have to know in advance where it's going or what path it'll take: the path integral simply calculates the sum of the probability amplitudes for every possible path to *any* possible endpoint. After a long enough time, interference effects guarantee that only the contributions from the stationary points of the action

¹⁴¹ *Ibid.*

give histories with appreciable probabilities.¹⁴²

The important thing to note here is that histories cancel out. This is described as in the manner of waves cancelling (varying phase) which is described in terms of complex numbers. A complex number is a number which has a real part and an imaginary part. I recommend reading the [Wikipedia page on complex numbers](#) if one is not already familiar with the idea of imaginary numbers.

An interesting anecdote (and excuse me for the ill placed tangent) that can be found from that article is that complex numbers are credited in Europe to Italian mathematician Gerolamo Cardano of the 16th century who was trying to find solutions to cubic equations. Another prominent personality in the history of investigating cubic equations was Omar Khayyam, initially known in the West for his poetry but who is now acknowledged as one of the foremost personalities in the history of mathematics (he was also a prominent astronomer of his time and a contemporary of Imam al-Ghazali). For cubic equations he used a geometric solution involving conic sections. The point of interest, however, is in his philosophy regarding mathematics and science. "There are at least three basic mathematical ideas of strong philosophical dimensions that can be associated with Khayyám:"¹⁴³

1. Mathematical order: From where does this order issue, and why does it correspond to the world of nature? His answer is in one of his philosophical "treatises on being". Khayyám's answer is that "the Divine Origin of all existence not only emanates wujud or being, by virtue of which all things gain reality, but It is the source of order that is inseparable from the very act of existence."
2. The significance of postulates (i.e. axiom) in geometry and the necessity for the mathematician to rely upon philosophy and hence the importance of the relation of any particular science to prime philosophy. This is the philosophical background to Khayyám's total rejection of any attempt to "prove" the parallel postulate, and in turn his refusal to bring motion into the attempt to prove this postulate, as had Ibn al-Haytham, because Khayyám associated motion with the world of matter, and wanted to keep it away from the purely intelligible and immaterial world of geometry.
3. Clear distinction made by Khayyám, on the basis of the work of earlier Persian philosophers such as Avicenna, between natural bodies and mathematical bodies. The first is defined as a body that is in the category of substance and that stands by itself, and hence a subject of natural sciences, while the second, called "volume", is of the category of accidents (attributes) that do not subsist by themselves in the external world and hence is the concern of mathematics. Khayyám was very careful to respect the boundaries of each discipline, and criticized Ibn al-Haytham in his proof

¹⁴² http://en.wikipedia.org/wiki/Path_integral_formulation - Retrieved 04/18/12

¹⁴³ http://en.wikipedia.org/wiki/Omar_Khayy%C3%A1m - Retrieved 04/18/12

of the parallel postulate precisely because he had broken this rule and had brought a subject belonging to natural philosophy, that is, motion, which belongs to natural bodies, into the domain of geometry, which deals with mathematical bodies.¹⁴⁴

This presents an interesting backdrop to this discussion as the debate about the applicability of mathematics to reality has been ongoing for a very long time. It's interesting to note the philosophical problems being discussed here were encountered even by Ibn al-Haytham in his attempt to construct a new model of celestial kinematics. One wonders what those two and the other mathematical astronomers and physicists of ancient history would say if they could see where developments would lead, where entire coordinate systems representing reality undergo transformations.

Returning to the subject at hand, each path or history's amplitude is given by the product of the amplitudes of the fundamental processes or events involved. Then all (infinitely many) histories are summed up.

When these are summed in the end, depending on their "phase", they cancel out or result in a constructive interference effect. Most of the constructive interference happens around the classical solution where the paths closest to the classical path (the usual path we would expect in our actual history) contribute the lion's share of the sum and the paths further from the classical path cancel out (deconstructive interference).

There are two concepts here to elaborate. First, the classical solution. Secondly, the contribution of a path or history to the sum.

What classical solution is referring to is [the principle of least action](#) (also known as the principle of stationary action or Hamilton's principle). As mentioned earlier the action is "an attribute of the dynamics of a physical system. It is a mathematical functional which takes the trajectory, also called path or history, of the system as its argument and has a real number as its result."¹⁴⁵ It is defined as the integral of the Lagrangian, a function which summarizes the dynamics of a system, between two instants of time. The action is a [functional](#) (often given by the symbol, S) "which returns the smallest possible value for the path taken by the system". The true trajectories are those that have least action.¹⁴⁶

When we study the aforementioned "classical limit" or "semiclassical limit" of quantum mechanics the Planck constant in the equations is going to zero (whereupon the classical trajectory is given).

¹⁴⁴ Nasr, S. H. (2006). *Islamic Philosophy from Its Origin to the Present: Philosophy in the Land of Prophecy*. SUNY Press. ISBN 0-7914-6799-6

¹⁴⁵ [http://en.wikipedia.org/wiki/Action_\(physics\)](http://en.wikipedia.org/wiki/Action_(physics)) - Retrieved 04/18/12

¹⁴⁶ http://www.scholarpedia.org/article/Principle_of_least_action

Keeping this in mind let's turn to the second consideration. Obviously not all paths are likely so we need to weight the contribution of the paths to reflect this. The contribution of a path or history to the sum is proportional to $e^{iS/\hbar}$ where S is the action (obtained from the Lagrangian), \hbar is the reduced Planck constant, and i refers to the imaginary unit. This expression is also referred to as the "weight" of each history (so the contribution of every history being proportional to it means it is weighted by it). It is equal to 1 where S is real which results in an oscillating integral.

An oscillating integral is a problem because it does not converge. A convergent integral gives us a real number (implying the limit exists). A divergent integral implies the limit does not exist or it's infinite.

We can tweak it so the integral converges by adding a small imaginary part to the time. We [analytically continue](#) the time to imaginary values. This is also described as a small rotation into imaginary time, a [Wick rotation](#). What this does is exponentially dampen the contributions from particularly large actions (those most furthest from the classical path, the one of least action).

This process means we are necessarily in a Euclidean space (as opposed to a Lorentzian one such as in the previously discussed Minkowski spacetime, henceforth referred to as "Lorentzian time"). The action thus described is sometimes called a "Euclidean action" or an imaginary action. The same process (a wick rotation, or analytically continuing a parameter to imaginary values) is how we convert a Minkowski/Lorentzian space into a Euclidean one.

This practice is quite controversial in physics. Quite a few people label it a mere mathematical "trick" with no physical significance. The fact it's being used in Feynman's path integral also tells us something because Feynman made this approach just to have an easier way of tackling traditionally tough problems in quantum mechanics. That the process uses the more fundamental Lagrangian and is predominantly used in Euclidean contexts speaks to its relative ease of use as its strength and main selling point, furthermore there are many statements from Feynman himself (some mentioned earlier here) which indicate he was not the sort to blur the lines between math and reality.

Nonetheless others maintain it has real world importance (notably Stephen Hawking, what we are about to discuss). Those who attempt to "justify" the use of such techniques tend to use philosophical arguments akin to reductionism.

Back to the world of quantum cosmology, where we apply this technique (already known for its heuristic approach devoid of useful interpretative metaphysical significance) to the problems of "initial conditions" of classical models of the universe (justified by the idea that quantum effects must have played a large role at the Big Bang). There are three basic ingredients for quantum cosmology, a theory of dynamics (general relativity), a hypothesis for initial conditions (to single out solutions from the wide range

of probabilities), and a way to interpret it.¹⁴⁷

In quantum cosmology a “state” is a 3-dimensional slice of a 4-dimensional spacetime and the wave function of a particle is replaced by the “wave function of the universe” which is the probability amplitude that the universe contains the hypothetical state.¹⁴⁸

The wave function indicates the regions in which spacetime is essentially classical and those in which it is not. The boundary conditions on the wave function set the initial conditions on the classical solutions. A strong peak in the amplitude is regarded as a prediction.¹⁴⁹

One thing to note is that the wave function of the universe is not explicitly dependent on the time parameter which is characteristic of parametrized theories like general relativity which model the intrinsic properties of something, specifically in how time is already contained among the dynamical variables describing it.¹⁵⁰ This is also called “reparametrization invariance” and it implies the dimensionality is larger than is necessary to describe the physics in question (like describing the length of a curved line which might require complicated ways to plot points, those ways don’t matter since the length is a simple one dimensional number).

The region in which the wave function is exponential is regarded as a classically forbidden region (corresponding to small values of the scale factor) and the region in which it is oscillatory is regarded as a classically allowed region.¹⁵¹

One merely transfers the question of initial conditions on the classical solutions to the question of boundary conditions on the wave function of the universe. To have complete predictive power, therefore, one needs a quantum theory of boundary conditions.¹⁵²

The author I’m quoting goes on to say,

Classically, there is no obvious reason for choosing one set of initial conditions over another. No one choice stands out as being more natural or elegant than any other. In quantum cosmology, however, one can argue that certain quantum states for the universe have considerably more appeal than others on the grounds of simplicity or naturalness. I will leave this to the reader to judge for themselves...

¹⁴⁷ Jonathan J. Halliwell, *Introductory Lectures on Quantum Cosmology*, March 1990

¹⁴⁸ http://ned.ipac.caltech.edu/level5/Carroll/Carroll5_1.html

¹⁴⁹ Jonathan J. Halliwell, *Introductory Lectures on Quantum Cosmology*, March 1990

¹⁵⁰ *Ibid.*

¹⁵¹ *Ibid.*

¹⁵² *Ibid.*

There are actually two ways to proceed from here, using the path integral method or the canonical quantization procedure. We will stick to the former but mention some things from the latter as it's always a factor since in quantum cosmology the Wheeler-De-Witt equation (related to the "wave function of the universe") is used hand-in-hand with the path integral.

In the path integral method the wave function is represented by a Euclidean functional integral over a certain class of 4-metrics and matter fields, weighted by the aforementioned Euclidean action (of the gravity + matter system).¹⁵³

The expression, "Euclidean path integral" should be taken with a very large grain of salt for the case of gravitational systems. [...] In particular, in addition to the usual issues associated with defining a functional integral over fields, one has to deal with the fact that the gravitational action is not bounded from below. This means that the path integral will not converge if one integrates over real Euclidean metrics. Convergence is achieved only by integrating along a complex contour in the space of complex four-metrics. The sum is therefore over complex metrics and is not even equivalent to a sum over Euclidean metrics in any sense. Furthermore, there is generally no unique contour and the outcome of evaluating the path integral could depend rather crucially on which complex contour one chooses.¹⁵⁴

One key thing to note about both the canonical quantization procedure and the path integral approach is that they both take place on a configuration space, defined in the canonical procedure as "the space of all 3-metrics and matter field configurations on a 3-surface."¹⁵⁵ This is called *superspace*, an infinite dimensional analogue to the Hilbert space used for the Lagrangian. Superspace is described by the DeWitt metric. The intrinsic geometry of each 3-metric fixes its location within the overall superspace (not time as mentioned earlier).

This superspace has nothing to do with the superspace of supersymmetry. Also, earlier authors in quantum cosmology used a different definition of superspace: they defined it to be the space of all three-metrics, but factored out by the three-dimensional diffeomorphisms.

What we do is sort of "zoom in" to a location on the superspace corresponding to the specific characteristics we want (such as homogeneity and isotropy). This is called *minisuperspace* which is finite dimensional.

¹⁵³ *Ibid.*

¹⁵⁴ *Ibid.*

¹⁵⁵ *Ibid.*

The basic idea then is to find those regions of the configuration space where the wave function is oscillatory as those should correspond to classical predictions.

In the Euclidean path integral representation,

If the solution is real, it will have real action, and the wave function will be exponential. However, it appears to be most commonly the case for generic boundary data that no real Euclidean solution exists, and the only solutions are complex, with complex action. The wave function will then be oscillatory.¹⁵⁶

With regards to interpreting probability amplitudes, although the original wave function does not carry a particular label playing the role of time, a notion of time may emerge: It is the affine parameter along the histories about which the wave function is peaked (i.e., the distance along the ridge).¹⁵⁷ Since the “wave function of the universe”, described by the Wheeler-De-Witt equation, is a relativistic version of the original Schrodinger equation, there is a conserved current correlating to the probability density, as there is in the original equation. In other words, probability is conserved (it can derive the [continuity equation](#) for probability). From this we can get the probability density and even something called the *probability current*.

The trouble with the relativistic wave function is that there can be negative probabilities. However, when done in the context of our minisuperspace’s “timelike” coordinate (corresponding in no way to actual time, just behaving like it). When this coordinate is negative (only in semi-classical regions) it corresponds to the possibility of both expanding and collapsing universes.

Now returning to the issue of choosing boundary conditions, there are two prominent ones in quantum cosmology. Hawking and Hartle’s “no boundary” proposal and the tunneling boundary condition (from the previous section on inflation).

Halliwell states,

It should be stated at the outset that all known proposals for boundary conditions in quantum cosmology may be criticised on the grounds of lack of generality of lack of precision, and these two are no exception. The issue of proposing a sensible theory of initial conditions which completely specifies a unique wave function of the universe for all conceivable situations, is to my mind still an open one.

The No-Boundary proposal is expressed in terms of a path integral and specifically chooses a closed geometry as the initial condition.

¹⁵⁶ *Ibid.*

¹⁵⁷ *Ibid.*

Hawking says about the choice,

...open inflation. This is the idea that the universe is infinitely large, and of low density, despite having been through a period of exponential expansion, in the very early stages. My opinion was, that these were all nice ideas, but that nature probably hadn't chosen the use any of them. I included open inflation in that list, because I believed strongly that the universe came into being, at a finite size, and I felt that implied that the universe now, was still of finite size, or closed. However, after Neil [Turok] gave a seminar on open inflation in Cambridge, we got talking. We realized it was possible for the universe to come into existence, at a finite size, but nevertheless, be either a finite, or an infinitely large universe now.

[...]

As I said, I thought the no boundary proposal, implied that the universe had to be spatially closed, and finite in size. But Neil Turok and I, realized his ideas on open inflation, could be fitted in with the no boundary proposal. The universe would still be closed and finite, in one way of looking at it. But in another, it would appear open and infinite.¹⁵⁸

So although Hawking was a firm believer in a closed spacetime geometry for many years he has in the past few years conceded the possibility of an open spacetime geometry in response to current developments with observations of the cosmic microwave background radiation which indicate the universe is expanding and will continue to do so. However he remains firm on the notion of the universe being created in a finite state.

In order to understand some of Hawking's motivations, we will have to touch on what his scientific philosophy seems to be. In the introduction to the classical theory chapter of the aforementioned collaborative effort with Roger Penrose, *The Nature of Space and Time*, in which he says,

There is a short article by Richard Feynman describing his experiences at a conference on general relativity. I think it was the Warsaw conference in 1962. It commented very unfavorably on the general competence of the people there and the relevance of what they were doing. That general relativity soon acquired a much better reputation, and more interest, is in a considerable measure because of Roger's work. Up to then, general relativity had been formulated as a messy set of partial differential equations in a single coordinate system. People were so pleased when they found a

¹⁵⁸ <http://www.hawking.org.uk/inflation-an-open-and-shut-case.html>

solution that they didn't care that it probably had no physical significance. However, Roger brought in modern concepts like spinors and global methods. He was the first to show that one could discover general properties without solving the equations exactly. It was his first singularity theorem that introduced me to the study of causal structure and inspired my classical work on singularities and black holes.

A point to note is that spinors and Penrose's own later development, twistors, are attempts to discretize spacetime. Interesting material to read up on which will be mentioned again a little later.

Continuing,

I think Roger and I pretty much agree on the classical work. However, we differ in our approach to quantum gravity and indeed to quantum theory itself. Although I'm regarded as a dangerous radical by particle physicists for proposing that there may be loss of quantum coherence I'm definitely a conservative compared to Roger. *I take the positivist viewpoint that a physical theory is just a mathematical model and that it is meaningless to ask whether it corresponds to reality. All that one can ask is that its predictions should be in agreement with observation.* I think Roger is a Platonist at heart but he must answer for himself.

Although there have been suggestions that spacetime may have a discrete structure I see no reason to abandon the continuum theories that have been so successful. General relativity is a beautiful theory that agrees with every observation that has been made. It may require modifications on the Planck scale but I don't think that will affect many of the predictions that can be obtained from it. It may be only a low energy approximation to some more fundamental theory, like string theory, but I think string theory has been over sold.

Emphasis mine. As we can see Hawking had a positivist bent in his earlier metaphysics (this book is from the 1990s). He says it is meaningless to ask whether the mathematical model corresponds to reality. In his old age, however, he unfortunately parts ways from this viewpoint. In his most recent book, *The Grand Design*, released in 2010, he takes his No-Boundary proposal, packaged with M-Theory (a version of string theory which effectively reduces to supergravity at low energies), and emphatically claims that the universe needs no notion of a God (Creator). We will get into the meat of the philosophy behind this argument later but what's worth noting here is that he clearly changes positions on the issue of whether the mathematics correspond to reality.

Returning to the issue of quantum cosmology, the next task is to describe the application of this proposal via a Euclidean path integral. Halliwell continues,

There is a further issue concerning the contour of integration. As discussed earlier a complex contour of integration is necessary if the path integral is to converge. Although convergent contours are readily found, convergence alone does not lead one automatically to a unique contour, and the value of the wave function may depend, possibly quite crucially, on which contour one chooses. The no-boundary proposal does not obviously offer any guidelines as to which contour one should take.

Because of these difficulties of precision in defining the no-boundary wave function, I am going to allow myself considerable license in my interpretation of what this proposal actually implies for practical calculations.

[...]

The point to note is that one rarely goes beyond the lowest order semiclassical approximation in quantum cosmology. [...] it is because our present understanding of quantum gravity is rather poor and if these models have any range of validity at all, they are unlikely to be valid beyond the lowest order semiclassical approximation. What this means is that in attempting to apply the no-boundary proposal, one need only concern oneself with the question of finding initial conditions that correspond to the no-boundary proposal at the classical level.

[...]

Consider next the contour of integration. Because we will only be working in the semiclassical approximation, we do not have to worry about finding convergent contours. Nevertheless, the contour becomes an issue for us if the solution to the Einstein equations satisfying the above boundary conditions is not unique. For then the path integral will have a number of saddle-points, each of which may contribute to the integral... [...] Without choosing a contour and performing a detailed contour analysis it is unfortunately not possible to say which saddle-points will generally provide the dominant contributions. We therefore have no general guidelines to offer here.

[...]

Some further remarks are in order. First, the contour of integration. The path integral for the no-boundary wave function as discussed above has two saddle-points, and Hartle and Hawking argued that it is the saddle-point corresponding to less than half a four-sphere that provides the dominant contribution. However, their heuristic argument is not, in my opinion, totally

convincing. A more detailed analysis of this situation by myself and Jorma Louko exposed the assumptions that Hartle and Hawking implicitly made to arrive at the above answer (Halliwell and Louko, 1989a). By a suitable choice of variables, and by working with a cosmological constant instead of a scalar field, we were able to evaluate the minisuperspace path integral for this model exactly. In particular, we were able to determine convergent contours explicitly for the model, and thus see whether or not certain saddle-points did or did not yield the dominant contribution to the path integral. What we found is that there are a number of inequivalent contours along which the path integral converges, each dominated by different saddle-points, and thus leading to different forms for the wave function. No one contour was obviously preferred. In particular, the no-boundary proposal did not indicate which contour one was supposed to take. A contour yielding the above form for the wave function could be found, but it was not obvious why one should take that particular one. So the essential conclusion here is that the no-boundary proposal as it stands does not fix the wave function uniquely. There are, so to speak, many no-boundary wave functions, each corresponding to a different choice of contour. The wave function is therefore only fixed uniquely after one has put in some *extra* information fixing the contour.

As an example, in the simple model above one could *define* the no-boundary wave function to be as defined by Hartle and Hawking, with the *additional* piece of information that one is to take the contour dominated by the less-than-half saddle-point. A more general statement is however not currently available. A possible approach to this problem is that of Halliwell and Hartle (1989), which involved restricting the possible contours on the grounds of mathematical consistency and physical predictions.

In other words despite Hawking's distaste for the notion of arbitrariness in nature he has little problem with being quite arbitrary himself, and this applies moreso for much of his philosophy (discussed in the pop science books he's written).

Here is Hawking himself (in the earlier work with Penrose) on his motivations for choosing this method, including the preference for Euclidean metrics and his views regarding the "shape" of the universe,

To implement the idea that the laws of physics hold everywhere, one should take the path integral only over non-singular metrics. One knows in the ordinary path integral case that the measure is concentrated on non-differentiable paths. But these are the completion in some suitable topology of the set of smooth paths with well defined action. Similarly, one would expect that the path integral for quantum gravity should be taken over the completion of the space of smooth metrics. What the path integral can't include is metrics with singularities whose action is not defined.

In the case of black holes we saw that the path integral should be taken over Euclidean, that is, positive definite metrics. This meant that the singularities of black holes, like the Schwarzschild solution, did not appear on the Euclidean metrics which did not go inside the horizon. Instead the horizon was like the origin of polar coordinates. The action of the Euclidean metric was therefore well defined. One could regard this as a quantum version of Cosmic Censorship: the break down of the structure at a singularity should not affect any physical measurement.

It seems, therefore, that the path integral for quantum gravity should be taken over non-singular Euclidean metrics. But what should the boundary conditions be on these metrics. There are two, and only two, natural choices. The first is metrics that approach the flat Euclidean metric outside a compact set. The second possibility is metrics on manifolds that are compact and without boundary.

The first class of asymptotically Euclidean metrics is obviously appropriate for scattering calculations. In these one sends particles in from infinity and observes what comes out again to infinity. All measurements are made at infinity where one has a flat background metric and one can interpret small fluctuations in the fields as particles in the usual way. One doesn't ask what happens in the interaction region in the middle. That is why one does a path integral over all possible histories for the interaction region, that is, over all asymptotically Euclidean metrics.

However, in cosmology one is interested in measurements that are made in a finite region rather than at infinity. We are on the inside of the universe not looking in from the outside. To see what difference this makes let us first suppose that the path integral for cosmology is to be taken over all asymptotically Euclidean metrics.

Then there would be two contributions to probabilities for measurements in a finite region. The first would be from connected asymptotically Euclidean metrics. The second would be from disconnected metrics that consisted of a compact spacetime containing the region of measurements and a separate asymptotically Euclidean metric. One can not exclude disconnected metrics from the path integral because they can be approximated by connected metrics in which the different components are joined by thin tubes or wormholes of negligible action.

Disconnected compact regions of spacetime won't affect scattering calculations because they aren't connected to infinity, where all measurements are made. But they will affect measurements in cosmology

that are made in a finite region. Indeed, the contributions from such disconnected metrics will dominate over the contributions from connected asymptotically Euclidean metrics. Thus, even if one took the path integral for cosmology to be over all asymptotically Euclidean metrics, the effect would be almost the same as if the path integral had been over all compact metrics. It therefore seems more natural to take the path integral for cosmology to be over all compact metrics without boundary, as Jim Hartle and I proposed in 1983.

Hawking's preference for Euclidean geometry rests in how messing with the time dimension in such a context allows us to address the otherwise unaddressable singularities like at black holes or at the Big Bang. But unlike other pop science authors he puts the science first and the math even before that where he talks a bit about issues with treating the universe like asymptotically flat and infinite Euclidean space in its early moments (in other words this isn't due to some emotional or realist bias on his part, it's just the math).

Keep in mind we can really only "see" to about 300,000 years after the Big Bang. The universe's history before that lies in the realm of theoretical physics and the time before the Planck era (10^{-43} seconds), where the singularity predicted by the standard model might be found, is even more highly speculative since we have no way of describing those conditions with standard model particle physics. There is by no means a consensus of the physics community on models to describe these times.

Let's return to the essence of the No Boundary proposal now that we've covered some of the basic background. First let's mention the idea of a de Sitter space and a de Sitter universe. A de Sitter space is defined at Wikipedia as,

...the analog in Minkowski space, or spacetime, of a sphere in ordinary, Euclidean space. The n-dimensional de Sitter space is the Lorentzian manifold analog of an n-sphere... [...] In the language of general relativity, de Sitter space is the maximally symmetric, vacuum solution of Einstein's field equations with a positive (repulsive) cosmological constant (corresponding to a positive vacuum energy density and negative pressure). When $n = 4$ (3 space dimensions plus time), it is a cosmological model for the physical universe;

This is called a de Sitter universe and it,

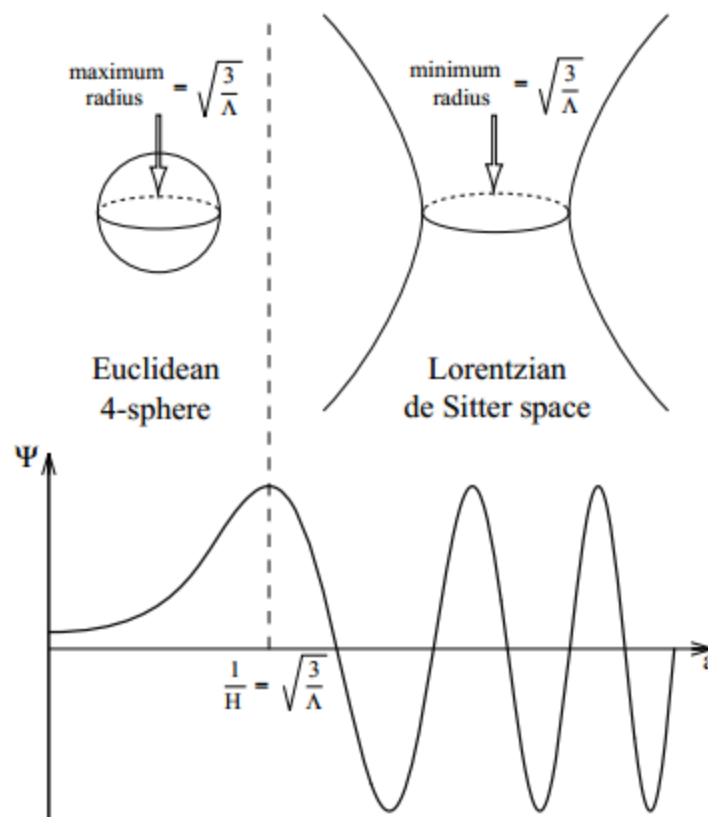
...models the universe as spatially flat and neglects ordinary matter, so the dynamics of the universe are dominated by the cosmological constant, thought to correspond to dark energy in our universe or the inflaton field in the early universe. According to the models of inflation and current observations of the accelerating universe, the concordance models of

physical cosmology are converging on a consistent model where our universe was best described as a de Sitter universe at about a time $t=10^{-33}$ seconds after the fiducial Big Bang singularity, and far into the future.

It describes a very simplistic model of an empty, exponentially expanding universe. It's used in modeling inflation for its ease of use (and the prohibitive complexity of attempting to model a realistic inflationary universe). A de Sitter space, and its corresponding universe, is hyperboloid in nature (as you might have expected from the Minkowski space) whereas the Euclidean models were hyperspherical. The middle of the hyperboloid is where we expect the Big Bang singularity normally (and the other half of the shape is discarded or ignored).

One can think of it as a closed universe that shrinks down from infinite size to a minimum radius and then expands again exponentially.¹⁵⁹

Here's a picture,

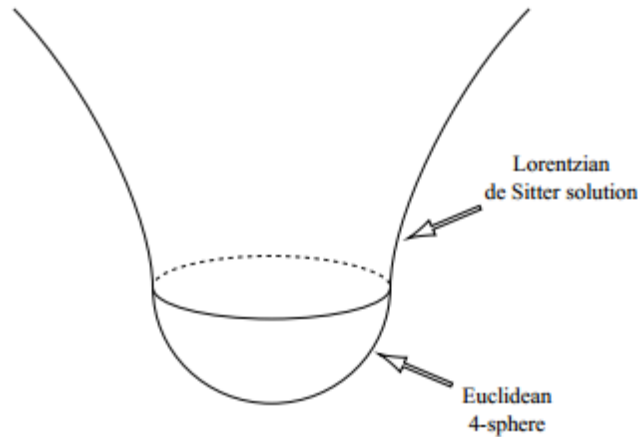


Thus one gets the idea that a wave function which varies exponentially [...] corresponds to an imaginary time Euclidean metric. On the other hand, a wave function which oscillates rapidly corresponds to a real time Lorentzian

¹⁵⁹ Hawking, Stephen, *The Nature of Space and Time*, 1994

metric.

Like in the case of the pair creation of black holes, one can describe the spontaneous creation of an exponentially expanding universe. One joins the lower half of the Euclidean four sphere to the upper half of the Lorentzian hyperboloid.¹⁶⁰



Unlike the black hole pair creation, one couldn't say that the de Sitter universe was created out of field energy in a pre-existing space. Instead, it would quite literally be created out of nothing: not just out of the vacuum but out of absolutely nothing at all because there is nothing outside the universe.

[...]

Thus the no boundary proposal makes cosmology into a science because one can predict the result of any observation. The case we have just been considering of no matter fields and just a cosmological constant does not correspond to the universe we live in. Nevertheless, it is a useful example, both because it is a simple model that can be solved fairly explicitly and because, as we shall see, it seems to correspond to the early stages of the universe.¹⁶¹

Hawking does a good job of developing the model to predict our observable universe (replacing the cosmological constant with matter fields, specifically the scalar field corresponding to the inflaton field whose potential acted as a cosmological constant responsible for inflation as per the previous section) but his attitude of trying to explain all current knowledge in a theoretical model isn't without its downsides (since our knowledge changes with newer and better ways of making observations). Like the

¹⁶⁰ *Ibid.*

¹⁶¹ *Ibid.*

people discussed in the inflation section, he's been reluctant to jump on the bandwagon of string theory (saying in the above quoted work, "*Thus it seems we don't need string theory even for the beginning of the universe*"), loop quantum gravity, or any developing new model. He prefers to strike out on his own path in quantum cosmology as we've seen. The issue with this is that it holds him to a little less accountability in that it makes room for quite a fair bit of arbitrariness. The evolution of his No Boundary proposal is proof of that.

His switch from insisting on a closed and finite universe to a finite in origin but potentially infinite one was touched on above. It was inspired by recent cosmological measurements and the subsequent developments in inflationary theory. Here is more from that talk,

The original idea for inflation, was that in some way, the universe got trapped in what was called, a false vacuum state. [...] The original model of inflation, which came to be known as old inflation, had various problems. How did the universe get into a false vacuum state in the first place, and how did it get out again. Various modifications were proposed, that went under the names of new inflation, or extended inflation. I won't describe them, because I have got into trouble in the past, about who should have credit for what, and because I now consider them irrelevant. [...] Andrei's idea removed the need to believe that the universe began in a false vacuum. However, one still needed to explain, why the field should have been nearly constant over a region, with a value that was not at the minimum of the potential.

To do this, one has to have a theory of the initial conditions of the universe. There are three main candidates. They are, the so called pre-big bang scenario, the tunneling hypothesis, and the no boundary proposal. In my opinion, the pre-big bang scenario is misguided, and without predictive power. And I feel the tunneling hypothesis, is either not well defined, or gives the wrong answers. But then I'm biased, for it was Jim Hartle and I, that were responsible for the no boundary proposal.

This says that the quantum state of the universe, is defined by a Euclidean path integral over compact metrics, without boundary. One can picture these metrics, as being like the surface of the Earth, with degrees of latitude, playing the role of imaginary time. One starts at the north pole, with the universe as a single point. As one goes south, the spatial size of the universe, increases like the lengths of the circles of latitude. The spatial size of the universe, reaches a maximum size at the equator, and then shrinks again to a point at the south pole.

Of course, spacetime is four dimensional, not two dimensional, like the surface of the Earth, but the idea is much the same. I shall go through it in

detail, because it is basic to the work I'm going to describe. The simplest compact four dimensional metric that might represent the universe, is the four sphere.

One can give its metric in terms of coordinates, sigma, chi, theta and phi. One can think of sigma, as an imaginary time coordinate, and chi, theta and phi, as coordinates on a three sphere, that represents the spatial size of the universe. Again, one starts at the north pole, $\sigma = 0$, with a universe of zero spatial size, and expands up to a maximum size at the equator, $\sigma = \pi$, over $2H$. But we live in a universe with a Lorentzian metric, like Minkowski space, not a Euclidean, positive definite metric.

One therefore has to analytically continue, the Euclidean metrics used in the path integral, for the no boundary proposal. There are several ways one can analytically continue, the metric of the four sphere, to a Lorentzian spacetime metric. The most obvious is to follow the Euclidean time variable, sigma, from the north pole to the equator, and then go in the imaginary sigma direction, and call that real Lorentzian time, t . Instead of the size of the three spheres going as the sine of $H \sigma$, they now go as the cosh of $H t$. This gives a closed universe, that expands exponentially with real time. At late times, the expansion will change from being exponential, to being slowed down by matter in the normal way. This departure of the scale factor from a cosh behavior, will occur because the original Euclidean four sphere, was not perfectly round. But the universe would still be closed, however deformed the four sphere.

For nearly 15 years, I believed that the no boundary proposal, predicted that the universe was spatially closed.

[...]

Despite these indications of a low density lambda universe, I continued to believe that the cosmological constant was zero, and the no boundary proposal, implied that the universe must be closed. Then in conversations with Neil Turok, I realized there was another way of looking at the no boundary universe, that made it appear open. One starts with the point that Andrei Linde made, that inflation doesn't need a false vacuum, a local minimum of the potential. But if the scalar field is not at a stationary point of the potential, then it can not be constant on an *instanton*, a Euclidean solution of the field equations. In turn, this implies that the instanton can't be a perfectly round four sphere. A perfectly round four sphere, would have the symmetry group, O_5 .

But with a non constant scalar field, the largest symmetry group that an

instanton can have, is O_4 . In other words, the instanton is a deformed four sphere.

One can write the metric of an O_4 instanton, in terms of a function, b of σ . Here b is the radius of a three sphere of constant distance, σ , from the north pole of the instanton. If the instanton were a perfectly round four sphere, b would be a sine function of σ . It would have one zero at the north pole, and a second at the south pole, which would also be a regular point of the geometry. However, if the scalar field at the north pole, is not at a stationary point of the potential, it will be almost constant over most of the four sphere, but will diverge near the south pole. This behavior is independent of the precise shape of the potential. The non constant scalar field, will cause the instanton not to be a perfectly round four sphere, and in fact there will be a singularity at the south pole. But it will be a very mild singularity, and the Euclidean action of the instanton will be finite.

This Euclidean instanton, has been described as the universe beginning as a pea. In fact, a pea is quite a good image for a deformed sphere. Its size of a few thousand Planck lengths, makes it a very petty pea. But the mass of the matter it contains, is about half a gram, which is about right for a pea.

I actually discovered this pea instanton in 1983, but I thought it could describe the birth of close universes only.

An instanton is a mathematical object or model (sometimes called a pseudo-particle) which, in addition to acting as a little “package” of the equations of motion of classical field theory on a Euclidean spacetime,¹⁶² (which is used in path integrals in the place of “*fundamental processes*” spoken of earlier) appears as a sort of “lump” in Euclidean space and which in Minkowski space describes a quantum tunneling event such as from a false vacuum to a true vacuum as mentioned in the last section or any case where the transition probability needs to be calculated for a particle tunneling through an energy potential barrier (a classically forbidden region). When used in Euclidean space (i.e, during a path integral approach involving an analytic continuation to Euclidean spacetime) the energy potential minima, usually pictured as a “well” (or valley, or dip) turns into a maxima (a “hill”). A classically forbidden region in a Minkowskian path integral becomes a classically allowed region in the Euclidean path integral.

(pictorially speaking—in the Euclidean picture—this transition corresponds to a particle rolling from one hill of a double-well potential standing on its head to the other hill)¹⁶³

An example of a real event describable by quantum tunneling is radioactive decay about

¹⁶² <http://en.wikipedia.org/wiki/Instanton> - Retrieved 04/20/12

¹⁶³ *Ibid.*

which there is plenty of information available online (it was originally study of radioactive decay which led into this). I will discuss quantum tunneling in more detail a little later.

Returning to Hawking,

As I said, I thought the no boundary proposal, implied that the universe had to be spatially closed, and finite in size. But Neil Turok and I, realized his ideas on open inflation, could be fitted in with the no boundary proposal. The universe would still be closed and finite, in one way of looking at it. But in another, it would appear open and infinite.

[...]

Let's go back to the metric for the pea instanton, and analytically continue it in a different way. As before, one analytically continues the Euclidean latitude coordinate, in the imaginary direction, to become a Lorentzian time, t . The difference is that one goes in the imaginary sigma direction at the north pole, rather than the equator. One also continues the coordinate, χ , in the imaginary direction, as a coordinate, ψ . This changes the three sphere, into a hyperbolic space. One therefore gets an exponentially expanding open universe.

One can think of this open universe, as a bubble in a closed, de Sitter like universe. In this way, it is similar to the single bubble inflationary universes, that have been proposed by a number of authors. The difference is, the previous models all required carefully adjusted potentials, with false vacuum local minima. But the pea instanton, will work for any reasonable potential. The price one pays for a general potential, is a singularity at the south pole. In the analytically continued Lorentzian spacetime, this singularity would be time like, and naked.

He's already invoking metaphysical claims about an unobservable container de Sitter universe in order to justify matching the model to current trends.

The other problem here is that the singularity they're trying to avoid at the Big Bang is still showing up but it's being swept under the rug as a "mild" one that won't affect the overall (finite) action of the instanton. He goes on to elaborate on why the mild singularity won't affect predictions of quantum fluctuations (perturbations about the instanton, the "dimples" of the pea) and their effect on the later large scale structure of the universe, a key ingredient for a testable theory. He compares the No Boundary condition to the Tunneling condition (of Vilenkin and Linde) in this respect,

According to the no boundary proposal, the probability of a field configuration, is e^{-S} to minus its action. Thus perturbations around the instanton, have

a lower probability, than the unperturbed background. This means that quantum fluctuations are suppressed, the bigger the fluctuation, as one would hope. On the other hand, according to the tunneling hypothesis, favored by Vilenkin and Linde, probabilities are proportional to $e^{-\text{action}}$. This would mean that quantum fluctuations would be enhanced, the bigger the fluctuation. There is no way this could lead to a sensible description of the universe. Linde therefore proposes to take $e^{-\text{action}}$ for the probability of the background universe, but $e^{+\text{action}}$ for the perturbations. However, there is no invariant way, in which one can divide the action, into a background part, and a part due to fluctuations. So Linde's proposal, does not seem well defined in general. By contrast, the no boundary proposal, is well defined. Its predictions may be surprising, but they are not obviously wrong.

Here is where we'll switch gears. He speaks critically about the tunneling hypothesis. Indeed the entire point of the No Boundary proposal was the analytic continuation to a Euclidean spacelike dimension of time that behaved like polar coordinates (the analogy of the Earth and the North Pole) which made it so one could claim "beginning" or "before the Big Bang" were incoherent concepts, there was no "beginning", $t=0$ was simply a timeless state of "now" of an existing universe. This was a very poetic solution which earned the Hartle-Hawking model many fans. In fact, I quite liked it myself. Even if one doesn't agree with it one has to marvel at the cleverness of it since it forces an avoidance of the entire "creation of the universe" issue. Of course whether it applied in reality was completely up for debate. I'm not a fan of Euclidean spacetimes as representation of reality, I see analytic continuation as indeed a math "trick" that makes it easier to get predictions that could apply to the real behavior of the universe without gaining a picture of what that universe actually "looks" like.

The Vilenkin tunneling hypothesis, on the other hand, was described earlier by Hawking in the following way,

Unlike the black hole pair creation, one couldn't say that the de Sitter universe was created out of field energy in a pre-existing space. Instead, it would quite literally be created out of nothing: not just out of the vacuum but out of absolutely nothing at all because there is nothing outside the universe.¹⁶⁴

This view says that at $t=0$ the de Sitter universe's volume reduces, literally, to zero. To nothing. *No fields, no forces*. It is from this state that the universe tunnels into existence from nothing.

¹⁶⁴ Hawking, Stephen, *The Nature of Space and Time*, 1994

Alan Guth tries to describe it more intuitively,¹⁶⁵

[He] suggested that the universe was created by quantum processes starting from "literally nothing," meaning not only the absence of matter, but the absence of space and time as well. This concept of absolute nothingness is hard to understand, because we are accustomed to thinking of space as an immutable background which could not possibly be removed. Just as a fish could not imagine the absence of water, we cannot imagine a situation devoid of space and time. At the risk of trying to illuminate the abstruse with the obscure, I mention that one way to understand absolute nothingness is to imagine a closed universe, which has a finite volume, and then imagine decreasing the volume to zero.

On the contrary, this concept of nothingness is pretty easy to understand as people have used it in philosophy for centuries if not millenia in some parts of the world.

The issues with this idea are so numerous *and so obvious* it boggles the mind that it ever got off the ground. In fact if one heads over to any science-centric discussion forum where this idea is mentioned you will find the same protests being made. On the other hand it also explains the far greater popularity of the No Boundary model.

To put it briefly, what Vilenkin and those who agree with him are *really* trying to say is the universe tunneled into existence *from a state of non-existence*. They are implying the universe somehow existed... in a state of non-existence. What could this mean? Let's put it in slightly different language befitting the thought: "The universe tunneled into existence *from a state of 'nothingness'*." The idea is that the universe can continue to exist despite being in a state of "nothingness", whereby its physical laws or behavior can continue to act (like a ghost of the physical universe).

What is the relationship of the universe to the laws of physics which describe its behavior, such as quantum mechanics? Can the laws of the universe exist without the universe? According to this idea they not only can exist apart from the universe, they will spontaneously create the universe! Plato's essentialism won't die, it seems.

When put this way fans of the theory from the physics community become only a few. It is the general opinion of those who hold any sort of empiricist or naturalist metaphysical viewpoints (ourselves as Muslims included) that the laws of physics describe the behavior of the universe and this requires the universe to exist. The behavior of the universe, while encompassing quantum tunneling, does *not* encompass tunneling from non-existence to existence in the absolute sense.

I will touch upon modern "scientific essentialism" in a later section but those

¹⁶⁵ Guth, Alan H., *The Inflationary Universe: The Quest for a New Theory of Cosmic Origins*, 1998

philosophers only use the universe's existence to argue for the necessary nature of the physical laws as a consequence. Existence is still preceding essence for them. This leapfrogs even them!

As I said, the observed and predicted (by our physics) behavior of the universe does *not* encompass tunneling from non-existence to existence in the absolute sense. This is because quantum tunneling does not happen in an absolute void. It happens in the vacuum. And the vacuum is not nothing. According to the Heisenberg Uncertainty Principle there is an application to the relationship between energy and time (as there is between position and momentum). What this means is that at small enough moments of time, the energy can become uncertain (temporarily violating, it appears, conservation of energy). During a quantum tunneling event "through" an energy potential barrier the situation is described as the particle *borrowing* energy from the surroundings, going *over* the hill (or "through it", because it appears on the other side), and then *repaying* the energy. In other words by the most likely and standard interpretation of this phenomenon, energy must be available, even if it be from the vacuum.

To quote David Albert from his review of Krauss' *A Universe From Nothing*:¹⁶⁶

The fact that some arrangements of fields happen to correspond to the existence of particles and some don't is not a whit more mysterious than the fact that some of the possible arrangements of my fingers happen to correspond to the existence of a fist and some don't. And the fact that particles can pop in and out of existence, over time, as those fields rearrange themselves, is not a whit more mysterious than the fact that fists can pop in and out of existence, over time, as my fingers rearrange themselves. And none of these poppings — if you look at them aright — amount to anything even remotely in the neighborhood of a creation from nothing.

A verse of the Qur'an was mentioned earlier which evokes such language (regarding creation *ex nihilo*) when it says that for a long expanse of time man was nothing worth mentioning (i.e, man existed in a state not worth mentioning... in that the physical parts which make us up were still disparately distributed among the rest of creation and man, as an assemblage of physical matter, had not yet appeared).

Returning to the physics, the Heisenberg Uncertainty Principle implies there are no solutions with a probability of exactly one or zero, so the probability being non-zero implies there will be incidents of particles appearing on the other side of such classically forbidden regions with a frequency proportional to this probability.¹⁶⁷

But really, it wouldn't be fair if we didn't explore what Vilenkin was actually doing while saying "nothing". According to Vilenkin's "outgoing modes" formulation of his tunneling

¹⁶⁶ [Albert, David, New York Times Sunday Book Review, March 23 2012](#)

¹⁶⁷ http://en.wikipedia.org/wiki/Quantum_tunnelling - Retrieved 04/20/12

boundary condition, recall the idea of superspace. The boundary of superspace should consist of singularities of the four-geometry (distinguished from boundaries of non-singular geometries).

Remember the talk about the conserved probability density and current in superspace? And how this current could have positive or negative values along the timelike coordinates?

The non-singular boundary is mapped to past timelike infinity and the singular boundary is mapped to spacelike and future timelike infinity. The idea is that probability flux flows out of superspace at the singular boundaries and is injected into superspace at the non-singular boundary at past timelike infinity.

This probability flux in the wavefunction on superspace (which is a configuration space of 3-metrics *existing as an abstract concept in the mind of its author*) is what presumably delivers the probability to make the universe's tunneling into existence happen. Perhaps he, whether subconsciously or otherwise, sees it as the other ignored end of the de Sitter hyperboloid being connected quantum mechanically to another spacetime (perhaps from the multiverse or a previous collapse from a previous cycle). At this point I'm just trying to make sense of it for him and this is the most logically consistent view from within the physics.

Even then it's a lost cause. The entire idea of a conserved probability current being derived from the wavefunction on the space of 3-metrics (superspace) depends on the fact that the wavefunction (even the configuration space, since we're really referring to minisuperspace) is "tuned" around observations of our own, actually existing, universe. The only reason there's any probability at all there for our particular result is because *it already exists* and that is the result we are specifically looking for. If there were another universe drastically different from ours in which life was still somehow miraculously possible they would not be getting the same results, needless to say.

Hawking, in describing his motivations for pursuing quantum cosmology, wanted to make a model which allowed us to make genuine predictions, not just fine tune initial conditions in the absence of predictions by classical theory. But the model itself is fine-tuned to predict *our* universe as a necessary precursor to making predictions about the nature of our universe, which is its *real* and *intended* purpose (the reasoning being we can then learn new things from the model which we can't yet observe). This type of model holds no water when it comes to the issue of predicting the existence of our universe because it was developed around that very idea. Remember, the probability involved in quantum tunneling events is ridiculously tiny. It's not like our universe can *and will* create itself from nothing. If their philosophy were even to be believed it could *but never would* (tiny probabilities can only be appealed to using the anthropic principle which will be discussed shortly).

So quantum cosmology, despite its philosophically flippant attitude, *still* fundamentally poses no issues for Islamic theology and metaphysics when it comes to its intended, original purpose (predicting the behavior of our universe). But where it parts ways from that (in trying to predict and describe extrauniversal or suprauniversal events), its extremely speculative (and imaginary¹⁶⁸) nature makes for unacceptable metaphysical doctrine and certainly couldn't constitute proof of any sort.

Of course, Hawking and Turok were aware of all these faults. This, the counterintuitiveness of the tunneling hypothesis, was likely part of the motivation behind Hawking's drive to formulate the No Boundary proposal. Turok says the following about the inflating pea instanton concept,

Think of inflation as being the dynamite that produced the big bang. Our instanton is a sort of self-lighting fuse that ignites inflation. *To have our instanton, you have to have gravity, matter, space and time.* Take any one ingredient away, and our instanton doesn't exist. But if you have an instanton, it will instantly turn into an inflating, infinite universe.

So it's clear that prominent physicists, many of them, do not believe in the idea that things can behave according to the laws of physics without these key ingredients (spacetime and the various fields in whatever form their theories predict).

But, it seems, the No Boundary proposal still comes packaged with the idea of a "pre-Big-Bang" scenario of "nothingness".

On the one hand it seems among the physicists' community there are those who still cannot grasp the philosophical implication of the original argument behind the No Boundary proposal's use of imaginary time and still figure it's describing some kind of quantum tunneling event from nothing into the curved Euclidean hemisphere. The use of an instanton did not help this cause at all, in spite of Turok's quoted words. People associate instantons with quantum tunneling events (especially due to the use of Euclideanized imaginary time). Instantons can be used to describe tunneling events involving false vacua (from a false vacuum state to a true one), and this still seems the most apt application to quantum cosmology, but they have done away with the false vacuum initial condition so that only leaves the notion of *nothingness* tunneling through a potential barrier into a state of being the universe. Or to put it more coherently, the notion of the universe in a state of nothingness tunneling through a potential barrier into a state of existence. It should be telling that this idea makes little sense when put it in the literal language of its authors (nothing tunneling past a potential energy barrier).

¹⁶⁸ Literally imaginary, it brings forth *images* of known geometries by which to understand abstract mathematics (or to make calculations easier by approximation) which cannot be captured in 3 dimensional imagery, causing confusion even in the minds of some of those learned in physics.

One could try to make more sense of it by trying to see what they mean by potential energy barrier. So what is the barrier here? A potential energy barrier simply refers to the potential energy required for some action being higher than the particle's kinetic energy and thus acting as a "barrier". There isn't enough energy for that action. What sort of action? Potential energy is the result of a restoring force applied to something to return it to a *lower energy state*. For example, lifting an object above the earth requires a certain amount of energy. That energy stays in the system in the form of its position in the gravitational field (gravitational potential energy) which acts as a restoring force (trying to bring the object back to a lower gravitational energy state, closer to the earth).

We've already discussed how the scalar field (inflaton) actually wants to *repel* things. The mechanism posited here is not a false vacua tunneling scenario but a "rolling" down a potential energy hill (the scalar field starts off at the necessary potential energy level, this is where the probability amplitude and anthropic principle come in, for the moment let's just accept that the scalar field starts at the necessary potential).

The idea is that we have gravity trying to collapse everything but the scalar field resisting. Gravity "wins" in this philosophical debate and collapses everything. So we start off with the universe in a completely collapsed state (I'm assuming the scalar field can collapse without re-inflating once it's reached a true vacuum/ground state, that it won't be bumped back up; I suppose this is what's going on in the oscillating universe theories but don't hold me to that, we aren't going into those here... it's possible they describe a situation where it's never completely collapsed to a zero radius). The scalar field starts off in a high energy state (for whatever reason) and wants to go to a lower energy state. This is achieved by inflation (opposite of gravity's action) which was described earlier. But there is supposed to be a potential energy barrier for the quantum tunneling event, right? So where or what is this barrier? There isn't one! It was already ruled out in slow roll inflation ("new inflation") by Linde where there isn't tunneling through a barrier (which is considered unable to explain our homogeneous and isotropic universe), but rather a rolling down a potential energy hill. And Hawking concurs.¹⁶⁹

So there is no "tunneling of the universe into existence from nothing" in Hawking's quantum cosmology. This seems like a redundant point but it's unfortunately still brought up.

However, Vilenkin didn't just popularize the "tunneling" part of the idea of tunneling of the universe from nothing into existence but also the "nothing" part. And here, though one would figure the No Boundary proposal should have avoided this too (as per Turok's statements), it seems Hawking decided to follow in Vilenkin's lead in his 2010 book, *The Grand Design* where he says things like,

"Because there is a law such as gravity, the universe can and will create itself

¹⁶⁹ Hawking, *The Nature of Space and Time*, 1994, "*The scalar field will run down the hill of the potential V to the minimum...*"

from nothing. Spontaneous creation is the reason there is something rather than nothing, why the universe exists, why we exist."

Or,

"As recent advances in cosmology suggest, the laws of gravity and quantum theory allow universes to appear spontaneously from nothing. Spontaneous creation is the reason there is something rather than nothing, why the universe exists, why we exist. It is not necessary to invoke God to light the blue touch paper and set the universe going."

The only logical reaction to these kinds of statements and arguments after having gone over everything else Hawking has done in this field is "...*what*." The man just threw his own science, covered earlier in the very same book, right out the window.

Clearly Hawking takes a different stance from Turok. He believes the "laws of nature" (i.e, gravity and quantum theory) can exist before the universe and then create the universe.

Two things. First, replacing belief in God with belief in omnipotent, omnipresent laws of nature which can exist in *nothing* isn't really taking atheism to any new heights, and I say that with as sarcastic a tone as I can muster.

Secondly, this winds up being a case *for* God. The universe, according to Hawking, needs these laws to exist *independently of the universe* and then create and govern the universe. Well, what are laws? They merely describe behavior. They are not real entities unto themselves. In fact, the mathematical models of the universe are treated by physicists as the scientific equivalent of legal entities, so if scientific/natural/physical law is itself entitatively treated then it implies a whole other, higher, metaphysical order (and you're back to religion). Anyway, these are no longer laws *only* of nature or laws *only* of the universe or physical laws because they are *greater* than the universe (they, in fact, describe how the universe is created). Quantum theory in particular, the facet of it used in this cosmological context, can be described as the laws of creation (or behavior of creating).¹⁷⁰ All behavior is the behavior of *something*, it is an attribute of something. This something goes unaddressed by science or Hawking. They call it the behavior of the universe but as we've just shown, the behavior cannot have been derived from the universe since the former created the latter. Something needed to have existed before the universe and *behaved* according to these patterns. Though I keep saying "before", forget time, the universe's existence is conditional or contingent on this behavior, not vice-versa. A pre-universe universe? Perhaps. Cyclical past-eternal theories of the universe are not rare (cycles of Big Bangs and Big Crunches). But Hawking rules this out, and so does anyone else who says it was created *ex nihilo* (even if they didn't mean to, this is the language they use). So what could possibly be the source of such

¹⁷⁰ See: Second quantization and creation and annihilation operators

behavior? What would be confused as “nothing” by science? Meaning, what could exist in undetectable form, a mode of existence like nothing we observe in nature (does not interact with any force field we know or can think of), but then create universes (which exist in a discernible form) in a manner which is mathematically describable... a behavior which continues to govern, consistently, the rest of the universe’s growth and possible eventual destruction. It’s uncanny how closely this describes Ash’arite metaphysics. Whatever the case this thing responsible for the behavior of creating must necessarily be called “Creator”, and it is associated with the proper noun referring to a being because it can not be seen via mathematical descriptions of physical laws (no physical interaction with anything by which it can be addressed) yet it creates things which are seen (due to interactions with force fields and the like) and in a *meaningful, non-arbitrary* manner (so it is in fact a “thing”, not some random fluctuation in a background mechanical process like a deeper universe).¹⁷¹

This idea of non-arbitrariness is very important to Hawking,

“I still believe the universe has a beginning in real time, at a big bang. But there’s another kind of time, at right angles to real time, in which the universe has no beginning or end. This would mean that the way the universe began would be determined by the laws of physics. One wouldn’t have to say that God chose to set the universe going in some arbitrary way that we couldn’t understand. It says nothing about whether or not god exists --- Just that God is not arbitrary.”¹⁷²

The idea that these laws or behaviors would *necessarily* manifest or emanate from God (making God, in effect, an unwilling participant) returns us to Neoplatonism (to which no better response exists than al-Ghazali’s *Incoherence of the Philosophers*).

Anyhow, it serves us no purpose to just gloat over his “mistake” (or perhaps he’s smarter than he realizes). We are, after all, interested in the proper methods of science. So let’s see if there is any salvaging a non-theological description of quantum cosmology’s view of the creation of the universe. Hawking et al. can invoke God however indirectly they wish but we would like to wrap up the universe in as neat a physical or mathematical description as possible (if, after all this, one still wants to trust quantum cosmology), not leaving any loose ends and not going out of bounds of science (like talking about nothing or God, both of which are unaddressable by science).

Regarding the notion of quantum tunneling in cosmology, American physicist Rafael Sorkin wrote a paper titled *Is the spacetime metric Euclidean rather than Lorentzian?*¹⁷³

¹⁷¹ Should one believe in past-eternal cyclical universe theories *and* that the same quantum theory was inherited through all of them, then this argument holds, forcing a confrontation on “past-eternal”.

¹⁷² Hawking, Stephen W., *Black Holes and Baby Universes and Other Essays*, 1993

¹⁷³ The first line of the abstract is “My answer to the question in the title is ‘No.’”

where he says,

When it comes to cosmology, one must be cautious with the word “tunneling” since it now refers to the “birth of a cosmos from nothing”. What’s more, the relevant path-integral now involves a sum over 4-geometries, which seems much farther from mathematical (or even physical) respectability than what we were considering earlier.

He goes on to utilize Lorentzian metrics in the path integral pointing out why the Euclidean method shouldn’t be generalized from black hole thermodynamics to Big Bang cosmology. It’s worth a read for its own sake. He also confronts the issue of what it means to be “born from nothing” in Vilkenkin’s language,

...if we are willing to neglect a number of important complications, we can make the problem seem remarkably close to more homely examples of tunneling, like the one treated above. This of course, is basically the view people have taken in discussing “creation of the universe via a gravitational instanton”.

[...]

To simplify things as much as possible, and to make the analogy with one-dimensional tunneling as close as possible, *let us consider an “empty” and (spatially) spherical cosmos which is born with zero radius and subsequently expands.*

[...]

In writing down the action-integral S explicitly, we could of course employ proper time τ and spatial radius a as our coordinates, but we can lend S a much more convenient form for present purposes by employing instead the quantities T and v , where on any hypersurface Σ coinciding with a 3-sphere of homogeneity, v is the volume of Σ and T is the spacetime volume which has accumulated up to that stage, or in other words the total 4-volume to the past of Σ . (Thus, T is the time-coordinate natural to unimodular gravity.)

...we can recognize an analogy that makes T correspond to time and v to position, while (up to sign) the cosmological constant Λ corresponds to the energy E . *If we now imagine a “source” at the origin (representing perhaps the end of the previous cosmic cycle) and a “sink” at some other value of v ,* we have a nearly perfect analog of our tunneling problem.

[...]

Of course any conclusion like the above remains tentative, because no one has ever (to my knowledge) embedded amplitudes like [above] in a coherent theory of quantum cosmology. One can compute some approximate amplitudes, but one doesn't know what they mean. Should one construe them as values of "the wave function of the universe", or (as I think) would it be better to conceive of them as contributions to the gravitational "quantal measure", a quantity which in turn might find its ultimate interpretation in terms of notions like "preclusion" and "anhomomorphic logic".

[...]

Into these questions intrude other conceptual issues, which however are also more technical in nature. For example, how literally should one take the identification of our parameter T as a kind of time? To embrace that idea is to do unimodular gravity, and thence spring other questions...

[...]

...let me close this section with a thought about the possible "practical" meaning of the damping-factor we have computed. Given the rather fanciful assumption of a spherical and empty cosmos, we might attach to Z in equation (16) a set of words like "*the amplitude for the cosmos to arrive at size v starting from zero size*". This phrase elicits a picture in which the cosmos is "born under a potential barrier" and then develops through different phases of growth. In the earliest phase, it likely has no continuum description at all. (Perhaps it has a tree-like structure.) Later it begins to expand as a Lorentzian manifold, but, being empty, must do so in a quantal manner by "tunneling". Finally, it emerges as a classical universe... A question then is how long the cosmos spends in the first two phases. For this we can return to our nonrelativistic example... . On this reading, our computation of Z would in effect have been counting the average number of births taking place during the pre-geometric and tunneling phases of cosmic growth.

[...]

Leaving to one side the thorny conceptual and technical problems that arise in this context, we wrote down a path integral describing a process in which *a cosmos is born as a sphere of zero radius* and expands quantum mechanically (in a "tunneling regime") until it is big enough to continue its expansion as an approximately classical (de Sitter) spacetime.

Simply put, it is not said that it is born from nothing (even if in fact it really might have). The universe is still the universe at $t=0$ and at zero radius, it just can't be described in

terms of geometry or continuum (he calls it the “pre-geometric” phase of cosmic growth). According to this view the laws of the universe started exactly *with* the universe. This can be applied to the No Boundary and Tunneling boundary conditions too.

Current developments at the time of this writing on the fallout of Krauss’ blasting of philosophy include this comment by David Albert,¹⁷⁴

I did, for the record, read all of Professor Krauss’ book. And I would have very much liked to say more about the specifically scientific issues he discusses in my review. But the space allotted me by the Times was very limited – and I figured (given the title and sub-title of the book) that the issue that was first and foremost in Professor Kraus’ mind was the question of creation from nothing – and so I thought it best to use what space I had to write as clearly and simply and directly as I could about that.

But maybe it’s worth saying, now that the question has been raised, that the discussions of quantum mechanics in *A Universe From Nothing* are – from a purely scientific point of view – very badly confused. Let me mention just one example. Professor Kraus’ argument for the ‘reality’ of virtual particles, and for the instability of the quantum-mechanical vacuum, and for the larger and more imposing proposition that ‘nothing is something’, hinges on the claim that “the uncertainty in the measured energy of a system is inversely proportional to the length of time over which you observe it”. And it happens that we have known, for more than half a century now, from a beautiful and seminal and widely cited and justly famous paper by Yakir Aharonov and David Bohm, that this claim is false.

Of course, the physical literature is full of sloppy and misleading talk about the ‘energy-time uncertainty relation’, and about the effects of ‘virtual particles’, and so on – and none of that does much harm in the context of calculations of scattering cross-sections or atomic energy levels or radioactive decay rates. But the business of pontificating about why there is something rather than nothing without bothering to get crucial pieces of the physics right, or to think about them carefully, or to present them honestly, strikes me as something of a scandal.

David Z. Albert

Krauss himself wrote an op-ed piece for *Scientific American* titled “The Consolation of Philosophy” which can be found [here](#).¹⁷⁵

I have a few comments before continuing.

¹⁷⁴ <http://philocosmology.wordpress.com/2012/04/07/an-explanation-from-nothing/#comment-275>

¹⁷⁵ <http://www.scientificamerican.com/article.cfm?id=the-consolation-of-philos>

Even more surprisingly, this author claimed with apparent authority (surprising because the author apparently has some background in physics) something that is simply wrong: that the laws of physics can never dynamically determine which particles and fields exist and whether space itself exists, or more generally what the nature of existence might be...

The laws of physics don't determine anything, they describe and predict. This does not lessen physics in any way and physicists should stop acting sensitive to insinuations that it does. Of course most physicists do not do that. Only those who have some agenda to push in the philosophical arena, like Krauss, do.

It may be true that we can never fully resolved the infinite regression of 'why questions' that result whenever one assumes, a priori, that our universe must have some pre-ordained purpose. Or, to frame things in a more theological fashion: 'Why is our Universe necessary rather than contingent?'

Well that's no surprise to anyone but it's convenient to get a statement from Krauss explicitly acknowledging this. The problem, however, is that this is what his book was advertised as answering! Now he admits it doesn't? And his only response is to invoke the anthropic principle?

Instead, sticking firm to the classical ontological definition of nothing as "the absence of anything"—whatever this means—so essential to theological, and some subset of philosophical intransigence, strikes me as essentially sterile, backward, useless and annoying.

You can't change language on a whim. Forgetting ideas, even philosophical ones, is the antithesis of the spirit of scientific inquiry.

If you want to add a new idea, pick a new name that isn't already taken. The hijacking of words to slipstream ideas into an unsuspecting populace is the work of media's "(m)ad men", not scientists.

It may be that even an eternal multiverse in which all universes and laws of nature arise dynamically will still leave open some 'why' questions, and therefore never fully satisfy theologians and some philosophers. But focusing on that issue...

Focusing on that issue is the subject of theology and related fields of philosophy. Not physics. Why would anyone expect physicists to necessarily care about a field that isn't their own?

It does not behoove science to "whore" for attention with pop science bestsellers

claiming to answer philosophical questions they clearly do not. It dirties the reputation of science.

...call that either philosophy or theology, I would say this: Please go on talking to each other, and let the rest of us get on with the goal of learning more about nature.

Who is he kidding when his work is marketed to this field?

The point to be taken from these modern debates is that any idea of a “past eternal” history (spreading across previous incarnations of our universe) is conjectural philosophy, not scientific. The scientific version, like Hawking’s, simply says time could not pass as it does now, so it isn’t really saying “eternity”, it’s just avoiding the issue by avoiding the concept of a “beginning”. The universe began, as Al-Ghazali argued, at a point in time. This implies contingency, not necessity, and there is no way to get around that (even if one implies the idea of “beginning” is incoherent because there’s a lot of math to back up its obviously contingent nature). This implies creation from nothing. So arguing for that also has no bearing on theology or religion, it’s already what they say. Trying to posit a natural mechanism for the creation process faces two issues. First, asserting these mechanisms can exist outside the universe is pure philosophy, not science. Bad philosophy at that. Moreover, trying to assert natural causation is an uphill battle and cannot be taken for granted when atheists themselves (Hume et al.) question whether it can ever really be proven. Physicists like Hawking himself espouse empiricist views of reality similar to Hume’s (before he apparently changed his mind for the duration of his 2010 pop science book). The issue with causation is perhaps unique to Islamic monotheism today among the Western or Abrahamic faiths and it means as long as there’s any natural phenomenon being discussed as a particular mechanism or explanation for anything, it will always work in Islamic theology’s favor (in fact, even as an extension of it... though we must clearly delineate where one ends and the other begins).

Multiverse and the Anthropic Principle: The Linchpin of Atheist Metaphysics

As we’ve seen from everything we’ve discussed so far there are really only two options to explain the existence of the universe.

Let’s get the obvious out of the way. The first is God. This has been discussed at length in previous sections. God has Will which was defined by Imam al-Ghazali as distinguishing like from like. So God answers all questions raised by rational thought of arbitrariness. This means there are only as many universes as God decides. There may be infinite *possibilities* (also created by God) but those brought into actual existence need not be infinite. Orthodox Islamic theology allows for a multiverse of several “universes” (in whatever structure). Though the source narration is short and

has been subject to much speculation and debate, it seems to indicate the possibility of a Many-Worlds scenario (Everett) as much as it does parallel universes in a multiverse (whether due to chaotic inflation or string theory). The significance is that in the MWI scenario there would be one point of creation and a branching (of essentially simultaneous histories) whereas a multiverse would arise in the context of chaotic/eternal inflation which is a scenario like Fakhr al-Din al-Razi's idea. God knows best the truth, of course. Any notions beyond that are purely theological speculation without support from any scriptural text (including what follows of my own thoughts). Moreover the anthropic principle is strongly applied to ours by Sufi theologians, from Imam al-Ghazali's relation that ours is the best possible universe to Maulana Muhammad Qasim Nanotvi's 19th century treatise on the application of that statement to the issue of finality of prophethood in the multiverse of Ibn 'Abbas' (ra) narration. Entitled *Tahzir an-Nas*,¹⁷⁶ it deals with a straight up multiverse scenario, not a branching one.

I have not encountered any works tackling the idea of a branching Many-Worlds scenario from the theological perspective of Islamic orthodoxy though if one existed or were to be written it would be extremely interesting as it would be dealing with the fundamental problems in quantum mechanics which have confounded Western philosophers for so long, namely the idea of simultaneous histories and to just get the take of Islamic occasionalists would be fascinating. Unfortunately it's probably not likely to happen since the conclusions that might come out of it would be extremely theologically controversial. Though I would like to point out to those interested that still the ability exists to discern a "best" possibility, such as when we use the sum over histories approach as discussed in previous sections (the label "best" history being applying to that of "least action", or the one where ΔS is closest to 0, the "most classical"). This could potentially resolve issues surrounding "essential sealship" (*khatamiyya dhatiyyah*). Though the issues surrounding finality of prophethood with regards to chronological sealship would be tougher to address, that's what would have been most interesting to see discussed as that's the real issue faced in quantum physics today. To the extent where some physicists have gone so far as to propose alternate systems of logics where classical logic seems to come up short (at the very least modality is required).

The essence of any argument for a Many-Worlds scenario for the Ibn 'Abbas (ra) narration would actually rest on something Hawking said and which can be considered a powerful statement as far as its metaphysical implications go for monotheism. That is, "*God is not arbitrary*". Simply put, though we cannot possibly hope to understand God beyond what He has told us, it doesn't mean we stop trying (without straying into metaphysical rationalism). A MWI scenario posits an order for the creation/evolution of multiple versions of a history. To be clear, this is only *implied* in the wording of the narration, "...*In every earth is a prophet like your Prophet, an Adam like your Adam, a Nuh like your Nuh, an Ibrahim like your Ibrahim and an 'Isa like your 'Isa*". Whether that

¹⁷⁶ A good article on clarifying misconceptions about it can be found [here](#).

means another version of the same person¹⁷⁷ is, of course, purely speculative. It could just refer to chronological equivalents in which case a general multiverse as discussed by the *ulema* would fit.

Let's turn now to the atheistic answer.

As mentioned, Hawking's fundamental issue with the idea of God is arbitrariness. He said, earlier in his career, that "*God is not arbitrary*", which reflects the compatibility of his entire worldview with the notion of God. He's saying that God, were he to believe in Him, creates all possible things and thus we do not stand out as special (and which is why, presumably, he does not believe in a "personal" God as he said in his own words).

Of course, he does not actually take the God route to explain existence. In his latest book, *The Grand Design*, he offers up his endorsement of his no boundary proposal packaged with M-Theory (supergravity and string theory). How exactly he reconciles his quantum cosmology with a theory that it's been opposed to for nearly two decades is perhaps a subject best left for his book. What concerns us here is the multiverse described by M-Theory. According to this, there potentially exist something on the order of 10^{500} possible universes. This is called the [string theory landscape](#).

So the only logical or rational solutions to the question of "why *this* way and not any other" has to either be because one was picked over the other (by a will) or that all possible ways exist and we just happen to find ourselves in this one because it makes life possible.

As you can see the second of those two is split into two components. A belief in the real, actual existence of a multiverse and then an application of the anthropic principle.

With the multiverse, questions can be raised about whether any finite number would be enough to satisfy the question. The finite number posited by any theory would have to be based on a specific set of laws which are applied to all universes and this move to define the nature of other universes can not be scientifically (or even logically) justified. It's a completely arbitrary move. I don't see how it's possible to get away with anything less than a belief in a real and infinite number of possible universes.

Of course the above is quite a simplification. While that's what the essence of the matter comes down to in our day it's useful to analyze the origins and role of the anthropic principle in physics.

The issue arose upon discovery of how physical constants in our universe seemed "fine tuned" for life. If any of these arbitrary-seeming values were different, life would not be possible.

¹⁷⁷ A popular subject for science-fiction of today.

The phrase "anthropic principle" first appeared in Brandon Carter's contribution to a 1973 Kraków symposium honouring Copernicus's 500th birthday. Carter, a theoretical astrophysicist, articulated the Anthropic Principle in reaction to the Copernican Principle, which states that humans do not occupy a privileged position in the Universe. As Carter said: "Although our situation is not necessarily *central*, it is inevitably privileged to some extent." Specifically, Carter disagreed with using the Copernican principle to justify the Perfect Cosmological Principle, which states that all large regions *and times* in the universe must be statistically identical. The latter principle underlay the steady-state theory, which had recently been falsified by the 1965 discovery of the cosmic microwave background radiation. This discovery was unequivocal evidence that the universe has changed radically over time (for example, via the Big Bang).

Carter defined two forms of the Anthropic Principle, a "weak" one which referred only to anthropic selection of privileged spacetime locations in the universe, and a more controversial "strong" form which addressed the values of the fundamental constants of physics.¹⁷⁸

Roger Penrose explained the weak form as follows:

"The argument can be used to explain why the conditions happen to be just right for the existence of (intelligent) life on the earth at the present time. For if they were not just right, then we should not have found ourselves to be here now, but somewhere else, at some other appropriate time. This principle was used very effectively by Brandon Carter and Robert Dicke to resolve an issue that had puzzled physicists for a good many years. The issue concerned various striking numerical relations that are observed to hold between the physical constants (the gravitational constant, the mass of the proton, the age of the universe, etc.). A puzzling aspect of this was that some of the relations hold only at the present epoch in the earth's history, so we appear, coincidentally, to be living at a very special time (give or take a few million years!). This was later explained, by Carter and Dicke, by the fact that this epoch coincided with the lifetime of what are called main-sequence stars, such as the sun. At any other epoch, so the argument ran, there would be no intelligent life around in order to measure the physical constants in question — so the coincidence had to hold, simply because there would be intelligent life around only at the particular time that the coincidence did hold!"

—The Emperor's New Mind, Chapter 10

Regarding the strong version,

¹⁷⁸ http://en.wikipedia.org/wiki/Anthropic_principle - Retrieved 04/23/12

One reason this is plausible is that there are many other places and times in which we can imagine finding ourselves. But when applying the strong principle, we only have one Universe, with one set of fundamental parameters, so what exactly is the point being made? Carter offers two possibilities: First, we can use our own existence to make "predictions" about the parameters. But second, "as a last resort", we can convert these predictions into explanations by assuming that there is more than one Universe, in fact a large and possibly infinite collection of universes, something that is now called a multiverse ("world ensemble" was Carter's term), in which the parameters (and perhaps the laws of physics) vary across universes. The strong principle then becomes an example of a selection effect, exactly analogous to the weak principle. Postulating a multiverse is certainly a radical step, but taking it could provide at least a partial answer to a question which had seemed to be out of the reach of normal science: "why do the fundamental laws of physics take the particular form we observe and not another?"

Since Carter's 1973 paper, the term "Anthropic Principle" has been extended to cover a number of ideas which differ in important ways from those he espoused. Particular confusion was caused in 1986 by the book *The Anthropic Cosmological Principle* by John D. Barrow and Frank Tipler, published that year which distinguished between "weak" and "strong" anthropic principle in a way very different from Carter's...¹⁷⁹

The WAP (weak anthropic principle) as stated by Carter is,

"We must be prepared to take account of the fact that our location in the universe is necessarily privileged to the extent of being compatible with our existence as observers."¹⁸⁰

His statement of the SAP (strong anthropic principle) is,

"The Universe (and hence the fundamental parameters on which it depends) must be such as to admit the creation of observers within it at some stage. To paraphrase Descartes, *cogito ergo mundus talis est.*"

The Latin tag ("*I think, therefore the world is such [as it is]*") makes it clear that "must" indicates a deduction from the fact of our existence; the statement is thus a truism.¹⁸¹

It should be noted this is the exact same line of reasoning used in the final step of the

¹⁷⁹ *Ibid.*

¹⁸⁰ "Location" here includes time as well as space.

¹⁸¹ http://en.wikipedia.org/wiki/Anthropic_principle - Retrieved 04/23/12

cosmological and ontological arguments for God. Even in our newer Islamic “clearest rational argument for the existence of a creator” which was discussed earlier. The final conclusion, of the necessarily existent being, is a deduction from the fact of our existence.

John D. Barrow, a cosmologist, and Frank J. Tipler, a mathematical physicist, wrote *The Anthropic Cosmological Principle* in which they offered their own spins on the idea.

Their version of the WAP is,

"The observed values of all physical and cosmological quantities are not equally probable but they take on values restricted by the requirement that there exist sites where carbon-based life can evolve and by the requirements that the Universe be old enough for it to have already done so."

Unlike Carter they restrict the principle to carbon-based life, rather than just "observers." A more important difference is that they apply the WAP to the fundamental physical constants, such as the fine structure constant, the number of spacetime dimensions, and the cosmological constant, topics that fall under Carter's SAP.¹⁸²

Their version of the SAP is,

"The Universe *must* have those properties which allow life to develop within it at some stage in its history."

This looks very similar to Carter's SAP, but unlike the case with Carter's SAP, the "must" is an imperative. They set out the following three different possible implications of the SAP,¹⁸³

1. "There exists one possible Universe 'designed' with the goal of generating and sustaining 'observers.'"
2. "Observers are necessary to bring the Universe into being."
3. "An ensemble of other different universes is necessary for the existence of our Universe."

The first option is the clear theological version of the SAP (or at least close to it, as a designed multiverse also works as discussed already).

The third is the necessity of the multiverse. These two were the alternatives I mentioned earlier.

¹⁸² *Ibid.*

¹⁸³ *Ibid.*

The second option is based on the interpretation of quantum mechanics of physicist [John Archibald Wheeler](#) and his idea of a participatory universe (and his version of the SAP which he calls PAP for participatory anthropic principle). And to a lesser extent other more mainstream interpretations which require observers to explain wavefunction collapse. I would suggest reading through his Wikipedia page to familiarize yourself with the concept which has become quite popular in science fiction. Barrow himself is a writer of popular science and a theist and Tipler is an advocate of intelligent design and also tried to anchor the idea of the "[Omega Point](#)" in physics. The Omega Point is the idea of a "natural God", a sort of new spin on materialistic or naturalistic pantheism which posits the idea that the end state of all existence monistically leads to a transcendental God-like state, which has similarly been used in science fiction (notably Isaac Asimov's *The Last Question*), and which Tipler has used to translate religious ideas into modern physics (including ideas like the resurrection of the dead). Needless to say it's been received with quite a bit of controversy. An interesting point to note is that the notion of an Omega Point is definitely targeting the idea of "God" with a capital G and as He is understood in Islamic theology (the Qur'an is filled with verses emphasizing God's knowledge and the PAP approach is centered around the idea of information). Let this serve as a forewarning that this likely will make its way into the Muslim world eventually (even if only on the internet) by trying to create some sort of distinction from the final state of existence (the Omega Point) and that which preceded it (taking out the pantheism), and then removing all notions of time altogether (so "final" isn't really final, but eternal, restoring compatibility with the Qur'an... or so it would be rationalized). It's an exercise in futility to try and weave early 21st century science with science fiction with the Qur'an but you figure someone's going to be bored enough to try it eventually.

While it's easy to discard these ideas for both traditional theists and atheists I would advise against treating these ideas lightly as there are a significant number of "agnostics" among the general population who, influenced by science fiction and popular science works, believe to some extent or another (usually not to the full extent of Tipler) a few of these ideas. Even some of the mainstream interpretations of quantum mechanics (Copenhagen, de Broglie-Bohm, the views of Heisenberg) suggest these "exotic" metaphysical views. Atheists would be surprised to learn that it's always been in the interests of science under Islamic civilization as well as modern/Western to keep the "crackpots" out of science. In Islamic theology this is accomplished with a clear theological demarcation between physics (realm of observation) and metaphysics (realm of belief) using basic empiricism (though both can and do use mathematics so that's often used by some to blur the lines, as it is here, for the purposes of pushing a specific metaphysical agenda), allowing for a kind of methodological naturalism. Though Tipler's views are quite imaginative, there exist a strong amount of challenges. [For a related religious issue, see: Appendix B]

Barrow and Tipler's views culminate in what they call a final anthropic principle (FAP), which is that,

“Intelligent information-processing must come into existence in the Universe, and, once it comes into existence, it will never die out.”

The WAP is without a doubt a basic [tautology](#). It's strength (and usefulness to science) does not lie in its ability to answer a question, but rather pose a new one. That of other possible universes (a multiverse). The latter must then be taken on faith in order to answer the question of “why *this* way and not any other?”. The anthropic principle itself is not an answer (that much should be accepted as there's been an enormous amount of criticism of it in both the science and philosophy communities).

The other thing to note is that the anthropic principle actually conflicts with the idea of a “theory of everything” since the latter has traditionally been associated with a hope to find a theory in which there are no free parameters. String theory, as a candidate for a “theory of everything”, was originally touted to put the anthropic argument to rest only to, ironically, make for the possibility of varying pretty much every constant (including dimensions) leading to the aforementioned “string landscape” and its immense number of possible universes.¹⁸⁴ These are referred to as “false vacua”, where a false vacuum (local minimum) corresponds, loosely speaking, to a particular brane configuration.

There have been plenty of criticisms leveled at the anthropic principle by itself but we won't concern ourselves with that here. You can easily read up on that from a simple internet search. Let's look at the anthropic principle in conjunction with a belief in a multiverse and see whether it can answer the question.

First, we have to make a point about the question. We are posing it as “why *this* way and not any other way”, not as “why does the universe appear fine tuned for life”. The latter question can be picked apart (mostly due to the arbitrary nature of the way “life” is defined) and actually brings up even more questions. The first way is the simplest and most fundamental way to invoke a necessary belief in a multiverse from a non-theistic perspective.

Is the multiverse purely a metaphysical (and therefore non-scientific) phenomenon?

Actually it is possible to pose a specific falsifiable theory involving a multiverse if that theory predicts interaction between the universes, assuming those phenomena can not be described in any other way. This makes it an extremely remote chance. String theory is not even entirely there yet, though the possibility exists for different branes to interact through gravity. And, as noted, even if multiple universe interaction is posed as an explanation for an observable phenomenon, it doesn't mean it has to be *true*. Another model that doesn't invoke other universes could conceivably explain it just as well.

This illustrates the nature of falsifiability in science, the hypothetico-deductive logic

¹⁸⁴ *Ibid.*

behind the modern conception of science, and reveals clearly its shortcomings on the issue of explanatory power versus predictive power (when positing unobservables to explain observables). [See the later section: [Does Science Explain Reality?](#)]

Moreover this requires *specific* falsifiable multiverse models or theories to be used in conjunction with the anthropic principle. Not simply a vague assertion of a multiverse (as we have been going along with so far). There are too many scientific problems with ending in an arbitrary generic multiverse. The entire thing becomes arbitrary and its existence requires an explanation (such as eternal inflation/chaotic inflation theory). Hawking, for example, uses the string theory landscape (a string theory version of eternal inflation). Of course that specific version of string theory's notion of interacting branes within the "bulk" is still quite a ways from being really falsifiable though credit is due for at least recognizing the need to pick one (even if it makes the rest of his book sound strange). Just the idea that a multiverse-describing theory *could* be falsified does not justify the use of just *any* multiverse model or even just the idea of a multiverse in general.

Now the problem becomes that the specific multiverse model needs to allow for the possibility of an infinite number of universes to truly resolve the arbitrariness problem in the posed question. The string theory landscape's 10^{500} universes are not enough for the reason I mentioned earlier.

Not to mention that belief in a multiverse doesn't address the "cosmological arguments" discussed earlier (it only addresses this modern issue of scientific fine tuning) as causality can be taken right through the multiverse and the infinite regress prolonged (a regress which is not infinite in time, by the way, so time is not necessary for it... it uses a philosophical notion of causality, internally logically consistent, but distinct from the idea in physics based on the speed of light) until the eventual arbitrary stop in some unprovable metaphysical initial condition which isn't as internally logically consistent as the idea of God and requires, therefore, an even greater leap of faith (one of the problems with the ideas of eternal universes, as pointed out by Imam al-Ghazali in the *Tahafut*).

The point here is that a belief in a multiverse, therefore, seems required for a logically and rationally consistent metaphysics of naturalism. And the issue then becomes what turns out to be the insurmountable problem of actually making that belief logically consistent. But that is sometimes avoided by some under a pretense similar to the following.

English physicist Paul Davies in his 2006 book *The Goldilocks Enigma* goes through the debate and comes upon the following responses to the question,¹⁸⁵

1. The absurd universe:

¹⁸⁵ *Ibid.*

- Our universe just happens to be the way it is.
2. The unique universe:
There is a deep underlying unity in physics which necessitates the Universe being the way it is. Some Theory of Everything will explain why the various features of the Universe must have exactly the values that we see.
 3. The multiverse:
Multiple universes exist, having all possible combinations of characteristics, and we inevitably find ourselves within a universe that allows us to exist.
 4. Intelligent Design:
A creator designed the Universe with the purpose of supporting complexity and the emergence of intelligence.
 5. The life principle:
There is an underlying principle that constrains the Universe to evolve towards life and mind.
 6. The self-explaining universe:
A closed explanatory or causal loop: "perhaps only universes with a capacity for consciousness can exist." This is Wheeler's Participatory Anthropic Principle (PAP).
 7. The fake universe:
We live inside a virtual reality simulation.

Traditional "rational" scientific responses to the question (from Carter onwards) would only admit the third choice (the multiverse). Barrows and Tipler tried to argue for the rest after 3. But a large number of people, including in the physics community, insist on the first two as well (and over time the first option has become more popular than the second as skepticism has set in over whether a TOE is achievable, though it is still no doubt the goal). So while the third option is still perhaps the leading candidate for atheists in terms of it being the only rational option that seems to not rely on faith in ourselves or our science (like number two), the first is popular just for avoiding the question.

The first option is not rational. It does not answer the question. In fact it suggests that we *shouldn't* ask the question which goes quite against the spirit of science, doesn't it? Such a response can not stand on its own when put up against theism or religion in general. Plus it has to be accompanied with (usually lengthy, philosophical, and subjective) arguments about why the other answers are not acceptable. Very few people (if anyone) actually do this. If the whole of philosophy cannot deal with numbers 4 or 7 after several thousand years of human thought, what hope would any given atheist have of refuting all seven? Though they don't need hope so much as ego, which I suppose is necessary because these positions are in practice often accompanied with quite a bit of blusterous misdirection when used as offensive attacks against religion.

It should be obvious that our posed question is not actually "anthropic", because it says nothing about life, let alone humans. This is one of the criticisms of the anthropic

principle, one shared by Carter himself who regretted his choice of words. Secondly, the anthropic principle makes assumptions about life being limited to carbon-based organisms. How do we define life?

Life (cf. biota) is a characteristic that distinguishes objects that have signaling and self-sustaining processes (i.e., living organisms) from those that do not...¹⁸⁶

Implicit in that idea is the information-centric view that some might prefer. Regardless, that definition could conceivably be met by any number of scenarios involving life (and consciousness) subsisting in just about any medium involving energy transfer (with energy being kept strictly to its barebones definition as the ability to do work on other physical systems), even seemingly immaterial physical systems (an example is heat). There've been some imaginative works of "hard science fiction" (usually written by those with a background in science and which try to use a lot of scientific detail) which explore this idea in depth. It's not impossible by the definitions.

Even in our own universe how can we rule out the possibility of self-sustaining bundles of information or patterns in almost any medium? Our view of life in the science of biology is, when addressed rationally, quite arbitrary (unjustifiably so if we are to use this definition in philosophical applications involving whole universes).

Keeping this in mind, it would be better to refer to the (now slightly more fine tuned) question the anthropic principle answers, "why does the universe seem fine tuned for our specific kind of carbon-based life?" as "the anthropic question" (keeping the term "anthropic" to refer to humanity as the standard for advanced carbon-based life capable of being "observers").

This question still isn't rationally satisfactory yet. The very method in which it is posed is tautological. According to a naturalistic or non-theological account of the origin of life (and man in particular) via evolution through natural selection, life *is a part of the universe* and thus inherits the "nature" of the universe in that, if a possible universe seems predisposed to favoring carbon-based life, that's what you'll get. If it seems predisposed to favoring some other kind of life, you'll (presumably; keeping with the 'infinite possible infinite universes with infinite opportunity for the low probabilities to manifest themselves' idea that the multiverse-centered metaphysics usually chooses) get that other kind. We do not go so far as to say life *must* arise like in Barrow and Tipler's final anthropic principle. The idea behind it is there, of course, if you assume an infinite amount of opportunity for life to arise in a universe which can potentially support life (the criteria for which has been significantly loosened). So it's sort of like saying "why is your body fine tuned for your arm?" (very loosely speaking). There's no point to that question.

¹⁸⁶ <http://en.wikipedia.org/wiki/Life> - Retrieved 04/23/12

So the next formulation of the question becomes “why is *our universe with our form of life* one of those predisposed to exist?” Which shows our initial version, “why *this way* and not any other”, was indeed a more rationally admissible version of this, the anthropic question. The “anthropic question” is simply a more “meaningful” (and open-ended) restatement of it. The answers are the same (whether you invoke belief in God or a multiverse). But the form of the question makes one think differently. It’s definitely not a scientific question (that can be answered by science) but a question which arises out of any human tradition of science. The train of thought leads to questions regarding the nature of our form of life, including its hitherto most advanced form witnessed, us.

The fact that the scientific community of the West stumbled onto the *anthropic* version of the arbitrariness question just belies the truth about what mankind constantly wonders about when studying themselves and the world in which they live.

Anyway, we’re not done yet. As we’ve said, the question being *anthropic* is kind of arbitrary. So we have to explicitly expand the connotations. “*Why is the existence of life even possible to begin with?*” Why does existence lead to life? One can see why Barrow and Tipler wanted to make that a necessary condition in the FAP.

Even the famous “atheist”¹⁸⁷ scientist, Carl Sagan, speculated that perhaps “we are a way for the cosmos to know itself”.

Islamic theology, of course, has a very specific and meaningful answer to that question and its more anthropic version. It is the same answer to the question of arbitrariness in general. This universe is the best possible form to host the best possible form of life. Us. By us I don’t mean humans only. I mean “observers” (those forms of life which can ask such questions), meaning humans and any other intelligent life similar to ours, whether in our universe or in another. And I also mean all other life, including all we’ve seen so far. According to Islamic theology all life reflects attributes¹⁸⁸ of the source of existence, the Creator. From the very state of existing to the example of life *trying* to sustain an unchanging essence in spite of the impossibility of such a task (believers see it as pretty much an arrow pointing to God... Tipler associated it with the Omega Point and tried to find the ideal within our physical universe at future timelike infinity... the Omega Point idea doesn’t interact very neatly with the multiverse idea). The “rational” life (i.e, humans) reflect some of the “higher order” attributes which we attribute to a “personal God”, like Will, Love, Mercy, Justice, etc. The existence of life at all, with or without rationality (“free” will), reflects the living nature of the source of existence.

However, it should be mentioned that to think of the idea of God in Islam and other such traditions as “personal” is an *anthropic mistake*. It presupposes that the idea is false and then tries to rationalize an explanation for the *idea*. It cannot be used to describe

¹⁸⁷ He apparently did not like that label.

¹⁸⁸ Discussion of the Islamic conception of the Divine Attributes would make this long work a little too long, plus there’s plenty of resources devoted to that subject already available.

God (other than the potential for a possible personal relationship between God and something else, but that isn't what's meant in the term "personal God") or the essence of the idea of God, or applied to God in terms of a philosophical genus. God cannot be described as a "personal God" in the way that man is described as a "rational animal". This conclusion is backwards. The idea of God would imply that man reflects God (in the Christian tradition they would call it man possessing godly traits or man being created in the image of God), not that God reflects man (as is implied with the term "personal God"). In Islamic theology God is *not* a person but God can still have a personal relationship with persons because God, having created persons, knows how to interact with them on their own terms (i.e, in human language, so God takes the pronouns "He" or "We" in Arabic). God, obviously, has no gender. The feminine pronoun isn't used (by us) because among most life (in our experience), the feminine gender is associated with reproduction and it would be preferable to pick (for common singular reference) the other gender solely on the antithetical nature of reproduction to God. This is not true in Christianity thus the misplaced idea among Westerners that Islam shares Christianity's idea of a "personal God". Even Judaism doesn't entirely share that idea. I heard Rabbi Michael Lerner speak once back in 2006 where he said that in Judaic spirituality, the Hebrew name means something like (my memory is rusty) the transformative force that turns what could be into what is (or I've heard "that allows being to be", along with the usual connotations of "without end" or "through which all things are", etc).

This should give some insight into why science was so closely associated with Sufism/ mysticism and esoteric theology in the Islamic tradition. Those were the people most motivated for science. The motivation shifted in later centuries to finding material means for worldly ends (and thus advances continued, but in engineering and the like rather than classical sciences). Then came the economic and political fall, the colonial era, and the conflict between the imposed foreign cultures and the local ones.

Cosmology in the Qur'an

It would be prudent here to make mention of the Qur'an's account of creation or "genesis". As such this section will return to the distinctly theological and philosophical tone of the earlier parts of this work.

There are really only three verses frequently quoted on this subject (with cosmological significance regarding the universe, as opposed to just about the earth, sun, moon and life) and the interpretations thereof varied among the first generations of Muslims. We'll start with those three and the "picture" they "paint" of creation and then move on to a few others to qualify.

The first is verse 30 of *surah 21*,

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

أَوَلَمْ يَرَ الَّذِينَ كَفَرُوا أَنَّ السَّمَاوَاتِ وَالْأَرْضَ كَانَتَا رَتْقًا فَفَتَقْنَاهُمَا^ط وَجَعَلْنَا مِنَ
الْمَاءِ كُلَّ شَيْءٍ حَيٍّ^ط أَفَلَا يُؤْمِنُونَ

- ARE, THEN, they who are bent on denying the truth not aware that the heavens and the earth were [once] one single entity, which We then parted asunder? – and [that] We made out of water every living thing? Will they not, then, [begin to] believe? [M. Asad]
- Do not the Unbelievers see that the heavens and the earth were joined together (as one unit of creation), before we clove them asunder? We made from water every living thing. Will they not then believe? [Yusuf Ali]
- Have those who disbelieved not considered that the heavens and the earth were a joined entity, and We separated them and made from water every living thing? Then will they not believe? [Sahih International]
- Do those who are kafir not see that the heavens and the earth were sewn together and then We unstitched them and that We made from water every living thing? So will they not have iman? [A. Bewley]

Western non-Muslim (Orientalist) translations:

- Have not the unbelievers then beheld that the heavens and the earth were a mass all sewn up, and then We unstitched them and of water fashioned every living thing? Will they not believe? [A.J. Arberry]
- Do not the infidels see that the heavens and the earth were both a solid mass, and that we clave them asunder, and that by means of water we give life to everything? Will they not then believe? [John Medows Rodwell]

What's interesting is the Urdu translation done by Mufti Muhammad Shafi in the *Ma'ariful Qur'an* as it reflects the original interpretation of the first Muslims, rendered here in English by his son, Mufti Muhammad Taqi Usmani,

Did the disbelievers not observe that the heavens and the earth were closed, then We opened them? And We created from water every living thing. Would they still not believe?

This is referring to opening and closing with regards to rainfall and vegetation. That the Earth was first in a state where there was no rainfall and vegetation. The first Muslims interpreted this verse metaphorically, not literally. Mufti Taqi Usmani adds as a footnote to his translation of his father's work,

The author has explained the interpretation of this verse as adopted by many authorities. But the miraculous style of the Holy Qur'an is that the words used by it may have different possibilities for interpretation. The words *ratq* and *fatq* used here have another meaning which is 'being compact' and 'being separated'. If these words are taken in this sense, the verse may also be translated as, "The heavens and the earth were compact, then We separated them." In this case the verse will refer to an event of the early creation, meaning thereby that the heavens and the earth were originally a single body. Thereafter Allah separated the earth from the heavens. The contemporary research about the Big Bang is close to this description. But it should always be kept in mind that the Qur'anic descriptions are independent of any scientific theory and the Qur'an should not be made subject to ever-changing theories.

The reason the interpretation of the heavens and earth being compacted into one became so popular so quick in a religious field that changes so very slowly (Qur'anic exegesis) is because this is using the actual literal reading of the verse which tends to be preferred where possible. Though verses are routinely interpreted as having multiple layers of meanings, the literal one (barring obvious use of Arabic metaphor or metonymy, which this was not) takes center stage.

There are numerous claims of science in the Qur'an made these days (made all the more prevalent due to the internet). When sorting through such claims which depend on translations, I've found [Lane's Arabic-English Lexicon](#)¹⁸⁹ as an invaluable guide (for really any Muslim whose primary language is English).

The first word, *ratq*, is from the RTQ root (Ra-Ta-Qaf) and the entry contains "*He closed up... and repaired*", "*He sewed up, or together*".

Further on it gives, "*He closed up the breach between them; he reconciled them; he reformed, or amended, the circumstances subsisting between them.*"

Three examples of 21:30 are given from traditional interpretations, two of which are the rainfall interpretation and another which says the heaven and earth (referring to sky and the planet earth) were united and were "rent" (as in rent asunder). These are all, of course, early or traditional interpretations.

The interesting points about the most apparent literal usages mentioned are firstly the "sewn up" translation and secondly, the connotation of "repair" or "reform/reconcile", which implies the action taken when someone joins something broken apart, and in so doing, changes the character of that thing (one might even say its essential properties), returning it to its original form as one joined thing. The key there is the connotation of a

¹⁸⁹ A 19th century dictionary compiled by Edward William Lane

change in form or state between the split and joined. The more literal we get, the more relevant the verse becomes to the theories about the beginning of the universe.

The next word, *fatq*, is from the FTQ root (Fa-Ta-Qaf) and the entry contains “*He slit it, rent it, rent it asunder or open, or divided it lengthwise: disjoined it, or disunited it: or undid the sewing of it, unsewed it, or unstitched it*”.

The entry is long and also contains,

“He *rectified* the language; or trimmed it, and *removed its faults, or defects*”,

“The cattle became *swollen, or inflated*, in the flanks, by reason of fatness;”

“The flanks of the sheep, or goats, became *dilated* by reason of much pasturing...”

“[There was in his flanks] a flaccidity, or laxness: or a swollen, or an *inflated*, state; or a *dilatation*,”

“He is the possessor of command or rule, so that he *opens* and *closes*, and *straitens* and *widens* [or rather widens and straightens]”

The next is verse 47 of *surah* 51,

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَالسَّمَاءَ بَنَيْنَاهَا بِأَيْدٍ وَإِنَّا لَمُوسِعُونَ

- AND IT IS We who have built the universe with [Our creative] power; and, verily, it is We who are steadily expanding it. [M. Asad]
- With power and skill did We construct the Firmament: for it is We Who create the vastness of space. [Yusuf Ali]
- And the heaven We constructed with strength, and indeed, We are [its] expander. [Sahih International]

Western translation:

And heaven -- We built it with might, and We extend it wide. [A.J. Arberry]

There is nothing mentioned in the *Ma'arif* *Qur'an* from the traditional commentaries on this verse, just the literal verse itself. The last word there, *musi'un*, is usually denoted

in most all translations as present tense, often interpreted to indicate an ongoing expansion.

The third is verse 11 of *surah* 41,

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

ثُمَّ اسْتَوَىٰ إِلَى السَّمَاءِ وَهِيَ دُخَانٌ فَقَالَ لَهَا وَلِلْأَرْضِ ائْتِيَا طَوْعًا أَوْ كَرْهًا
قَالَتَا أَتَيْنَا طَائِعِينَ

- And He [it is who] applied His design to the skies, which were [yet but] smoke; and He [it is who] said to them and to the earth, “Come [into being], both of you, willingly or unwillingly!” - to which both responded, “We do come in obedience.” [M. Asad]
- Moreover He comprehended in His design the sky, and it had been (as) smoke: He said to it and to the earth: "Come ye together, willingly or unwillingly." They said: "We do come (together), in willing obedience." [Yusuf Ali]
- Then He directed Himself to the heaven while it was smoke and said to it and to the earth, "Come [into being], willingly or by compulsion." They said, "We have come willingly." [Sahih International]

This is referring to a stage after the separation indicated in 21:30 when the heaven(s) (whether just ours, the lowest, or all) was in a smoke-like gaseous state and from which the heaven(s) and earth both emerged by the will of God (and they had no free will in the matter). One translator I noticed translated it a little more literally. Tahir-ul-Qadri put “come together willingly or unwillingly” as “*Get in (compliance with Our system) either under the influence of mutual attraction and coordination or under aversion and revulsion.*” Saying, in effect, come together through attraction or repulsion. One could, if going down that road, make a really anachronistic translation out of it in light of modern cosmology. We will, for now, ignore that interpretation/translation and return to it a little later when necessary.

41:12 goes on to add that the seven heavens were formed in two “days” and God “*inspired in each heaven its mandate*” (“*assigned to each heaven its duty and command*”), indicating each heaven has its own order, possibly unique and distinct from the others.

Additional verses include 7:54 which says Allah created the heavens and earth in six days, about which the commentaries vary considerably since a day is given various lengths of time relative to the hereafter or heavens, sometimes in the thousands of years, other times in the tens of thousands, with commentators agreeing in those

instances that these simply refer to immensely long periods of time. But no standard by which to relate time to these first six days is known since it is implied this is before anything else, so God alone knows.

65:12 says Allah has created seven heavens and also seven earths. Other verses, like 2:29 indicate the earth (at least ours) was created before the heavens were ordered into seven. 65:12 indicates Allah's "command" comes down among them slowly. Why slowly? As the *Ma'ariful Qur'an* mentions, the Qur'an itself says that Allah can create anything in an instant (He says "be" and it is) but Allah prefers a gradual and ordered creation by which the rest of creation can learn from its example. Traditions of the Prophet (saw) mention that hastiness in anything is generally disliked. This is the general backdrop for Ash'arite atomic metaphysics (the universe is created more or less instantaneously at every moment in the appearance of a gradually changing order reflecting the Will, Command (Decree), and Attributes of God).

37:6 says the lowest or nearest (to us) heaven has been adorned with stars (and planets as its sometimes translated). This "nearest" heaven to the earth (literally, "sky") would be referring to the actual universe we see and are in.

35:41 indicates the heavens themselves are in motion from which it is possible to deviate (which God prevents from occurring).

Verses like 22:65 indicate the heavens (or at least the lowest) are to be associated with the sky (including what is beyond our basic atmosphere), as in, part of our universe *and He withholds them from collapsing onto the Earth* (italicizing for emphasis not quotation). Which of the seven, if not all, this refers to is unknown but it means at least ours (the lowest one with the heavenly bodies we can see).

The thing about the Qur'an to keep in mind, especially for those unfamiliar with it, is that it is approached from a personal perspective. The Qur'an is not a book you go to to get scientific facts (like an Encyclopedia). It is a book of moral/behavioral guidance and theology, which includes or necessitates some statements applying to cosmological creation. You are supposed to approach it with your own existing knowledge of cosmology, or any science, whether your knowledge is from the 7th century or the 21st. Do the verses still speak to you? Do they make sense? Or more than that, do their meanings retain efficacy? Hamza Tzortzis describes this as the Qur'an "not negating established realities". The remarkability of the text is that it does not go out of date. An astronomer of either the 7th or 21st century could equally feel at home in its descriptions, in fact the latter moreso than the former, who would have no clue what some of these ideas pointed to (which were wildly different from accepted cosmological models of the time, such as the Ptolemaic celestial spheres).

So the picture painted is one where, if we are to apply it to a modern understanding of cosmology, the heavens and earth are separated in a Big Bang-type event marking the

first event of creation. Each heaven seems to correspond to a universe, though whether they all are bounded from each other is unknown (aside from the lowest, the one we see, seemingly out of reach of the others). The “Earth” refers, most likely from the usage, to our planet (and not our planet with the universe around it). The point about several Earths is not expanded upon except in the narration of Ibn ‘Abbas (ra) so whether they are derived in a Many-Worlds scenario or they are actual other planets viewing the same sky we do or whether they exist in separate universes for themselves is unknown (the verse’s specific language, “*of the earth the like thereof*”, is also hard to interpret off the cuff as we are doing here). The cosmological picture most closely resembles bubble universes when we take into account the staggered creation of the heavens and earth despite originating from the same opening moment. The “gaseous” state of the heavens before their ordering into seven distinct “realms” with distinct “orders” could refer to some sort of nebulous substance outside the boundary of the observable universe undergoing still further “big bangs” in order to create a “bubble” for each heaven, the idea being that if each has a distinct order (corresponding to a system of physical laws), it would need to be a separate “causal patch”. Though of course there could conceivably be some way for there to be a seamless transition between the heavens of distinct orders without the need for causal patch separation (spatially open universes), implying one could seamlessly travel from our observable universe and keep going to the other heavens (it is in fact mentioned that *djinn*, spirits who subsist on energy convection currents like heat waves (as the Qur’an says, they are created “from the fire of a hot wind”), travel to the boundaries of our visible heaven and are turned back violently). It’s also possible that each heaven is a container of all the heavens lower than it (which are bubbles within bubbles, resulting in a diagram similar to the ancient celestial spheres model but with bubble universes instead of spheres). From all indications these other universes are very different from ours and follow many completely different physical laws (simply going by what is described of Heaven, and Hell, in the rest of the text). That brings up the interesting point of the location of Hell. It is unknown. So the possibility remains of there being more than several universes (with the lowest “heaven” corresponding to our observable universe). The highest (or furthest from us) heaven or heaven(s), according to tradition, contain Paradise (usually associated with “Heaven” with a capital H as a proper noun). The Qur’an also says there is “stuff” inbetween the heavens and earth, and all is under God’s knowledge, leading to the possibility that there might not be “hard” boundaries associated with the horizons as there are in the bubble inflation model. The Qur’an also indicates the heavens are *dispositioned* to “collapse” onto the Earth (in 22:65) which does not conflict with our understanding of gravity. Indeed it wouldn’t be hard to understand for anyone of the 7th century familiar with Greek celestial sphere cosmology either... they might not have known what gravity was but they observed its effects everyday when they saw objects falling to the Earth. Unlike the Ptolemaic model, however, the Qur’an says the heavens are dispositioned to collapse, not be static spinning spheres.

It’s amazing to realize just how far science has progressed in that the Qur’an’s account of creation becomes more clear with time. It is not unreasonable to speculate (purely

hypothetically) that there would be a gravity-like force in the other heavens. And if there is indeed a graviton in our universe, there could even be an equivalent in Heaven as well. That thought is hard to comprehend.

Non-Muslim readers might be rolling their eyes at this point but this entire work, and this chapter in particular, is intended primarily for Muslims. Allow me to shed a little light on my “metaphysical agenda”.

During the entire time I was writing this section on cosmology I avoided looking at any of the Qur’anic verses on the subject. I had never actually read these in a cosmological context before, only brushing over them in normal readings. I had read some “out there” theories on the internet regarding wormholes and the speed of light in the Qur’an and ignored those. After I finished writing the sections on actual physics, which allowed me to brush up on a lot and learn new things as well, I turned to the Qur’an for this section.

Since a young age I always envisioned the “Heavens” as this completely disconnected realm of several layers (like the layers of our sky, one on top of another) leading to the region above the highest which was the domain of the *‘Arsh*, or the throne of God, whatever that meant. I always envisioned this domain as free from the petty “physical laws” of this universe and figured Judgment Day implied the complete annihilation of our universe, which was a separate entity from the Heavens which I had supposed existed for a far longer time. I believed Paradise to be a “magic-like” place literally in that things popped into existence out of nothing according to people’s wills (by the Will of God of course). I imagined it, basically, to be as far removed from our existence as possible.

But the Qur’an clearly says otherwise. It says in no uncertain terms that our planet, and the heavens, including the lowest which includes all the stars we can see (corresponding roughly to our observable universe), all started from what sounds like a “Big Bang”. It says *our* neck of the woods was developed *before* the heavens. Meaning this is all before angels or other spirits populated the worlds. It says in no uncertain language that the *djinn* travel to the edges of the lowest heaven to “listen” to what’s going on in the beyond, to, it is implied, glean information about events in this universe (including events perhaps yet to happen... so Muslim fans of all those “holographic” universe theories which posit ideas like the information for our universe is encoded on our cosmological horizon might be getting excited). The Qur’an says that the order of God descends through the heavens slowly by means of angels, and we can only presume these are whom the *djinn* are trying to “eavesdrop” on. We have some sort of physical understanding of what *djinn* are (as mentioned earlier regarding life possibly subsisting on convection currents, as is most clearly implied by the Qur’anic verse describing their nature), but we have no real clue how to relate to what angels are (except as beings of heavenly light, which we have no clue how to relate to physical light since our own souls are made, at least partly, of the same stuff yet we see no physical evidence of them). So this is the extent of what we can deduce from the Scripture on this matter. Somehow, angels, in whatever form, convey information from beyond this universe to this universe

(those wormhole ideas come into play here, and I still don't subscribe to them unless we actually find evidence for their real existence; and if we did then I suppose why wouldn't an angel or spirit use one? Or even us for that matter if we ever lasted long enough to try?).

So now that it is theologically established that the idea of heavens being “universes” in some form has more scriptural support than any other position, still more verses indicate the heavens follow divine “mandates” or “orders”, implying a physical system not unlike our universe's laws (alike in that a system of laws exist, whatever those laws may actually be). The Qur'an goes so far as to mention that the earth and heavens (السَّمَاءُ "as-samaa, the word used interchangeably with “sky” but also used in every context which clearly refers to the cosmos, like 35:41) are dispositioned to fall (collapse), being subject to the same physical laws (gravity), that we are.¹⁹⁰ And the beauty of this verse is that it has real meaningful relevance for the 7th century Muslims in the manner of rainfall from the sky, and for us in the 21st century too. The language seems to natively support each conclusion in their own historical context, which is rather amazing (although with the benefit of hindsight and history on our side, the modern cosmological renderings of the verses are more literal interpretations and thus more favored).

This ought to be quite a revelatory shock for most Muslims. It legitimizes science in a way that people would not expect from Islam when ignoring its history. In fact it does so to the uncomfortable reactions of Muslims. Indeed, I felt uncomfortable reading and reflecting on all this because it challenged my notions and forced me to change what I thought of science. The reality of the interaction between Islam and science is not that progress in science delegitimizes religion, that would only be the case for those ignorant of religion. Nor is it entirely that religion legitimizes science for even though that might have been the case in the early days of Islam, it's obvious now that simple material progress is more than enough. It's that religion *does* legitimize science but science, through progress, can be the driving or initiating factor in this, essentially forcing religious recognition and demanding theological attention. Why would this be anything but the case when science is a description of the behavior of nature, of Allah's creating, and that we, as part of that, are drawn to it? Would Allah limit His grand creating just to avoid stepping on the toes or hurting the egos of mere men who do not understand it? As the Qur'an says, Allah's creating demands our attention and it should be no surprise, then, that science inherits this quality as it is essentially a description of that. The non-believer who studies the reality of Allah's creating, what Allah is *actually* creating and how, has the upper hand over the believer who tries to shoehorn Allah into the limited creative capacity of his or her own imagination.

You can think whatever you want about a scientist or a specific tradition of science itself (including various paradigms, theories, models, etc), but the essence of the practice,

¹⁹⁰ The relation between “natures”, “dispositions”, the *'amr* (command), and *'aradh* (accidents), and physical “laws” as distinct from the *khalq* (creation) and *jawhar* (substance) will be covered in later sections.

describing the behavior of the creation, trying to discern the natural laws or natural order inherent in the creation, is not something to be taken lightly, underestimated, or even neglected. We do not say gravity is a physical *thing* that we *know* is in heaven. It might be, it might not be. What we do say is that gravity corresponds to our observations of the behavior of the celestial bodies in the lowest observable heaven (and right here on Earth), behavior which the Qur'an indicates applies to the rest of them at least at certain times.

Though studying heaven will by no means get you there, only belief and good works can do that, this too was once a part of religion in an age where basic belief and morality were not so daunting and difficult in and of themselves.

Now let's perform an exercise in interpreting the Qur'an's apparent meaning in light of modern scientific knowledge and theories.

One of the major fallacies committed by people *trying* to find science in the Qur'an is that they go looking for literal words to describe misunderstood scientific theories. For example I found a website where someone asserted that *ratq* in the context of the first verse discussed here also carried the connotation of a "total darkness". Except I found no such association in Lane's Arabic-English Lexicon, which they cited. Perhaps they were using a different version. Whatever the case, they interpreted this to mean the Big Bang formed out of a black hole. They used the idea of "darkness" to literally mean a black hole. But this doesn't fit with the physics. The singularity at the Big Bang, if it was indeed a singularity, was not a black hole. "Darkness" could imply nothingness of course, or literal darkness in that there was no physical light, but trying to stick a black hole there is too much of a jump. It's just flat out incorrect in that it's misusing definitions. That is not how you do it.

On the other hand when I learned about black holes, the various theories about them that have come and gone (gone defunct), and how it is thought that there might be supermassive black holes in the center of every large galaxy, I thought that such a simple and poetic structure of the cosmos would seem like one of the things that could fit in the Qur'an's style of language. So, without forcing anything into the text, and through a cursory reading keeping in mind my established view of reality, I, not unexpectedly, came upon a verse that contained exactly what I was thinking about in 31:10 which says, "*He hath created the heavens without supports that ye can see*". Of course one must always utilize the historical *tafsirs*, the gold standard for Qur'anic exegesis, to see whether such an interpretation is warranted or not. The more historical support there is for such an interpretation, the less controversial it would be. Could the verse simply mean there were no supports at all? Is the notion of invisible supports for the celestial phenomena grammatically admissible? The verse is repeated in 13:2 which says, according to the same translator (here taken from Pickthall), "*Allah it is Who raised up the heavens without visible supports*". We don't know if this includes the heavens we can not see but it must include the lowest level that we *do* see.

According to the *Ma'ariful Qur'an's* commentary on 31:10,

Verse 10 opens with the words: (He has created the skies without the pillars that you may see). Another verse on the same subject: (13:2) has appeared earlier in Surah Ar-Ra'd (with a different translation). Analyzed grammatically, the text admits two alternative meanings.

1. If we were to take (*tarawnaha*) to be the attribute of ('*amad*) and revert its pronoun to '*amad*, it would mean that Allah Ta'ala created the skies without pillars that you may see, that is, had the pillars been there, you would have seen them. When pillars are not seen, it is clear that this great roof of the sky has been erected without pillars. This explanation has been reported from Sayyidna Hasan and Qatadah. (Ibn Kathir)

2. And if we were to take the pronoun of: (*tarawnaha*) as reverting to: (*as-samawat*: the skies) and this sentence as standing independently, then, it would mean that 'Allah Ta'ala created the skies without pillars as you see.' Then, there is yet another option in the case of the first grammatical analysis whereby it could also be taken to mean that 'The skies stand on pillars that you cannot see - they are invisible.' This last explanation has been reported from Sayyidna Ibn 'Abbas, 'Ikrimah and Mujahid (Ibn Kathir).

Both interpretations of the grammar are from *Tafsir Ibn Kathir* which is perhaps the most famous classical Sunni commentary based on the source texts and earlier commentaries.

Furthermore the immediate context of this verse is the mention of mountains on Earth as also representing a stabilizing effect. That part of the verse is more famous and controversial having been used to attempt and prove scientific “miracles” in the Qur’an and simultaneously used to prove the Qur’an has incorrect science. If we reconcile that verse with the “invisible pillars” of the heavens, however, we can come to a greater understanding of how the Qur’an refers to natural phenomena in human language. For example, a black hole isn’t really a tangible *thing*. It is a manifestation of a specific behavior of the fundamental forces of nature according to physical laws. It is, obviously, not a literal pillar. It is even described as *invisible*. We detect black holes by detecting their effects and the most direct evidence involves rotation rates of material outside of black holes and emission from accretion disks. But when we as humans observe it we can liken it to a “support” in that these large galaxies likely (it’s still a developing field) could not exist as they are without a supermassive black hole at the center. They are key to the formation and presence of large galaxies like ours.¹⁹¹ ¹⁹² So while this is like no pillar we’ve ever seen in any act of human construction, such a label would be one

¹⁹¹ http://news.nationalgeographic.com/news/2005/04/0406_050406_blackholes.html

¹⁹² <http://www.universetoday.com/13732/why-are-there-black-holes-in-the-middle-of-galaxies/>

of the few non-scientific ways to describe it. In fact, such a view means that black holes might not even be what the verse was referring to but any other similar invisible stellar phenomenon that is functionally necessary for the formation and structure of the cosmos (and implies stability). Dark matter, if it ever pans out as a real thing, could also fit the bill (as per footnote 190 and how it's used to explain the rotation of galaxies). In fact, it doesn't even matter whether we think of black holes or dark matter. The actual point is that the behavior of nature is described. In which case the fact that the behavior of some fundamental forces can be likened to "support" is of no surprise to anyone and an assertion which could have been made by any person even thousands of years before Islam (except for the "invisible" part, though it's not unimaginable). Which would in no way lessen the magnitude of the verse's message because the point is to observe what we can of nature and take heed from the structure and order in it, from the actual, real, behavior of it and how our existence is so dependent on that order (invoking the "fine tuning" anthropic question of the previous section) and even a part of it.

Now if we extend that view of the forces of nature to the mountains mentioned in the next instant, the mountains are not the stabilizing effect. They are the visible manifestations of "invisible" forces of nature (the behavior of a thing is obviously not the thing, it describes the change over time of its state whereas the thing itself can be conceptually understood without the context of time... alluding to the issues of this entire section on cosmology). The mountains would correspond to the visible evidence, not the forces themselves. Mountains are seen where tectonic movement is winding down, where continental plates have collided and are stabilizing (temporarily on geologic time scales). One of the premier anti-Islamic criticisms of "science in the Qur'an" promoting Muslims is that those who say similar things are confusing cause and effect. One such anti-Islamic polemic site compares the situation to a car crash. It says the slow halt of the plates during collision is obviously the action of the plates, not the mountains (as if any Muslim, even ignorant of the subject, has ever said the reverse) and it's akin to saying a crushed engine compartment stabilizes the car during a crash when obviously the the crash itself is the stabilizing force. It's a straw man argument. I'm not a fan of Muslims trying to claim there are scientific miracles in the Qur'an (I believe a true or proper scientific miracle has to be of a predictive use for humanity, keeping in line with the nature of science itself) but they never say this. The entire point is that in a car crash the engine compartment deforms, from the absorbing of energy, which does stabilize the passenger compartment (from being too affected itself). The entire point of these verses is that had nature or the universe not found itself in an equilibrium state of the most transient and fleeting quality, our existence and life here would not be possible. So take heed from the fleeting nature of our existence and realize that it all reflects on the opposite nature of the Creator upon whom all things (including existence itself) are dependent. Our very existence can be likened to the visual effect of the invisible force which is God's creating.

This gets back to the earlier discussion on how Allah's Customary Way (*jary al-ada*) can sort of indefinitely (hypothetically, from our perspective... we do believe it probably stops

somewhere) be divided into substances and accidents. The accident for one substance might itself consist of still more substances in whom an even deeper level of accidents are yet still manifested as more substances. Similar to how the fundamental forces, in quantum field theory, are mediated by force carrier particles. We can take this in the opposite direction as we are here. The black holes and mountains can be seen as accidents or, especially in light of human language and a human view of nature, as substances. Science can be seen to correspond to this sort of analysis which explains substances in terms of accidents and so on as described (mathematical reductionism). What the Qur'an is doing here is illustrating that relationship (using metaphor based on the human experience to describe larger events) inherent in the process of creation. The Qur'an's verses attempt to paint a picture of reality or nature that humans can understand, and it does it in a very skilled and poetic manner free from the issues that most scientists in our day have when they tread into the fields of philosophy or pop science (due to the fundamentally varied way in which we conceptualize mathematical descriptions of reality). This idea will be discussed further in the later section on Imam Maturidi's metaphysics.

Another point to note is that aside from these orthodox sources of commentary (companions of the Prophet (saw) like Ibn 'Abbas (ra)), there are plenty of commentaries by other scholars since they who have speculated upon the meanings, some with really exotic or strange interpretations. As they interpreted the Qur'an in their time, so too do we interpret the Qur'an in our time by the original, literal, text (including, as we just did, analysis of its grammar) and what commentary is to be found in the authentic narrations of the Prophet (saw) and the noble companions. No *tafsir* beyond this is binding on anyone else. Indeed there have been some strange interpretations that seem as if they came out of some Eastern religions using heavily metaphorical language describing the creation and movements of the heavens in terms of an ocean, or other worldly phenomena. Such language is clearly metaphorical as it's being used by humans and one person's interpretation to such an extent is not binding on any other Muslim since it goes above and beyond the apparent meaning of the text without explicit support in the ancillary texts (hadith, Sunnah). Likewise, my reading of this text with the thought of stellar phenomena like black holes kept in mind is in no way authoritative or binding on anyone else. It is simply unprovable. All we can say is that the text's structure allows for such an interpretation.

Let's move to another verse which is a little less ambiguous in its literal meaning but for which interpretations tend to range into the highly theoretical realm of modern cosmology.

Verse 104 of chapter 21, *Surah al-Anbiya* says,

- On the day when We will roll up heaven like the rolling up of the scroll for writings, as We originated the first creation, (so) We shall reproduce it; a promise (binding on Us); surely We will bring it about. [Shakir]

- The Day that We roll up the heavens like a scroll rolled up for books (completed),- even as We produced the first creation, so shall We produce a new one: a promise We have undertaken: truly shall We fulfil it. [Yusuf Ali]
- On that Day We shall roll up the skies as written scrolls are rolled up; [and] as We brought into being the first creation, so We shall bring it forth anew a promise which We have willed upon Ourselves: for, behold, We are able to do [all things]! [M. Asad]

The *Ma'arif* Qur'an mentions about this verse,

Sahih al-Bukhari contains a story on the authority of Sayyidna 'Abdullah Ibn 'Umar that the Holy Prophet (saw) said that on the Day of Judgement Allah Ta'ala would roll up all the seven skies (heavens) and the seven worlds along with all the created things thereon in His hand, and all of them together would be no more than a grain of rye in His hand. (Ibn Kathir)

So, needless to say many, if not most Muslims, in light of modern cosmology interpret this to indicate a new Big Bang following a “Big Crunch”, where the universe (the unobservable part which contains all the others including our observable universe) “collapses” back on itself. We (no one, in fact) do not have any indication when this might occur (a major theme in Islamic theology), nor how it may occur. Whether by what we know to date of the laws of physics (like some kind of bubble nucleation triggered by a vacuum metastability event, the spontaneous decaying of a false vacuum to a lower energy state, which we cannot be absolutely sure will not happen in our own universe and definitely can not make any statements about in the unobservable universe) or by some as yet unknown mechanism.

This excerpt also provides a direct authenticated link to a narration of the Prophet (saw) which adds some credence to the Big-Bang-type interpretations of the Qur'an's account of creation. The verse implies the second creation will ensue as the first did and the emergence of the seven heavens and seven worlds from such a small size can only be interpreted as an expansion (though whether it happened exactly as it's theorized in Big Bang cosmology is a different subject).

The following was added in a revision,

There is another verse used, especially among the more orthodox, to indicate the idea of black holes. Verse 75 of chapter 56, *Surah al-Waqi'ah*.

This verse is interesting for the different translations used.

- Furthermore I call to witness the setting of the Stars,- [Yusuf Ali]

- So, I swear by the setting places of the stars, [M. Taqi Usmani]

Where God Himself swears by something and in fact, calls that something to witness to testify on behalf of God's glory (from the previous verse, *Al-'Azim*, the Magnificent).

Muhammad Asad translates it as,

"NAY, I call to witness the coming-down in parts [of this Qur'an]"

Since the brackets denote implied words, the literal translation is:

"NAY, I call to witness the coming-down in parts"

Tahir ul-Qadri also translated it this way. Most others translate the last word as "stars" (*najm*, what is almost always used for that). Why Asad would think it meant something else would be due to the behavior described of them. Stars don't "come down in parts". One translator even describes it as the death of the stars (i.e, supernovae) but is a controversial translator not accepted by the mainstream. You can understand their perspective though (going from the idea of falling to death, treating the original metaphorically rather than literally).

Other translations describe it as "falling", "setting", or "locations" (always referring to a multitude or variety of different locations, not one location). The term "locations" or "positions" is in the sense of "location of a thing which comes to pass" or when something "takes place", which is the meaning of the word used, *mawaqi* (as per Lane's Arabic-English Lexicon). It's thus a very literal rendering into English which should appear to anyone as likely not containing the original intent of the meaning. Turning "takes place" into "places" obviously is a bit of a stretch.

The Orientalist non-Muslim translators mostly used "falling" and "setting".

This is one case of a verse which was perhaps not fully understood by the scholars of Islam and Qur'anic exegesis for over 1000 years. There's a general consensus (among both Muslims and non-Muslims) that the intentioned meaning most likely means to invoke multiple literal meanings of the word, as the Qur'an does in numerous other places (and, indeed, has become known for in discussions about translating it out of Arabic).

The word, *mawaqi*, is from the WQ'A (Waq-Qaf-Ayn) root. The name of chapter 56, *Al-Waqi'ah*, is from the same root and it means "The Inevitable" or "The Inevitable Event". This is the truest meaning of the root as the definitions in Lane's Arabic-English Lexicon evolve from this:

The thing, or affair, [fell, befell,] happened; took place; came to pass; became

[executed, performed, or] realized;

He lighted, or came, upon a thing or place; and he became in a place.

[They lapsed into the years of scantiness of herbage]

It chanced, or happened, to come to him, or it: and, said of a thing borne by water, it drifted to it, namely, a place.

It fell, lay, or closed, upon it, or against it.

He originated the thing, or event, and made it to befall.

He fell into a snare, or the like: he became ensnared.

[He was, or became, meaning he found himself, came to be, or chanced to be, in a desert, or waterless, land]

He made an onslaught upon them / He made an assault, or a sudden assault, upon the enemy

[A mark on an official decree] as though the muwaqi upon the writing marked, upon the case respecting which the writing was written, that which confirmed it, and rendered its execution obligatory

He threw himself [or plunged] into the affair: he fell into the affair: he fell into the affair, subjecting himself to difficulty.

And he fell to the thing; such as eating, and drinking, and the like

[Similar in meaning to "He was near to doing, or experiencing, the affairs, or events"]

He caused him to fall into a snare, or the like; he ensnared him.

Waqi' - Actually occurring. An event; a fact; a case. In fact; reality.

An occasion (lit., a place) of falling into sin.

So, taking all those usages into account, one can see the root of the word means an inevitable place or event which one cannot escape; which one falls into. It's similar to how we talk about fate or destiny in the English language. Like, "a fate you cannot escape" or "your inevitable destiny". The notions "fate" or "destiny" are not implied in the Arabic word here (as we can see from its usage). The example of "falling into sin" is the

most intuitive and easy to understand. Being near to some sins or temptations, one feels as if they are being inevitably pulled towards that act with the added connotation (in the Arabic) of the event actually having happened (in reality; it came to pass), as opposed to the idea of some event in the future (like the idea of fate/destiny in the common English usage of similar language, which could be avoided in principle).

Just the raw meaning of the root word invokes a black hole in our imaginations. But let's look at the verse, what is it ascribing this to? To stars. And what is the inevitable event which befalls them?

On first glance, it appears that it is not said.

But then, that wouldn't make much sense now, would it? Even if the non-Muslim skeptic wishes to ascertain the meaning of this verse and believes it was written by a man, what are the odds the person makes such an egregious error when everything else in the Qur'an is the epitome of high and noble speech? Clearly it had to be intentional, not by mistake.

Which would mean that we can only refer to the inevitable event by itself then. The word itself, *mawaqi*, is the inevitable event and taken literally actually means place. The meaning is literally place and is always used metaphorically to refer to an event. Here the two are conflated. We have to take the literal meaning and use it as it has always been used (i.e, an event one falls into). This gives you a place which one falls into, which one cannot escape. Not just one place, since *mawaqi* is plural, so it cannot be an event which is a fate which befalls all stars equally, but a multitude of real existing, varied, places or events. A multitude of unique events.¹⁹³ The *mawaqi* are the focus of the sentence, not the stars, meaning it could apply to all stars if you stretch the meaning (although any Qur'anic exegetist would take issue with such a liberal translation) but only necessarily applies to some if we stick by the simple and apparent language.

The next verse (56:76) confirms,

- and, behold, this is indeed a most solemn affirmation, if you but knew it! [M. Asad]
- And lo! that verily is a tremendous oath, if ye but knew - [Pickthall]
- And most surely it is a very great oath if you only knew; [Shakir]
- And that is indeed a mighty adjuration if ye but knew,- [Yusuf Ali]
- and, truly, that is an oath to be sworn if you know, sublime. [Dr. Bakhtiar]
- and, indeed, that is a most mighty oath, if you only knew [Wahiduddin Khan]
- And it is an asseveration of immense magnitude if only you knew. [Al-Muntakhab]
- And verily that is a mighty oath, if ye but knew! [Daryabadi]
- And behold! This, indeed, is a great witness if your knowledge can encompass it.

¹⁹³ Unique in the same way as being able to be identified as separate locations, the same way stars are charted in the sky and given unique identity.

[Shabbir Ahmed]

- (and that is indeed a mighty oath, did you but know it) [Arthur John Arberry]
- and, verily, it is a grand oath if ye did but know - [Edward Henry Palmer]
- -- and it is surely a great oath, if ye knew it; -- [George Sale]
- And it is a great oath, if ye knew it, [John Medows Rodwell]

It confirms that we did not know the meaning, even implies we could not know, which is why speculative interpretation of this verse was mostly neglected by scholars or not taken seriously because the implication was that we did not have knowledge of this at least at the time of the Qur'an's revelation.

Furthermore if we take it metaphorically (or slightly less literally), it does not have to necessarily refer only to black holes that stars fall into, but the multitude of different fates that befall stars. The reason we would want to do this is because that returns a little weight to the "stars" in the verse, not just the *mawaqi*. If the *mawaqi* are interpreted as events, they would be events which apply to the stars. If we take it literally as only actual places (i.e, black holes, places stars can fall into), it would also work (linguistically and scientifically) but only refer to one possible fate.

It is also important to note the importance of the notion of inevitability. In English there is still a connotation of an inevitable event being able to be avoided. The Arabic connotation here is more like inescapability. The event actually occurs, it is a description of a present or past sort, not something in the future yet to happen. It's in the Qur'an's particular usage here, which can be considered irregular by normal Arabic use, which preserves that idea but seems to focus it on nothing in particular (on itself), a physical inevitability or inescapability.

It is quite remarkable that the same phrase, when taken literally, refers to an inevitable or inescapable place one falls into (and a multitude of these as real places which some stars have fallen into)... and when taken slightly more metaphorically, also means the various different results (events) that inevitably happen to one class of things. Both of which are perfectly applicable to stars in modern cosmology. It's not as if these are just two aspects of stars, these are the two predominant areas of study identified with stars (black holes and the life cycles of stars). One in fact results from the other. Of the various fates that can befall a star, it can go supernova (explode) after which it could also collapse into a black hole (the birth of a black hole which could "eat" other stars). It could become a black dwarf, a neutron star, or a pulsar (a pulsar is a rotating neutron star which emits very regular radio waves we can pick up here).

In fact, verse 86:1 refers to a specific type of "knocking star" which has also been associated with pulsars in modern interpretations. The typical translation is "night visitor" which, when the Arabic is looked into using Lane's Lexicon, refers to the person who comes by night, rapping or knocking on the door (the knocking is a signature feature of the usage). 86:1 is similarly qualified by 86:2 which asks "And what can make you know

[understand] what the night comer is?", implying it too contains knowledge mankind did not have at least at the time of revelation.

[The following about verses 41:9-12 was added in a revision]

I was given a question about these verses, specifically in response to some Islamophobic polemic website which asserted that these verses indicate that the Earth was formed whole (physically) before the rest of the universe emerged from its gaseous/nebulous state.

The issue is in taking 41:11 as a direct continuation of 41:10. Verses 9 and 10 are talking about the development of the Earth, specifically. Verses 11 and 12 shift in tone and subject to the formation, at the macro-cosmological scale, of universes (the seven heavens). The Earth is not already formed in 41:11, it is not carried over from 41:10. Obviously how can the Earth be formed in 41:11 if we assume the events of verses 9 and 10 already took place? That would make no sense. Even if the author was a common man (as the person making the accusation believes) of the 7th century he would know this makes no sense, so to imply this is some random glaring error and ignore the more apparent and accurate interpretation is disingenuous and irrational.

The Earth is mentioned in 41:11 for what must be a special relative context. It is relating the Earth's formation to the development of the heavens implying it was the same mode or type of creative action (this terminology will be elaborated upon in following sections). Here is where Tahir-ul-Qadri's translation comes into use. The literal text indicates that God gives a command which does something to their behavior. All it says is "come both of you" and translators add "come [into being]" or "come [together]". Some have interpreted this to mean that "willingly" refers to mutually attractive forces and "unwillingly" to the opposite. It indicates the formation was done via an attractive force (or mode of creation) which is identified with gravity. Gravity is the force instrumental both in the forming of individual planets and the structure of entire universes. Forming in this context refers to the structure within them, as the verses indicate where they say "*made in each heaven its affair*" and "*adorned the nearest heaven with stars*" which could refer not only to different possible sets of physical laws but also, more obviously, to the literal physical order in the structure. Both contexts (the formation of the Earth and the formation of the seven heavens) refer to the now well known scientific idea that gravity is the force which actually developed the large and small scale structure of our universe (galaxies, solar systems, and planets).

Expanding this concept, in other verses (22:65) it is indicated that the universe(s) is held unwillingly, that it is dispositioned to collapse but God keeps it from collapsing indicating that a mode of creation acting essentially opposite to the one just discussed is needed to keep the universe from collapsing onto itself. 35:41 indicates this directly, that if heavenly bodies deviated from their orbits (that what is currently keeping them orbiting is removed) that would be the end of them: they'd likely fall into the center of

their gravitational fields since removing the kinetic energy would leave only gravitational (potential) energy. Kinetic energy, motion/momentum/velocity/etc are all the creative action of God directly on the subject (taken here to refer to bodies, specifically heavenly bodies) whereas gravitational energy is the creative action of God on one subject relative to the creative action on another (relativity).¹⁹⁴ Translators interpret this in two contexts, for planets or for the heavens themselves and in the latter context the word "vanish" is used, which has multiple applicable usages. For one thing, if God did not sustain the creation it would cease to exist; for another, if God did not balance the various modes of creation or forces in certain ways, they would collapse together and vanish, whatever that could mean. That last sentence doesn't mean singularities always disappear because the verse describing a "big crunch" of the universe and the associated hadith indicate it collapses into the size of "a grain of rye in His Hand" before re-expanding, but I suppose since they are so small relative to the scale of the subjects God is addressing in the Qur'an (us), "vanish" is also meant in the literally apparent sense (a Big Crunch would look like a vanishing).

[End addition]

Calling these miracles of any sort is missing the point. The entire Qur'an itself is considered a miracle by Muslims. It should not be divided into multiple subjective miracles. Science observes the behavior of nature, describes its order in mathematical/logical terms, and predicts (more or less inductively). This is not a scientific miracle by that standard. So what kind of miracle is it? Is it a miracle at all? The Qur'an is the miracle and verses like these just express one facet of that, which is how it upholds established realities in remarkable (some might add miraculous) ways.

Energy

Perhaps the most fundamental and simultaneously elusive quantity in all of physics, energy and its behavior (especially that it is conserved) is linked to everything we see being as it is (that nature is consistent) and not any other way.

What is energy?

While the official definition, that it is an indirectly observed quantity representing the ability a physical system has to do work on other physical systems¹⁹⁵, is easy, explaining it intuitively to the layman is not so easy. While searching for good intuitive introductory texts online I found a few such pages at the website of the [New Mexico Solar Energy Association](#), an educational non-profit. Here are a few of them,

¹⁹⁴ Where the order in the creating of one serves to dictate the order in the creating of the other. This will be elaborated in later sections.

¹⁹⁵ <http://en.wikipedia.org/wiki/Energy> - Retrieved 04/07/12

[What is energy?](#)¹⁹⁶

[How was energy defined and discovered in the first place?](#)

[What are the properties of energy?](#)

[How is energy converted?](#)

Feel free to browse other parts of their site for additional reading.

Another property of energy in the purely scientific context can be gleaned from how we measure or derive it, mathematically, like in mechanics. Mechanics is the branch of physics concerned with the behavior of physical bodies when subjected to forces or displacements, and the subsequent effects of the bodies on their environment.¹⁹⁷

The modern practice of physics began with Newtonian mechanics which dealt with vectors (acceleration, momentum, etc). Then Lagrangian mechanics were developed which worked with scalars representing the energy of the system. These were a little easier to work with and were second order differential equations. Then Hamiltonian mechanics were developed which were first order differential equations and made things even easier. The latter are still in use today and Hamiltonian mechanics have been expanded to cover quantum mechanics. Lagrangian mechanics are considered a more basic formalism.

The Lagrangian of a dynamical system is a function that summarizes the dynamics of that system. It is defined as the kinetic energy of the system *minus* its potential energy. Using this, we can derive the equations of motion of the system.¹⁹⁸

The *action* of a system is an attribute of the dynamics of that system. We can derive the action of a system by integrating the Lagrangian over time (what we are doing essentially is calculating the Lagrangian at several instants of time, drawing a graph, and taking the area under the curve).

As we see, we can use what we know about the energy of a system to figure out what change is occurring (the dynamics).

From Lagrangian mechanics we can move to Hamiltonian mechanics. The Hamiltonian is slightly different in that it is defined as the total energy of a system, the kinetic energy plus the potential energy. Like with the Lagrangian, we can then derive the equations of

¹⁹⁶ http://www.nmsea.org/Curriculum/Primer/what_is_energy.htm

¹⁹⁷ <http://en.wikipedia.org/wiki/Mechanics> - Retrieved 04/28/12

¹⁹⁸ <http://en.wikipedia.org/wiki/Lagrangian> - Retrieved 04/27/12

motion of the system.

We have discussed already the principle of least action, the idea that “nature” will tend to choose the course of least action in possible trajectories or histories for an action.

We mentioned in passing Noether’s theorem. This theorem states that any differentiable symmetry of the action of a physical system has a corresponding conservation law.¹⁹⁹

For illustration, if a physical system behaves the same regardless of how it is oriented in space, its Lagrangian is rotationally symmetric; from this symmetry, Noether's theorem shows the angular momentum of the system must be conserved. The physical system itself need not be symmetric; a jagged asteroid tumbling in space conserves angular momentum despite its asymmetry — it is the laws of motion that are symmetric. As another example, if a physical experiment has the same outcome regardless of place or time (having the same outcome, say, somewhere in Asia on a Tuesday or in America on a Wednesday), then its Lagrangian is symmetric under continuous translations in space and time; by Noether's theorem, these symmetries account for the conservation laws of linear momentum and energy within this system, respectively.²⁰⁰

So, since the equations describing observed phenomena are symmetric (or invariant, or unchanging) with respect to place, we can derive a conservation law for momentum.

If the equations describing observed phenomena are similarly invariant with respect to *time*, we can derive a conservation law for *energy*.

These illustrate fundamental relationships in nature. These symmetries are also expressed in the Uncertainty principle. There is the well known position-momentum version of the uncertainty principle and also an energy-time version of it.

So, in a way similar to how momentum is related to position (momentum is the mass times the velocity where velocity is the rate of change of position, or the change in position over time), energy is related to time.

Energy is defined as the ability of a physical system to do work on another physical system.

Kinetic energy today is actually defined as $(\frac{1}{2}mv^2)$ which is obtained from the equation for *work* (needed to accelerate a body of a given mass from rest to a certain velocity) which is defined as force times displacement.

¹⁹⁹ http://en.wikipedia.org/wiki/Noether%27s_theorem - Retrieved 04/28/12

²⁰⁰ *Ibid.*

Now *force* is actually the rate of change of *momentum* (assuming constant mass).

Regarding momentum,

Mōmentum was not merely the motion, which was *mōtus*, but was the power residing in a moving object, captured by today's mathematical definitions. A *mōtus*, "movement", was a stage in any sort of change, while *velocitas*, "swiftness", captured only speed.²⁰¹

It can be seen as intuitively describing the power associated with change. I am *not* referring strictly to the physics definition of power (as the rate at which work is performed). A specific kind of change which dominated most of physics was the movement associated with velocity or speed (literal motion).

So while momentum is conserved when the coordinate system does not change no matter *where* you are, the *energy* or the rate of change of momentum times the displacement (proportional to the momentum times the velocity, or also described as the square of the momentum divided by twice the mass) is conserved when the coordinate system does not change with time (it won't matter *when* you are).

Intuitively speaking it makes sense if we consider that the rate of change of a quantity that is unchanging should not change so long as we are consistent in the way we measure change. Something can only be "unchanging" if the way we measure change is consistent. So the change measured as "movement" should be "conserved" when our spatial coordinates are invariant or unchanging. Now, time being the ultimate measure of change, if time itself somehow changes, then we cannot measure *any* unchanging quantities because we'll have no objective measure by which to know if the change occurring was in the quantity being measured or in ourselves or in how we measure change. So energy is associated with the "power" behind the change in movement being used to effect either change in motion or movement *or any other kind of change*. Momentum can be seen as that "power" being used only to effect change in motion. Energy expands that concept to indicate simply the power behind any sort of change. The conservation of these means that this (*applied*) power is not changing, the amount of change it is effecting is not changing. **We can measure change in one thing by relating it to change in another, and time is hence the ultimate measure of change.** This should make more sense of what was said earlier in Imam Nasafi's Creed about how time for some natural philosophers is a measure of motion but for us it is a "measure of something renewed by which something else renewed is measured", with "renewal" here referring to a passive change (i.e, simply existing from one moment to the next without discernible physical motion).²⁰²

²⁰¹ <http://en.wikipedia.org/wiki/Momentum> - Retrieved 04/29/12

²⁰² That these two measures of Time are obviously equivalent (in physics), it implies a relationship between motion and non-discernible internal change.

This is why we can, from the equation for *kinetic* energy (this corresponds to the power associated with change in motion), derive equations of motion. And from the equation for work we can derive the equation for kinetic energy. So *work* can be seen as describing the resulting physical change when the system is acted upon by the power associated with change (the “power residing in a moving (changing) object”) from another system. Or in other words, when that “power” actually *does* something (like make something move). The subject of “power” in physics will be covered later in this section.

We generally treat the conservation of energy as this inviolable rule in physics, stating energy cannot be created or destroyed. Remember, however, that according to general relativity and study of the universe at cosmic scales, the universe is not invariant over time. It’s actually expanding with time. Therefore we do not expect energy to be conserved at these scales as was discussed in previous sections. In addition, there isn’t even a clear definition of “energy” at these scales. An example is the Big Bang and the inflationary epoch which were characterized by the addition or creation of massive amounts of energy. This energy did not come from within the universe and we can say nothing about it having come from outside the universe, so we can just say it was “created”.

Gottfried Leibniz (1646-1716)

The modern concept of “energy” emerged out of the idea of *vis viva* or the “living force”, of Gottfried Leibniz.

Leibniz was an important personality in the history of philosophy and science. Indeed, he was one of the most influential individuals in Europe’s recent history.

Westerners generally consider him to have been a brilliant polymath, independently applying his genius to many fields. If one studies his life and works, however, one realizes that he was more human than they treat him. He formulated his own conception of metaphysics and this formed the bedrock of his view of the world. This view of the world is behind every notable idea he made in mathematics, the sciences (physics especially) and philosophy. So we shall discuss, briefly, his metaphysics and then his achievements, including his notion of *vis viva*.

Due to the convoluted and esoteric nature of his writings, it has been quite difficult for people to discern exactly what his metaphysical and theological views were. On top of that they seemed to have varied over the course of his writings.

Some assume he was a pantheist, in spite of the fact that he *rejected* the pantheism of Spinoza who was considered the standard bearer for modern European pantheism.

From Leibniz’s first introduction to Spinoza’s ideas about God (Nadler

1999, 301) he was sharply opposed to them and even considered them dangerous. Indeed, even after he had just met with Spinoza he thought that his pantheistic metaphysics was strange, full of paradoxes and based on faulty demonstrations (Nadler 1999, 341). Spinozism does not seem to have appealed to Leibniz in the least.²⁰³

Without a doubt, though, he was a kind of panentheist. The confusion over his panentheism versus pantheism probably arises from how it appears that his idea of God seems to be lifted from a pantheistic viewpoint. Indeed his entire metaphysics seems like it started off with taking the views of Spinoza and Descartes, deconstructing them, and re-assembling them to fit his own thoughts.

As a philosopher, Spinoza was a radical simplifier: there was ultimately just one stuff of reality (perceived by humans in different ways); it proceeded by immutable laws; and the totality of it was identical with God. Leibniz worked in the opposite direction, constructing a highly complex scheme of the world in which realities were multiplied to infinity. And his aim was the precise opposite of Spinoza's: he wanted to preserve the idea of a God who transcended the world and had made an active choice when He created it.²⁰⁴

Having been born to a Jewish family and having remained a monotheist it's obvious that his idea of God is the same which Muslims call Allah. If there are flaws or confusions in his work, and there undoubtedly appear to be many, it's not inconceivable that they're at least partly due to the dearth of theological ideas in Europe suitable for formulating a panentheistic worldview (we discussed already some of the strange character of European occasionalism). He didn't have too many options to choose from.

For one thing, he talked about God in terms of "substance", following Descartes' lead. He had to define a special type of substance that he could use for God. Where Descartes said that God was pretty much the only "real" or "effective" substance (in that He exists independently), foreshadowing the idealistic character of later European occasionalism (like Berkeley's) and Spinoza's pantheism, Leibniz sets out to distinguish between "radical substance" (God's) and created things.

For the Muslim reader, the big difference comes with his notion of causality which was not quite at the level of occasionalism. Though indirectly it could have been seen as pseudo-occasionalist. He defined a cause as the aggregate of all requisites of a thing (a requisite for him is that without which a thing cannot exist). This is quite an ineffective notion of causality as it's almost begging the question, especially when he speaks of this as an effective cause of existence. All things wind up being intricately linked to each other and to God, and God winds up containing "the aggregate of all

²⁰³ Okrent, Nicholas E., *Leibniz on Substance and God in "That a Most Perfect Being is Possible"*, Philosophy and Theology, Vol. 12, Issue 1, 2000

²⁰⁴ <http://www.telegraph.co.uk/culture/3649452/...0870-428-4115.html>

requisites of all things". It's perhaps language and terminology like this, particularly strange for the reader used to the rigorous language of Islamic theology, which caused confusion among commentators as to his having believed in pantheism. So, further complicating matters, he takes the reasoning to its logical conclusion and takes on a more occasionalist tone regarding causality in other places,

In Leibniz's metaphysics there are layers of more or less ontologically basic things. Modes are ontologically dependent on the things of which they are modifications, and everything is ontologically dependent on God. Because God contains the requisites of all finite things, all finite things are causally dependent on God. Furthermore, because something can be understood only if its requisites are understood, everything is conceptually dependent on God. Finite things, being causally, conceptually and ontologically dependent on God, are not radical substances.²⁰⁵

Since he conflated the essence of a thing with its cause he began to say, in effect, that God was the essence of all things. Which he then tried to reconcile with his views by saying that all things were various modes (modified manifestations) of God's attributes. This is logically pantheist language but Leibniz clearly did not intend it to convey pantheism as he affirmed the ontological externality (in the context of real existence) of things elsewhere in his writings.

Other departures from Islamic theology include the idea that goodness was independent of God and that God was almost compelled to create the best possible world (applying the medieval precursor of the anthropic principle to the problem of theodicy). Though he does not use the language "compelled", it is the natural conclusion of such a view from an Islamic perspective, so it reflects on his work and not his beliefs insofar as they probably didn't entirely match up since he continuously struggled to capture, in words, their evolving form.

He denies the Cartesian dualist notion of matter as simple illusory extension of a conscious spiritual world. It has to be more than that.

From *The History of Philosophy* by Alfred Weber,²⁰⁶

...It must unhesitatingly affirm that there is nothing inextended in the material world, and nothing unconscious in the spiritual world. But that would be to fly in the face of facts, and to assert an absurdity. No; extension, as the Cartesians conceive it, cannot of itself explain sensible phenomena. It is synonymous with passivity, inertia, and death, while everything in nature is action, movement, and life.

²⁰⁵ *Ibid.*

²⁰⁶ All following uncited excerpts in this section are from this work.

And, indeed, does not the state of extension, which constitutes the nature of body, presuppose an *effort* or force that extends itself, a power both of resistance and expansion? Matter is essentially resistance, and resistance means activity. Behind the (extended) state there is the act which constantly produces it, renews it (extension). A large body moves with more difficulty than a small body; this is because the larger body has greater power of resistance. What seems to be inertia, or a lack of power is in reality more intense action, a more considerable effort. Hence, the essence of corporeality is not extension, but the force of extension, or active force.

Cartesian physics deals with inert masses and lifeless bodies only, and is therefore identical with mechanics and geometry; but nature can be explained only by a metaphysical notion that is higher than a purely mathematical and mechanical notion; and even the principles of mechanics, that is, the first laws of motion, have a higher origin than that of pure mathematics. This higher notion is the idea of FORCE. It is this power of resistance that constitutes the essence of matter. As to extension, it is nothing but an abstraction; it presupposes something that is *extended, expanded, and continued*. Extension is the diffusion of this "something." Milk, for example, is an extension or diffusion of whiteness; the diamond, an extension or diffusion of hardness; body in general, the extension of materiality. Hence, it is plain that there is something in the body anterior to extension (the force of extension). True metaphysics does not recognize the useless and inactive masses of which the Cartesians speak. *There is action everywhere. No body without movement, no substance without effort.*

The remarkable compatibility or intuitiveness of these ideas with both the atomism of Imam Ash'ari and especially the metaphysics of Imam Maturidi (to be discussed in a later section) is not lost on us.

Leibniz goes on to emphasize "force" in the manner the other philosophers (like Spinoza) spoke of "substance", more similar to Imam Maturidi's emphasis of *natures* or *elements* (a particular class of fundamental constitutive accidents) than Imam Ash'ari's *jawhar*.

The manner in which he uses this idea against Cartesian dualism is reminiscent of Imam Maturidi's debates against the Manichean dualists of his time. He also uses this idea against the idea of pantheism,

But here their paths diverge. Spinoza's "substance" is infinite and unique; Leibniz's "force" is neither one nor the other. If there were but one single substance in the world, this one substance would also be the only force; it alone would be able to act by itself, and everything else would be inert, powerless, passive, or rather, would not exist at all. Now, the reverse is

actually true. We find that minds act by themselves, with the consciousness of their individual responsibility; we likewise find that every body resists all other bodies, and consequently constitutes a separate force. Shall we say, in favor of Spinozism, that the indwelling forces of things are so many parts of the one force? But that cannot be, since force is essentially indivisible. By denying the infinite diversity of individual forces, the abstract monism of Spinoza *reverses the very nature of things, and becomes a pernicious doctrine*. Where there is action there is active force; now there is action in all things; each constitutes a separate center of activity; hence there are as many simple, indivisible, and original forces as there are things.

What he basically does is construct an atomized metaphysics to anchor his worldview. He calls these “monads”. It sounds, superficially at least, kind of like the combining of Ash’arite atomism with Maturidi “natures”.

These original forces or *monads* may be compared to physical points or to mathematical points; but they differ from the former in that they have no extension, and from the latter, in that they are objective realities. Leibniz calls them *metaphysical points or points of substance* (they are both exact, like mathematical points, and real, like physical points), *formal points, formal atoms, substantial forms* (in scholastic language), to indicate that each constitutes an individual, independent of all the other monads, acting of itself and depending only on itself in form, character, and entire mode of life.

Here’s an excerpt from Leibniz himself,

1. My topic here will be the monad, which is just a simple substance. By calling it ‘simple’ I mean that it has no parts, though it can be a part of something composite.
2. There must be simple substances, because there are composites. A composite thing is just a collection of simple ones that happen to have come together.
3. Something that has no parts can’t be extended, can’t have a shape, and can’t be split up. So monads are the true atoms of Nature—the elements out of which everything is made.
4. We don’t have to fear that a monad might fall to pieces; there is no conceivable way it could go out of existence naturally.
5. For the same reason, there is no way for a simple substance to come into existence naturally, for that would involve its being put together, assembled, composed, and a simple substance couldn’t be formed in that way because it

has no parts.

6. So we can say that the only way for monads to begin or end—to come into existence or go out of existence—is instantaneously, being created or annihilated all at once. Composite things, in contrast with that, can begin or end gradually, through the assembling or scattering of their parts.

7. It doesn't make sense to suppose that a monad might be altered or re-arranged internally by any other created thing. Within a monad there's nothing to re-arrange, and there is no conceivable internal motion in it that could be started, steered, sped up, or slowed down, as can happen in a composite thing that has parts that can change in relation to one another. monads have no windows through which anything could come in or go out! And anyway, quite apart from the imperviousness of monads to them, these supposed migrating accidents are philosophical rubbish: accidents can't detach themselves and stroll about outside of substances! . . . So neither substance nor accident can come into a monad from outside.

[...]

10. I take it for granted that every created thing can change, and thus that created monads can change. I hold in fact that every monad changes continually.

His seventh point (“monads have no windows...”) is actually used to attack a specific notion of natural causality advanced by some philosophers where substances can send accidents to one another. I cannot paste his entire work of course, so that should be enough to indicate how similar this is to Islamic atomism, but distinctly different. His monad can be seen fundamentally as a combination of a substance (*jawhar*) and its essential accidents (natures composed of *'aradh*).

Of course the language of his monadology soon departs from the more naturalistic tone of Islamic metaphysics. He says things like,

[Monads are] "like a separate world, self-sufficient, independent of every other creature, embracing the infinite, expressing the universe."

His next problem becomes how to paint a coherent picture of reality with these fundamental substances that can in no way influence one another. How do they coordinate behavior? Whereas the Islamic theologian can give the simplest answer and say God creates them in an order, this is more of a logical answer than a metaphysical one. We don't know exactly how God creates.²⁰⁷ God constructs the physical world

²⁰⁷ And this acts as a limit on Islamic theological speculation, giving it a more succinct and naturalistic tone than Leibniz' complete philosophy and metaphysics of monadology.

not just with the apparent order that we can perceive in it, but also according to even a metaphysical order.²⁰⁸ So we cannot say *for certain* whether God just creates the substances in a physical order without any further metaphysical order at play. But we generally do say that for the sake of brevity.

This can be identified as the “truth” at the heart of criticism of Islamic theology for abandoning “theological speculation”. What is really meant by those who level such claims is that Muslims abandoned metaphysical speculation which could then be directly applied to physics. That is ignorant of the fact that these metaphysical models were not made with physical predictions in mind. These were made by theologians who knew the capacity to investigate atomic phenomena would be ever beyond them, potentially impossible ; they could not have foreseen the extent to which technological advances increased our ability to make observations. They were made as internally logically consistent metaphysical models which would explain all known empirical phenomena in an Islamic theological worldview. And that was done to defend Islamic theology from philosophical attacks from all corners. The resulting model, based on the orthodox theology of Islam, was highly effective²⁰⁹ and in fact it just so happened that science progressed far along enough to make these views seem remarkable prescient.

Nonetheless these views deeply influenced every orthodox scholar who studied them, including those who worked in “natural philosophy” (science). For instance, Ibn al-Haytham’s work in optics was highly reflective of metaphysical atomism. Other philosophers and scientists made real world predictions about cosmology based on the orthodox theology/metaphysics in their challenges to prevailing models (including the very idea that outer space between planets was traversable).

In fact, sometimes theologians took issue with some of their fellow orthodox Muslims who made such speculations.²¹⁰ Not on any theological principle, however, but based on a philosophical idea closely rooted in the heart of Islamic epistemology. They disliked inherently unfalsifiable metaphysical statements which they saw as serving no worthwhile purpose (and hence as a waste of time). To this was added statements that could not conceivably be verified in the near future. Recall the quotes from Islamic theologians and philosophers about the celestial spheres Ptolemaic model and the

²⁰⁸ Such that angels even play a role as mentioned at the conclusion of the “Cosmology in the Qur’an” section, though we can detect no trace of them in the math or observations.

²⁰⁹ In that it trounced pretty much every competing metaphysics it ever encountered in the philosophical arena. Neoplatonism, dualism, pantheism, materialism, even other panentheist ideologies.

²¹⁰ Though it’s telling that the people making such statements were often the most highly regarded theologians of their time, like Fakhr al-Din al-Razi, so it’s not reflective of the attitude of the majority of the theologians. Some theologians leaned towards more basic philosophy (such as that involving logic and epistemology) while others towards “natural philosophy” (scientific pursuits). These can (and many would argue, should) naturally conflict at times. As they do even today.

heliocentric model. The idea among those theologians and philosophers who *did* sometimes criticize metaphysical speculation (in the natural sciences) wasn't that speculation should be abandoned but that effort should be focused on areas within the realm of empirical observability and on expanding the borders of that through the refinement of existing and development of new instrumentation and techniques.²¹¹ Hence cosmology (apart from mathematical astronomy which predicted observable events) was seen as a waste of time, and even Hawking commented on its reputation not changing much until the last century.

Beyond those few cases, the abandonment of metaphysics in general was not due to any theological principle or any particular theologian (like Imam al-Ghazali). So long as metaphysical speculation is demarcated as philosophy, and not theology, there is no "threat" to theology. This is, when done with a focus on physics, an inherently philosophical speculation, not a theological one. Few theologians would have had a problem with this (though most of the "orthodoxy" which bothered scientists were likely not theologians) since ideally those speculations made predictions about experience which could eventually be verified or refuted. The issue was *theological* speculation in metaphysics whereby one challenged the basic idea that God created things in the order of cause and effect. As long as this principle went unchallenged, *philosophical* speculation about how exactly this occurred (which is, in essence, what Imam Maturidi did) fell outside the domain of theology, but still within metaphysics (one could say the other side of the border between theological metaphysics and philosophical metaphysics). The cause of abandoning the "positive" kind of speculation that was beneficial to the natural sciences was not due to abandoning theological speculation, or even philosophy, but the abandonment of natural philosophy itself.²¹² Muslims *did* lose their passion for science. They in fact lost it at the same time they lost their passion for theology. This is a subject for a later chapter, however.

Returning to the subject at hand, in answering this Leibniz ironically returns to yet more parallels with Islamic theology. He believes in a "pre-established harmony" which is reflected within each monad (or as I would put it, "encoded" or "programmed" into it). Each monad has a "will"²¹³ or rather, a "perception". There are many degrees of perception and our rational thought as humans is but one example, the highest example. Each monad is like a soul and is limited to a subjective experience of the world (as we are).

²¹¹ It is unfortunate that the theologians with focuses on more traditional philosophy who made such good points weren't themselves natural philosophers. Imam al-Ghazali who described the importance of the study of science but was not a scientist himself and could not motivate people enough in that regard. Some of the fault for this also lies on the scientists who ignored philosophy.

²¹² Referring to the sciences established in mathematics and empiricism, which Imam al-Ghazali endorsed as a necessity for human progress as mentioned earlier.

²¹³ *c.f.* the verse of the Qur'an which depicts creation as Allah ordering the heavens and earth to come into being willingly or unwillingly.

The perceptions of the monad do not, it is true, extend beyond itself. Having no "windows by which anything can enter or depart," it can only perceive itself. We ourselves, the higher monads, do not perceive anything except our own being, and that alone we know immediately. The real world is wholly inaccessible to us, and the so-called world is merely the involuntary projection of what takes place within ourselves. If, notwithstanding, we know what takes place outside of us, if we have an (indirect) perception of the external world, it is because we are like all monads, representatives of the universe, and because, consequently, that which takes place in us is the reproduction in miniature of that which takes place on the large scale in the macrocosm. Since the monad directly perceives itself alone and its own contents, it follows that the more adequate an image it is itself, the more complete will its perception of the universe be. The better a monad represents the universe, the better it represents itself. If the human soul has a clear and distinct idea of the world, it is because it is a more exact and more faithful image (idea) of the universe than the soul of the animal and the soul of the plant

This sounds little different than the Islamic narrative of all creation reflecting the Divine Attributes, even by their existence, with mankind charged with reflecting the "higher order" attributes (i.e. free will). Indeed, narrations from the hadith canon indicate Allah will (on the Day of Judgement) give voice to things which were inanimate in this world, so they can stand as witnesses.

All monads represent and perceive, or, in a word, reproduce the universe, but they reproduce it in different degrees, and each in its own way. In other terms, there is a gradation in the perfection of the monads. In the hierarchy thus formed, the most perfect monads rule, the less perfect ones obey. Accordingly, we must distinguish between physical individuals, such as nature offers, and the metaphysical individuals or monads composing them. A plant or an animal is not a monad and individual in the metaphysical sense, but a combination of monads, of which one rules and the others obey. The central monad is what is called the soul of the plant, animal, or man; the subordinate monads grouped around it form what we call body. "Each living being," as Leibniz expressly states, "has a ruling entelechy, which is the soul in the animal, but the members of this living body are full of other living beings, - plants, animals, - each of which has also its entelechy or governing soul." "Each monad," he also says, "is a mirror of the universe, from its point of view, and accompanied by a multitude of other monads composing its organic body of which it is the ruling monad."

However, by virtue of the autonomy of the monads, this dominating influence of the central monad is purely ideal; the latter does not really act upon the

governed monads. The obedience of the governed monads is, in turn, quite spontaneous. They do not subordinate themselves to the ruling monad because this forces them to do so, but because *their own nature counsels them to do it*.

This is obviously similar to Islamic morality/theology in general which was discussed in earlier sections (*fitrah, akhlaq*, etc; these ideas are applied to all things in the metaphysics of natures or *taba'i*). His monads' autonomy is actually quite a rigorous preservation of divine causality (and denial of natural causality) in that only God (even by Leibniz's metaphysics) creates substances, accidents, etc in the form of natures or dispositions acting as "essential properties" (real essences). Of course for brevity's sake most Muslims are concerned with saying no more than simply "Allah creates according to an order", irrespective of how that order is physically manifested. For Leibniz, God, through the pre-established harmony programmed into the essences of all things, acts as the conductor of all physical actions. Muslims would simply add that these "monads" and their internal forces could not be self-sustaining sources of their own change and existence. This is the weakest link of Leibniz's metaphysics, he says nothing about how something can continue existing without God's direct constant action.

Of course in Europe these ideas did not exist so simply. In Leibniz's world, occasionalism (the Cartesian kind) implied God intermittently intervening in affairs, perhaps to correct or repair. This is why he did not opt for occasionalism outright and in fact tried to formulate this meticulous atomism to accomplish the same thing. The idea that God must be the "force" behind the the force of each monad, constantly creating, sustaining, and changing it is implied in his writings but he seems to feel that by saying it outright is to go too close to Descartes or Spinoza.

His view of Cartesian occasionalism was like the following,

The theory of pre-established harmony differs from the occasionalistic system in an important point. The latter assumes a special divine intervention every time the soul and the physical organism are to agree. God regulates the soul by the body or the body by the volitions of the soul, as a watchmaker constantly regulates one clock by the other. According to Leibniz, the harmony between the movements of the body and the states of the soul is the effect of the Creator's perfect work, as the perpetual agreement between two well-constructed watches results from the skill of the mechanic who has constructed them. Those who assume that the Creator constantly intervenes in his work, regard God as an unskillful watchmaker, who cannot make a perfect machine, but must continually repair what he has made.

Leibniz somehow associates occasionalism with Newton's theology which just makes apparent Europe's complete misunderstanding of authentic monotheistic occasionalism. What is described above is Cartesian occasionalism which, to Islamic

theology. might as well not be occaisionalism at all. Newton was a deist, which is as far opposed to occaisionalism as monotheism can possibly get. Even that entire paragraph is patent nonsense to anyone who's read the Qur'an. Occaisionalism isn't about a special "intervention" because to use the word intervention presupposes an *independently existing* construct which is not possible in either Islamic metaphysics or even Leibniz's. All constitutive substances and accidents are ever dependent, *contingent*, on God for their existence at every moment. Leibniz' metaphysics are more (effectively or functionally) occaionalist than the European philosophers who actually claimed to be occaionalist! Of course, Leibniz's *theology* is *not* occaionalism because he clearly did not intend for it to be. It is panentheism which wound up appearing much like Islamic occaionalism (but not completely) in spite of Leibniz's own intentions. A common theme in Leibniz's work is how it apparently gets out of his own control and this would be another example of that.

The European issue there seems to be that they think saying ("*la hawla wa la quwwata illah billah*") is to imply imperfection in the creation. This is because they have a self-centric viewpoint since they are deriving all these things from philosophy and not scripture. But in Islam it is meant to focus instead on the perfection of the Creator (we derive it straight from His message in the Qur'an) which necessitates that the creation itself cannot be *absolutely* perfect because absolute perfection is reserved for God. So the creation can be relatively perfect when judged by God's design. With regards to the actual act of creating, it is indeed the perfect "work" of God. Leibniz thought to avoid this issue by transferring the burden of perfection to God's work (keeping in line with perhaps his idea of forces if we keep in mind the intuitive relationship between the idea of work and force) and design rather than God's creation. By avoiding mention of God's creation as distinct from God's creating (the latter corresponding to His "work"), he managed to "get by" by passing off his ideas about God's work (creating) as addressing European issues with God's creation. Even though the Islamic conception shows that the perfection of God's work or design should follow necessarily from simply affirming the perfection of God and that creating is, in fact, distinct from creation but also distinct (to a lesser degree obviously) from His essence as *necessarily existent* or you can say the essential divine attribute of existence (due to the Islamic conception of the Divine Attributes). These principles of Islamic theology are necessary for upholding a truly realist monotheistic worldview that is internally logically consistent. The issue for the Muslim here is that Leibniz's ideas here about God's "work" are pure theological metaphysical speculation which we, as just discussed, tend to avoid. It's not as if they would be terribly relevant for his physics or math anyway, as he even neglected some other areas of metaphysics mentioned earlier without impact on his other work. When he theorizes about the actual form God's work takes, that is more akin to philosophical speculation which Muslim theologians engaged in only insofar as they needed and which was more suited for Muslim scientists since, while it was metaphysics, it was more headed towards philosophy and natural philosophy rather than theology (which is in the opposite direction). In other words it was metaphysics focused on addressing physics, not metaphysics focused on addressing theology (the latter of which is controversial in

Islam when done without need whereas the former ought to ideally eventually make falsifiable physical predictions²¹⁴). It's like the idea of trying to explicitly define God's "Customary Way" (*jary al-ada*) which could take the form of substances composed of accidents composed of substances and so on and so forth which is needless speculation from theology's point of view and only worthwhile when used in natural philosophy (physics) because there you're anchoring your speculations in empirical and mathematical truths.

Non-Muslim readers should take note of the fact that the "mind-body" or "soul-body" problem of Cartesian and post-Cartesian European occasionalism is non-existent in Islamic theology. Humans have metaphysical souls and acquire actions by willful intent, but actions are, of course, created by God in the normal manner of God's creating. Good actions are created by His pleasure, and evil ones by His displeasure. Actions of free willed individuals cannot be anything *but* created by God in any panentheistic theology, including Cartesian occasionalism and Leibniz's metaphysics. Leibniz's particular idea of the nature or essence of "body" as extension implies an active continuously renewing state dependent on a "force". The only thing separating his metaphysics here from the Islamic idea is that he has conflated substance and accident and in so doing, seemingly absolves himself of having to explicitly acknowledge that a "true" substance (not a monad for us, but for him it would be his monad or substance as distinct from "radical substance") would require continuous creation and annihilation (lest time stand still). He shifts this burden of continuous change to the monads and their internal forces.²¹⁵ Perhaps his goal all along was his idea of "force", but the idea of force does not require independence from God whatsoever. This is the typical European/Western inability of the time to understand how reality can exist and yet be dependent on God at the same time, stemming from a fear of redundancy, loss of meaning (such as encountered in Berkeley's idealistic spin on occasionalism) and confused ideas about "perfection" as it applied to God and creation. This is the problem with trying to go the occasionalist route without the Qur'an, without faith in a personal/relatable God, and without the rest of Islamic metaphysics (the soul or *Ruh*).

I have discussed mostly the similarities, but not all. And undoubtedly there are many differences. Leibniz's metaphysics go off in their own convoluted direction.

Let's get back to the initial subject of discussion. What sort of contributions did Leibniz make to science and math based on this worldview? There are actually too many to go into, so I recommend taking a look over [his bio on Wikipedia](#). We'll only concern

²¹⁴ The purpose of Islamic metaphysics in its age wasn't to make physical predictions but to form an internally logically consistent metaphysical model which, beyond explaining known and observable empirical phenomena of the time, justified Islamic theology in debates and defended it from foreign ideologies and philosophies, pointing out the absurdities and inconsistencies in the latter. It was highly effective in this regard.

²¹⁵ Making his idea of God "weaker" than the Islamic idea, although notably more powerful than some of his European contemporaries.

ourselves with a couple.

Calculus,

“...as a mathematician he discovered the differential calculus (independently of Isaac Newton), where finding the area of an object is done by dividing it up into an infinite number of 'slices' and then adding them together, an idea which is reflected in his concept of a universe made up of infinitesimal 'Monads'.”²¹⁶

In physics,

Leibniz contributed a fair amount to the statics and dynamics emerging about him, often disagreeing with Descartes and Newton. He devised a new theory of motion (dynamics) based on kinetic energy and potential energy, which posited space as relative, whereas Newton was thoroughly convinced that space was absolute. [...] Until the discovery of subatomic particles and the quantum mechanics governing them, many of Leibniz's speculative ideas about aspects of nature not reducible to statics and dynamics made little sense. For instance, he anticipated Albert Einstein by arguing, against Newton, that space, time and motion are relative, not absolute.²¹⁷

And specifically, his notion of the *vis viva* or “living force”,

Leibniz's *vis viva* (Latin for *living force*) is mv^2 , twice the modern kinetic energy. He realized that the total energy would be conserved in certain mechanical systems, so he considered it an innate motive characteristic of matter. Here too his thinking gave rise to another regrettable nationalistic dispute. His *vis viva* was seen as rivaling the conservation of momentum championed by Newton in England and by Descartes in France; hence academics in those countries tended to neglect Leibniz's idea. In reality, both energy and momentum are conserved, so the two approaches are equally valid.²¹⁸

From the Wikipedia article on energy,

The concept of energy emerged out of the idea of *vis viva* (living force), which Gottfried Leibniz defined as the product of the mass of an object and its velocity squared; he believed that total *vis viva* was conserved. To account for slowing due to friction, Leibniz theorized that thermal energy consisted

²¹⁶ <http://www.btinternet.com/~glynhughes/squashed/leibniz.htm>

²¹⁷ http://en.wikipedia.org/wiki/Gottfried_Leibniz - Retrieved 04/28/12

²¹⁸ *Ibid.*

of the random motion of the constituent parts of matter, a view shared by Isaac Newton, although it would be more than a century until this was generally accepted. In 1807, Thomas Young was possibly the first to use the term "energy" instead of *vis viva*, in its modern sense.

There's also a Wikipedia page further detailing his idea of [vis viva](#),

Proposed by Gottfried Leibniz over the period 1676–1689, the theory was controversial as it seemed to oppose the theory of conservation of momentum advocated by Sir Isaac Newton and René Descartes. The two theories are now understood to be complementary.

The theory was eventually absorbed into the modern theory of energy though the term still survives in the context of celestial mechanics through the *vis viva* equation.

...it was [...] Gottfried Wilhelm Leibniz during 1676–1689 who first attempted a mathematical formulation. Leibniz noticed that in many mechanical systems (of several masses, m_i each with velocity v_i) the quantity mv^2 was conserved. He called this quantity the *vis viva* or *living force* of the system. The principle, it is now realised, represents an accurate statement of the conservation of kinetic energy in elastic collisions, and is a consequence of the conservation of momentum. However, many physicists at the time were unaware of this connection and, instead, were influenced by the prestige of Sir Isaac Newton in England and of René Descartes in France, both of whom had set great store by the conservation of momentum as a guiding principle. Thus the momentum mv was held by the rival camp to be the conserved *vis viva*. It was largely engineers [...] who objected that conservation of momentum alone was not adequate for practical calculation and who made use of Leibniz's principle. The principle was also championed by some chemists...

The French mathematician Émilie du Châtelet, who had a sound grasp of Newtonian mechanics, developed Leibniz' concept and, combining it with the observations of Willem 's Gravesande, showed that *vis viva* was dependent on the square of the velocities.

Members of the academic establishment such as John Playfair were quick to point out that kinetic energy is clearly not conserved. This is obvious to a modern analysis based on the second law of thermodynamics but in the 18th and 19th centuries, the fate of the lost energy was still unknown. Gradually it came to be suspected that the heat inevitably generated by motion was another form of *vis viva*. [...] *Vis viva* now started to be known as energy, after the term was first used in that sense by Thomas Young in 1807.

Before we continue, let's briefly distinguish between kinetic and potential energy. Potential energy is considered *the capacity to do work* and is measured by the position of a body or the arrangement of the particles of the system.²¹⁹ Kinetic energy is the energy an object possesses due to actualized motion. Leibniz's idea encompasses both (energy in general) but his measurement was of kinetic energy.

Since our goal here is to understand the concept of energy in the context of Islamic theology and metaphysics, Leibniz's idea of a "living force" can be quite useful.

I traditionally identified energy simply with the "creative action" of God. We can also describe it, along the above lines, as the "creative force" of God, or from the perspective of the created things, the "existing force" or "force of existence".²²⁰ "Living" force seems a bit of a misnomer for modern contexts and in fact any use of the term "force" would as well.²²¹ For reasons I'll make clear in the next section on entropy, I also identified this as the "ordered creative act of God", but since one of the results of that "order" is the conservation of energy, a better fit would be "the conserved (relatively unchanging) creative action of God that enacts change". The "unchanging change" in a system. On the other hand, we can use the idea of "work"²²² to be more specific and define energy as the "work" of God, automatically implying that conservation of energy means a conservation of "God's work" which here is synonymous with "creating" and "creative action", but a bit more succinct. The conservation of energy would therefore mean simply that the "creating" done by God, measured by the *amount of change*, in a closed physical system tends to remain conserved according to His *Customary Way*. "Amount of change" is used to mean, really, "*amount of creation*" **since change in Islam is metaphysically synonymous with creation (God is unchanging, creation is by nature change)**.²²³ In some contexts "change" is the more intuitive choice (for instance where there is a history of the thing's previous existence). Here the word "work" also seems more intuitive for the layperson because "amount of creation" can invoke thoughts about matter whereas energy need not be in the form of matter (referring to that which occupies space and has mass). So there could be such a thing as an immaterial manifestation of God's work or creative action (massless particles, which occupy space, like photons (light)).

When applied to the cosmos, God's work or creating (as measured by the amount of creation) could be said to not have been "conserved" in that He created *ex nihilo* (from nothing) where there was previously non-existence in the order (the *change* was from

²¹⁹ http://en.wikipedia.org/wiki/Potential_energy - Retrieved 05/01/12

²²⁰ Leibniz's idea of monads, forces, and corporeality could be seen as foreshadowing, conceptually, Einstein's special relativity and mass-energy equivalence.

²²¹ Since force has a specific definition in physics as the mass times the acceleration.

²²² Which, although it has a correlating term in physics with an exact definition, is much more suitable to non-physics use in the prevailing culture than the term "force".

²²³ One could use "renewal" here instead of change since in every instant of time even the thing which is not changed must be renewed.

no history of a universe existing to the universe existing, so “the amount of change” itself changed). Even though God creates essentially *ex nihilo* at every moment of creation, there was a previous existence or moment in the order of events (history) when we speak of the creating going on at this very moment in our lives (where the term “change” makes sense). So the “conservation” speaks to the order inherent in creation. We can expand on this idea of energy as the “order in God’s creating measured by the conserved amount of change or creation” in the next section.

Entropy

Heat is one of the most important forms of energy. It is transferred from one system to another via thermal interaction.

Heat is defined as energy transferred to the system by thermal interactions. Heat flows spontaneously from systems of higher temperature to systems of lower temperature. When two systems come into thermal contact, they exchange thermal energy due to the microscopic interactions of their particles. When the systems are at different temperatures, the net flow of thermal energy is not zero and is directed from the hotter region to the cooler region, until their temperatures are equal and the net flow of energy is zero. Spontaneous heat transfer is an irreversible process, which leads to the systems coming closer to mutual thermodynamic equilibrium.

The first law of thermodynamics requires that the energy of an isolated system is conserved. To change the energy of a system, energy must be transferred to or from the system. For a closed system, heat and work are the mechanisms by which energy can be transferred. For an open system, total energy can be changed also by transfer of matter. Work performed on a system is, by definition, an energy transfer to the system that is due to a change to external or mechanical parameters of the system, such as the volume, magnetization, center of mass in a gravitational field.

In a thermodynamic sense, heat is never regarded as being stored within a system. Like work, it exists only as energy in transit from one system to another or between a system and its surroundings. When energy in the form of heat is added to a system, it is stored as kinetic and potential energy of the atoms and molecules in the system.²²⁴

Heat is thus distinguished from work as two kinds of energy transfer between systems. Of course we can study them together in one system and how they affect each other. Thermodynamics is the branch of physical science concerned with heat and its relation

²²⁴ <http://en.wikipedia.org/wiki/Heat> - Retrieved 04/30/12

to other forms of energy and work.

It defines macroscopic variables (such as temperature, entropy, and pressure) that describe average properties of material bodies and radiation, and explains how they are related and by what laws they change with time.²²⁵

The word “macroscopic” is important as it doesn’t usually go into the microscopic atomic structure of the systems. For instance we can talk about the temperature, entropy, and pressure of the universe at the Big Bang and how it evolved afterwards without needing to really invoke any other talk about forces, fields, particles, etc. Of course all branches of physics eventually relate to one another.

The subject is a considerably extensive one, too large to go into here. So if you are not already familiar with the basic concepts, I recommend reading through the Wikipedia pages at the very least. I found a very good and easily readable article on the origin and basic idea behind thermodynamics at PhysLink.com which can be found here,

<http://www.physlink.com/education/askexperts/ae280.cfm>

Entropy is one of the “macroscopic” variables mentioned earlier. It is defined as,

Entropy is a thermodynamic property that can be used to determine the energy not available for work in a thermodynamic process...

[...]

There are two related definitions of entropy: the thermodynamic definition and the statistical mechanics definition.

[...]

The thermodynamic definition was developed in the early 1850s by Rudolf Clausius and essentially describes how to measure the entropy of an isolated system in thermodynamic equilibrium. Importantly, it makes no reference to the microscopic nature of matter. The statistical definition was developed by Ludwig Boltzmann in the 1870s by analyzing the statistical behavior of the microscopic components of the system. Boltzmann showed that this definition of entropy was equivalent to the thermodynamic entropy to within a constant number which has since been known as Boltzmann's constant. In summary, the thermodynamic definition of entropy provides the experimental definition of entropy, while the statistical definition of entropy extends the concept, providing an explanation and a deeper understanding of its nature.

²²⁵ <http://en.wikipedia.org/wiki/Thermodynamics> - Retrieved 04/30/12

[...]

In classical thermodynamics, the concept of entropy is defined phenomenologically by the second law of thermodynamics, which states that the entropy of an isolated system always increases or remains constant. Thus, entropy is also a measure of the tendency of a process, such as a chemical reaction, to be entropically favored, or to proceed in a particular direction. It determines that thermal energy always flows spontaneously from regions of higher temperature to regions of lower temperature, in the form of heat. These processes reduce the state of order of the initial systems, and therefore entropy is an expression of disorder or randomness.

This is the basis of the modern microscopic interpretation of entropy in statistical mechanics, where entropy is defined as the amount of additional information needed to specify the exact physical state of a system, given its thermodynamic specification.

[...]

The second law of thermodynamics states that in general the total entropy of any system will not decrease other than by increasing the entropy of some other system. Hence, in a system isolated from its environment, the entropy of that system will tend not to decrease. It follows that heat will not flow from a colder body to a hotter body without the application of work (the imposition of order) to the colder body.²²⁶

An important point to note is that work, in the physics sense of the word, is here associated with *an imposition of order*. This is not what we meant by work in the colloquial sense with regards to “God’s work in creating” since God can create in both ordered and disordered fashion.

Why would God create anything in disorder? Well disorder is inherently associated with complexity as well, despite what we may think. Without it, complexity would not be possible. Increasing the entropy of a system increases the possible states that the system can be in. The current predominant idea in physics is that the universe started off in a very low entropy state. Had the universe not increased in entropy, then complex structures like galaxy, stars, planets, and even physical lifeforms would not have been possible. In a very intuitive sense we can associate “more” with “more entropy”. Thus, God, being One, indivisible and eternal, is the ultimate example of order. The source of all order, in fact. When God creates other things, they are by virtue of their nature as creation in a state of disorder. Multiplicity, from one to many, is an example of a situation where increasing entropy or disorder in the system is necessary. Monotheism is considered a more “ordered” theology than polytheism, which is often associated with

²²⁶ <http://en.wikipedia.org/wiki/Entropy> - Retrieved 04/30/12

disorder or chaos (i.e, we imagine the pantheon of the Greeks or Romans constantly fighting each other).

So one “purpose” of entropy in a theological worldview is as a medium for multiple and varied creation. A medium for a newer and different level of order. For example, the order inherent in the cosmos today, all the laws of science, would not be possible without a more disordered universe than the one which existed at the Big Bang. Similarly increasing disorder allowed a greater number of possible configurations which were necessary for complex structures like galaxies, stars, and planets to form. So a new “level” of order was made possible. Even among humans, though we depend on the development of disorder in the universe for the conditions necessary for us to exist, amongst ourselves we prefer order and not disorder. In fact, God’s law for humans is all about obeying a divine order (by choice). Those who disobey bring disorder into the human social system which is seen as bad or immoral. This can be extended to any kind of human social order of any religion or lack thereof. If humans continued to increase in disorder we would die out and our physical constituents would be in a more disordered state in nature, allowing potentially other life to form from it.²²⁷

However, for entropy to decrease with any form of order, disorder must increase overall in spite of that. Thus for all of Earth’s complex life, the universe continues to head in a direction of constantly increasing entropy which is often associated with “the arrow of time”, which can be seen metaphorically as our time running out (like in an hourglass). Recall *Surah al-Asr* where Allah swears by Time (in the first verse) that mankind is in a (perpetual) state of loss (in the second verse) and then in the third verse says except those who upheld the divine law in the Qur’an, who contributed order with belief and good deeds, for such acts would not be lost or done in vain in that they are recorded among our deeds to be rewarded later.²²⁸

One example of how disorder must increase overall is how a refrigerator or air conditioner cools the temperature of an area which is inherently a form of decreasing entropy or increasing order. Except overall the disorder has increased because the machine releases heat as wasted energy (usually to the outside). So highly ordered things, whether biological or mechanical, tend to be extravagant spenders of energy, constantly dumping the spent energy to the external world and universe (like in the form of heat). Even our own bodies’ incredible complexity and order come at a cost, we are sources of waste or spent energy in the form of thermal and chemical/biological waste. The human body can be seen as an engine of sorts in that respect. It also allows us to do work, or to act in the physical world.

Some additional ways of stating the definition of entropy,²²⁹

²²⁷ Yes, the circle of life and all that.

²²⁸ Our deeds are all we can bring with us into the next life.

²²⁹ [http://en.wikipedia.org/wiki/Entropy_\(order_and_disorder\)](http://en.wikipedia.org/wiki/Entropy_(order_and_disorder)) - Retrieved 04/30/12

- A measure of the unavailability of a system's energy to do work; also a measure of disorder; the higher the entropy the greater the disorder.
- A measure of disorder; the higher the entropy the greater the disorder.
- In thermodynamics, a parameter representing the state of disorder of a system at the atomic, ionic, or molecular level; the greater the disorder the higher the entropy.
- A measure of disorder in the universe or of the availability of the energy in a system to do work.
- Entropy and disorder also have associations with equilibrium. Technically, entropy, from this perspective, is defined as a thermodynamic property which serves as a measure of how close a system is to equilibrium — that is, to perfect internal disorder. Likewise, the value of the entropy of a distribution of atoms and molecules in a thermodynamic system is a measure of the disorder in the arrangements of its particles. In a stretched out piece of rubber, for example, the arrangement of the molecules of its structure has an “ordered” distribution and has zero entropy, while the “disordered” kinky distribution of the atoms and molecules in the rubber in the non-stretched state has positive entropy. Similarly, in a gas, the order is perfect and the measure of entropy of the system has its lowest value when all the molecules are in one place, whereas when more points are occupied the gas is all the more disorderly and the measure of the entropy of the system has its largest value.

A frequently used example for illustrating the concept of entropy is how a vase will fall off a table and break but you will never see broken pieces spontaneously combine into a vase and land on a table. This also depicts the relationship between the arrow of entropy and the arrow of time.

Another example is phase change. A solid melting into a liquid is an example of increasing entropy. The process perhaps most associated with “increasing disorder” is burning.

A newer way of describing entropy for students is in terms of energy dispersal.

The description of entropy as energy dispersal provides an introductory method of teaching the thermodynamic concept of entropy. In physics and physical chemistry, entropy has commonly been defined as a scalar measure of the disorder of a thermodynamic system. This newer approach sets out a variant approach to entropy, namely as a measure of energy dispersal or distribution at a specific temperature. Under this approach, changes in entropy can be quantitatively related to the distribution or the spreading out of the energy of a thermodynamic system, divided by its temperature.

The energy dispersal approach to teaching entropy was developed to

facilitate teaching entropy to students beginning university chemistry and biology. This new approach also avoids ambiguous terms such as disorder and chaos, which have multiple everyday meanings.²³⁰

I recommend reading that entire page before continuing,

[http://en.wikipedia.org/wiki/Entropy_\(energy_dispersal\)](http://en.wikipedia.org/wiki/Entropy_(energy_dispersal))

This should clear up confusion over the association between “cold” and lower entropy since space is obviously quite cold and we wouldn’t describe it automatically as the lowest entropy state. So at the same temperature the greater entropy is in the state with the greater dispersion.

For further reading, I recommend browsing through the Wikipedia links in the footnotes.

Entropy in Information Theory

The concept of entropy is strongly related to information. From the basic entry on Wikipedia we find information mentioned in several places,²³¹

These processes reduce the state of order of the initial systems, and therefore entropy is an expression of disorder or randomness. This is the basis of the modern microscopic interpretation of entropy in statistical mechanics, where entropy is defined as the amount of additional information needed to specify the exact physical state of a system, given its thermodynamic specification.

[...]

The most general interpretation of entropy is as a measure of our uncertainty about a system. The equilibrium state of a system maximizes the entropy because we have lost all information about the initial conditions except for the conserved variables; maximizing the entropy maximizes our ignorance about the details of the system.

[...]

In information theory, entropy is the measure of the amount of information that is missing before reception and is sometimes referred to as Shannon entropy.

²³⁰ [http://en.wikipedia.org/wiki/Entropy_\(energy_dispersal\)](http://en.wikipedia.org/wiki/Entropy_(energy_dispersal)) - Retrieved 04/30/12

²³¹ <http://en.wikipedia.org/wiki/Entropy> - Retrieved 05/01/12

We can call the thermodynamics notion of entropy the “Boltzmann entropy”.

In information theory, entropy is a measure of the uncertainty associated with a random variable. In this context, the term usually refers to the Shannon entropy, which quantifies the expected value of the information contained in a message, usually in units such as bits.

Equivalently, the Shannon entropy is a measure of the average information content one is missing when one does not know the value of the random variable.

[...]

Entropy is a measure of disorder, or more precisely unpredictability. For example, a series of coin tosses with a fair coin has maximum entropy, since there is no way to predict what will come next. A string of coin tosses with a coin with two heads and no tails has zero entropy, since the coin will always come up heads. Most collections of data in the real world lie somewhere in between. It is important to realize the difference between the entropy of a set of possible outcomes, and the entropy of a particular outcome. A single toss of a fair coin has an entropy of one bit, but a particular result (e.g. "heads") has zero entropy, since it is entirely "predictable".

English text has fairly low entropy. In other words, it is fairly predictable. Even if we don't know exactly what is going to come next, we can be fairly certain that, for example, there will be many more e's than z's, or that the combination 'qu' will be much more common than any other combination with a 'q' in it and the combination 'th' will be more common than any of them. Uncompressed, English text has about one bit of entropy for each character

[...]

A single toss of a fair coin has an entropy of one bit. A series of two fair coin tosses has an entropy of two bits. The entropy rate for the coin is one bit per toss. However, if the coin is not fair, then the uncertainty is lower (if asked to bet on the next outcome, we would bet preferentially on the most frequent result), and thus the Shannon entropy is lower.

[...]

The inspiration for adopting the word entropy in information theory came from the close resemblance between Shannon's formula and very similar known

formulae from thermodynamics.²³²

Regarding the relationship between entropy in thermodynamics and information theory,

At an everyday practical level the links between information entropy and thermodynamic entropy are not evident. Physicists and chemists are apt to be more interested in changes in entropy as a system spontaneously evolves away from its initial conditions, in accordance with the second law of thermodynamics, rather than an unchanging probability distribution. And, as the minuteness of Boltzmann's constant k_B indicates, the changes in S / k_B for even tiny amounts of substances in chemical and physical processes represent amounts of entropy which are so large as to be off the scale compared to anything seen in data compression or signal processing. Furthermore, in classical thermodynamics the entropy is defined in terms of macroscopic measurements and makes no reference to any probability distribution, which is central to the definition of information entropy.

But, at a multidisciplinary level, connections *can* be made between thermodynamic and informational entropy, although it took many years in the development of the theories of statistical mechanics and information theory to make the relationship fully apparent. In fact, in the view of Jaynes (1957), thermodynamic entropy, as explained by statistical mechanics, should be seen as an *application* of Shannon's information theory: the thermodynamic entropy is interpreted as being proportional to the amount of further Shannon information needed to define the detailed microscopic state of the system, that remains uncommunicated by a description solely in terms of the macroscopic variables of classical thermodynamics, with the constant of proportionality being just the Boltzmann constant. For example, adding heat to a system increases its thermodynamic entropy because it increases the number of possible microscopic states for the system, thus making any complete state description longer.

Maxwell's demon can (hypothetically) reduce the thermodynamic entropy of a system by using information about the states of individual molecules; but, as Landauer (from 1961) and co-workers have shown, to function the demon himself must increase thermodynamic entropy in the process, by at least the amount of Shannon information he proposes to first acquire and store; and so the total thermodynamic entropy does not decrease (which resolves the paradox). Landauer's principle has implications on the amount of heat a computer must dissipate to process a given amount of information, though modern computers are nowhere near the efficiency limit.²³³

²³² [http://en.wikipedia.org/wiki/Entropy_\(information_theory\)](http://en.wikipedia.org/wiki/Entropy_(information_theory)) - Retrieved 05/01/12

²³³ *Ibid.*

Regarding the theoretical relationship between the two kinds of entropy,

...a connection can be made between the two. If the probabilities in question are the thermodynamic probabilities p_i , the (reduced) Gibbs entropy σ can then be seen as simply the amount of Shannon information needed to define the detailed microscopic state of the system, given its macroscopic description. Or, in the words of G. N. Lewis writing about chemical entropy in 1930, "Gain in entropy always means loss of information, and nothing more". To be more concrete, in the discrete case using base two logarithms, the reduced Gibbs entropy is equal to the minimum number of yes/no questions needed to be answered in order to fully specify the microstate, given that we know the macrostate.²³⁴

Maxwell's Demon

Maxwell's demon is a fascinating thought experiment showing the nature of the relationship between the two interpretations of entropy.

Maxwell's demon is a thought experiment created by the physicist James Clerk Maxwell to "show that the Second Law of Thermodynamics has only a statistical certainty". It demonstrates Maxwell's point by hypothetically describing how to violate the Second Law: a container is divided into two parts by an insulated wall, with a door that can be opened and closed by what came to be called "Maxwell's demon". The demon opens the door to allow only the "hot" molecules of gas to flow through to a favoured side of the chamber, causing that side to gradually heat up while the other side cools down, thus decreasing entropy.

[...]

In his letters and book, Maxwell described the agent opening the door between the chambers as a "finite being". William Thomson (Lord Kelvin) was the first to use the word "demon" for Maxwell's concept, in the journal *Nature* in 1874, and implied that he intended the mediating, rather than malevolent, connotation of the word.²³⁵

Before we go into the philosophical implications of this thought experiment, a brief overview,

The second law of thermodynamics ensures (through statistical probability) that two bodies of different temperature, when brought into contact with

²³⁴ http://en.wikipedia.org/wiki/Entropy_in_thermodynamics_and_information_theory

²³⁵ http://en.wikipedia.org/wiki/Maxwell%27s_demon - Retrieved 05/01/12

each other and isolated from the rest of the Universe, will evolve to a thermodynamic equilibrium in which both bodies have approximately the same temperature. The second law is also expressed as the assertion that in an isolated system, entropy never decreases.

Maxwell conceived a thought experiment as a way of furthering the understanding of the second law. His description of the experiment is as follows:

... if we conceive of a being whose faculties are so sharpened that he can follow every molecule in its course, such a being, whose attributes are as essentially finite as our own, would be able to do what is impossible to us. For we have seen that molecules in a vessel full of air at uniform temperature are moving with velocities by no means uniform, though the mean velocity of any great number of them, arbitrarily selected, is almost exactly uniform. Now let us suppose that such a vessel is divided into two portions, A and B, by a division in which there is a small hole, and that a being, who can see the individual molecules, opens and closes this hole, so as to allow only the swifter molecules to pass from A to B, and only the slower molecules to pass from B to A. He will thus, without expenditure of work, raise the temperature of B and lower that of A, in contradiction to the second law of thermodynamics....²³⁶

In other words, Maxwell imagines one container divided into two parts, A and B. Both parts are filled with the same gas at equal temperatures and placed next to each other. Observing the molecules on both sides, an imaginary demon guards a trapdoor between the two parts. When a faster-than-average molecule from A flies towards the trapdoor, the demon opens it, and the molecule will fly from A to B. Likewise, when a slower-than-average molecule from B flies towards the trapdoor, the demon will let it pass from B to A. The average speed of the molecules in B will have increased while in A they will have slowed down on average. Since average molecular speed corresponds to temperature, the temperature decreases in A and increases in B, contrary to the second law of thermodynamics.

Note that the demon must allow molecules to pass in both directions in order to produce only a temperature difference; one-way passage only of faster-than-average molecules from A to B will cause higher temperature and pressure to develop on the B side. In fact, because temperature and pressure are related, if A and B both contain the same numbers of molecule per unit volume, the one with the higher temperature will also have higher pressure;

²³⁶ Leff, Harvey S. & Andrew F. Rex, ed. (1990). *Maxwell's Demon: Entropy, Information, Computing*. Bristol: Adam-Hilger.

the demon must actually let more slow molecules pass from B to A than fast ones pass from A to B in order to make B hotter at the same pressure. Indeed, by regulating the number of molecules passed in each direction, the demon could achieve a pressure difference instead of a temperature difference, or any combination of temperature and pressure differences (possibly including lower pressure on the higher temperature side, depending on the variance in the speeds of the molecules).²³⁷

Those with theology in mind are going to think “well, if God is omniscient (All-Knowing), He could do it, but no one expects supernatural phenomena to be addressable”. The trouble is that Maxwell’s demon is a *finite* being and we’re considering a finite being who somehow manages to get all the information about the system. This would seemingly violate the second law of thermodynamics.

Some resolutions,

Several physicists have presented calculations that show that the second law of thermodynamics will not actually be violated, if a more complete analysis is made of the whole system including the demon. The essence of the physical argument is to show, by calculation, that any demon must "generate" more entropy segregating the molecules than it could ever eliminate by the method described. That is, it would take more energy to gauge the speed of the molecules and allow them to selectively pass through the opening between A and B than the amount of energy saved by the difference of temperature caused by this.

One of the most famous responses to this question was suggested in 1929 by Leó Szilárd, and later by Léon Brillouin. Szilárd pointed out that a real-life Maxwell's demon would need to have some means of measuring molecular speed, and that the act of acquiring information would require an expenditure of energy. Since the demon and the gas are interacting, we must consider the total entropy of the gas and the demon combined. The expenditure of energy by the demon will cause an increase in the entropy of the demon, which will be larger than the lowering of the entropy of the gas.

In 1960, Rolf Landauer raised an exception to this argument. He realized that some measuring processes need not increase thermodynamic entropy as long as they were thermodynamically reversible. He suggested these "reversible" measurements could be used to sort the molecules, violating the Second Law. However, due to the connection between thermodynamic entropy and information entropy, this also meant that the recorded measurement must not be erased. In other words, to determine whether to let a molecule through, the demon must acquire information about

²³⁷ http://en.wikipedia.org/wiki/Maxwell%27s_demon - Retrieved 05/01/12

the state of the molecule and either discard it or store it. Discarding it leads to immediate increase in entropy but the demon cannot store it indefinitely: In 1982, Bennett showed that, however well prepared, eventually the demon will run out of information storage space and must begin to erase the information it has previously gathered. Erasing information is a thermodynamically irreversible process that increases the entropy of a system. Although Bennett had reached the same conclusion as Szilard's 1929 paper, that a Maxwellian demon could not violate the second law because entropy would be created, he had reached it for different reasons.

John Earman and John Norton have argued that Szilárd and Landauer's explanations of Maxwell's demon begin by assuming that the second law of thermodynamics cannot be violated by the demon, and derive further properties of the demon from this assumption, including the necessity of consuming energy when erasing information, etc. It would therefore be circular to invoke these derived properties to defend the second law from the demonic argument. Bennett later acknowledged the validity of Earman and Norton's argument, while maintaining that Landauer's principle explains the mechanism by which real systems do not violate the second law of thermodynamics.

[...]

Regarding Landauer's principle, the minimum energy dissipated by deleting information was experimentally measured by Eric Lutz *et al.* in 2012. Although a demon could, in principle, observe the particle, save the result and act on it, deleting the result would necessarily dissipate heat and thus increase entropy. Without an infinite memory, the demon would eventually have to overwrite its previous results. Additionally, the deletion became more energy-efficient the slower it was, thus also requiring the demon to asymptotically approach zero processing speed.

Information is strongly related to Islamic metaphysics. The verses most instrumental in the development of Ash'arite atomism mention together the finite and quantifiable nature of the material world (as far as God is concerned) and the knowledge associated with each particular or variable. From earlier,

There is nothing hidden in the heavens and the earth that is not (recorded) in a manifest book. (27:75)

Nothing in the heavens and in the earth, even to the measure of a particle, can escape Him, nor is there anything smaller than that or bigger, but it is recorded in a manifest book. (34:3)

And He has encompassed all that is with them, and has comprehensive knowledge of every thing by numbers. (72:28)

It does conjure up parallels to the idea of Maxwell's hypothetical being which had all the information about a system, including the problem of storing or deleting information and figuring out where the second law would come in to apply to such a finite being.

Obviously God is not a finite being. That implies a certain measure of significance regarding these verses as they apply to the metaphysical order behind the physical one. These aren't fully fleshed out ideas in Islamic metaphysics because it would be fairly speculative and not something we could likely ever test. The traditional theological approach has been to interpret the universe as finite (in content) but, keeping within the universe's temporal dimensional constraint, we don't know if God could just create an infinite amount of content and still have knowledge of it all, even recorded in some manner. New developments in mathematics are worth a look in revisiting the idea. As we saw from Leibniz's metaphysics, atomism doesn't require a finite number of substances to be effective. However, merely acknowledging this possibility is not a theological position or argument. Until the subject is revisited by theologians, the prevailing conclusion is still that we assume the universe to be finite.

On a slightly tangential note: the "debate" here is over the philosophical meaning behind mathematics. Whether math can be used to describe such things as real infinities or whether it is merely our way of measuring the world and the only use for infinities, as our math describes them, is for approximation. If one believes the latter then these verses are likely describing a finite universe. The controversy with the former position is that it invokes ideas of a higher level of math which can only be understood by God and is beyond the understanding of creation. It's a redundant or unnecessary concept without more overt scriptural support. When it is asserted that this "unreachable" math affects us, which these verses do not imply, it can be seen as threatening to the notion of objective logic being within human reach, forcing a kind of "logical relativism". Strange how these days it is the atheists on the other side of this debate though they routinely accuse theists of using such ideas. Some attempt to hide this inevitable conclusion in anti-realist metaphysics where abstract math is the only truth and reality for them.²³⁸

One thing left to mention here is the relationship between energy and entropy.

The quantity called [Gibbs free energy](#) is a simple and useful tool to understand this.

It is,

...a thermodynamic potential that measures the "useful" or process-initiating

²³⁸ Not coincidentally, there exist plenty of attempts by physicists to argue for new systems of logic to justify their specific metaphysical interpretations of, for one example, quantum mechanics. In a looser sense it's similar to Hawking's statements about imaginary time in cosmology.

work obtainable from a thermodynamic system at a constant temperature and pressure.

Just as in mechanics, where potential energy is defined as capacity to do work, similarly different potentials have different meanings. The Gibbs free energy is the maximum amount of non-expansion work that can be extracted from a closed system; this maximum can be attained only in a completely reversible process. When a system changes from a well-defined initial state to a well-defined final state, the Gibbs free energy ΔG equals the work exchanged by the system with its surroundings, minus the work of the pressure forces, during a reversible transformation of the system from the same initial state to the same final state.²³⁹

The Gibbs free energy, originally called *available energy*, was developed in the 1870s by the American mathematician Josiah Willard Gibbs. In 1873, Gibbs described this “available energy” as,²⁴⁰

the greatest amount of mechanical work which can be obtained from a given quantity of a certain substance in a given initial state, without increasing its total volume or allowing heat to pass to or from external bodies, except such as at the close of the processes are left in their initial condition.²⁴¹

From the Wikipedia page you can see the equation for free energy or *energy available for work* comes down to,

$$\Delta G = -T\Delta S$$

Which basically says that, assuming other conditions are constant, the change in the amount of energy available for work is equal to the change in entropy multiplied by the amount of energy *not* available for work (in the form of heat energy).

From this we can get a sense for the relationship in that the increase of disorder, which corresponds to a loss of information, is associated with the conversion of energy from a usable form to a non-usable form (heat). This refers to natural processes (such as chemical reactions). We’ve learned how to harness “wasted” heat energy by converting it into mechanical energy (such as with steam).²⁴²

²³⁹ http://en.wikipedia.org/wiki/Gibbs_free_energy - Retrieved 05/02/12

²⁴⁰ *Ibid.*

²⁴¹ J.W. Gibbs, “A Method of Geometrical Representation of the Thermodynamic Properties of Substances by Means of Surfaces,” *Transactions of the Connecticut Academy of Arts and Sciences* 2, Dec. 1873

²⁴² Old fashioned steam power is still used, for example, in generators attached to nuclear reactors.

What we can say about nature from a theological perspective is that when God creates according to a manifest order (the Customary Way), information (in the physical world) is generated in that it is able to be derived from such a system by virtue of the order inherent in it. So, energy (usable energy in natural processes) correlates with an increase in information (a decrease in entropy). Heat, however, is the creative action of God (energy manifested as motion) separated from such information (an increase in entropy). This is God creating, essentially, disorder (or it can be seen as relatively more “raw” creative action). It is still the creative action of God and thus another form of energy. The terms order and disorder are, of course, relative. There is still order, information, etc down at the atomic and subatomic scale.

When God says nature is made available to us for use (i.e, for food, shelter, etc) what’s being referenced is how we take the other creation of God (let’s say another animal, like fish), destroy the information in it (destroy the order, its form), and harness that energy for the chemical reactions which sustain our bodies. Remember how renewal was mentioned as another way of referencing the creative act of God (as a specific type of change). Harnessing energy from food is sort of like transferring God’s renewing action into our own bodies, which means we can be healthier and live longer (than otherwise starving). On a slightly deeper level we can think of it as subsisting on the order inherent in creation because that puts energy in a usable form for us. We can harness the rest of creation for its energy to use as work in accomplishing other tasks, like building things (clothes, shelter, even machines which themselves operate on similar principles). Moreover, God has gifted us with the intelligence to use even “wasted” energy (heat) for work. Thus the availability of God’s creative, renewing action is associated with the general state of affairs: the arrow of time, the arrow of entropy, the idea that time is always “running out” for us and the universe in which we live.²⁴³

“Do no mischief on the earth, after it hath been set in order...”

(7:56)

Causality (in Physics)

Though there’s hardly been a response worth its salt to the skepticism of natural causality that arose from the work of occasionalists, reflected in the work of philosophers like David Hume, science is still built on the relationships or correlations between events which it described. Expressing skepticism of natural causality did not mean nature fell apart. Whether you believe nature is the work of God or something else, or merely an illusion, it obviously contains these relationships between events which at least appear to be causal.

²⁴³ Allowed to continue indefinitely, the universe would die a “[heat death](#)” where all the fuel for stars would run out.

Causality in physics is based around the idea that nothing can exceed the speed of light, even causal connections. This is visually represented by the "[light cone](#)", which describes the temporal evolution of a flash of light in Minkowski spacetime. Causality is hence more of a guiding principle for physics, something derived *from* the physics. Actually modeling spacetime events does not require causality, we could describe scenarios where causality is seemingly violated without a problem. The only problem would be in trying to make sense of it.

We can therefore see causality in physics as being a consequence of the physical order inherent in the physical world which the science of physics attempts to describe.

Recall the definition proposed earlier for causality in physics, "The coming into existence of any thing must correlate to an event which specifies the information regarding that thing." This reflects the idea just discussed; that physical information is derived from the order inherent in nature. It's from the same root as the idea of the light cone but it can also encompass quantum phenomena like entanglement which seem to defy that traditional notion (where quantum entangled particles are only related by information).²⁴⁴

At its foundation physical or natural causality can thus be understood in the general sense as the idea that events occurring in nature should stick to the established order inherent in nature. By "established" it is simply meant that behavior which has been observed, recorded, and studied consistently. This is the understanding which stays most true to the spirit and history of the scientific tradition. Trying to prove the laws of nature to be inviolable and absolute is a philosophical claim which can find itself at odds with science.²⁴⁵

From the Wikipedia article on information,

In 2003 J. D. Bekenstein claimed there is a growing trend in physics to define the physical world as being made of information itself (and thus information is defined in this way) (see Digital physics). Information has a well-defined meaning in physics. Examples of this include the phenomenon of quantum entanglement where particles can interact without reference to their separation or the speed of light. Information itself cannot travel faster than light even if the information is transmitted indirectly. This could lead to the fact that all attempts at physically observing a particle with an "entangled"

²⁴⁴ Actually this definition was derived in a previous section from theology but the principle in it is the same as the traditional light cone idea of causality.

²⁴⁵ There is no scientific motivation for such an action, only a philosophical and metaphysical one: To reconcile science with newer worldviews which have unfairly attempted to burden it with the responsibility to find all truths upon which civilization can be built, including law, ethics, morality, philosophy, etc. Since the tradition of science can obviously not do such a thing this serves as an excuse to do whatever one likes while still under the guise of objectivity and the moral authority it provides.

relationship to another are slowed down, even though the particles are not connected in any other way other than by the information they carry.

Another link is demonstrated by the Maxwell's demon thought experiment. In this experiment, a direct relationship between information and another physical property, entropy, is demonstrated. A consequence is that it is impossible to destroy information without increasing the entropy of a system; in practical terms this often means generating heat. Another, more philosophical outcome is that information could be thought of as interchangeable with energy. Thus, in the study of logic gates, the theoretical lower bound of thermal energy released by an *AND* gate is higher than for the *NOT* gate (because information is destroyed in an *AND* gate and simply converted in a *NOT* gate). Physical information is of particular importance in the theory of quantum computers.²⁴⁶

We can see why the philosophical idea that nature is a simulation of some sort has gained more of a following in recent times.²⁴⁷

This also illustrates the notion of why a Will must be invoked to explain the order in nature. As the Wiki article on physical information states,²⁴⁸

Information itself may be loosely defined as "that which can distinguish one thing from another".

Indeed this is how Imam al-Ghazali defined will as well.²⁴⁹

There's a section on classical information versus quantum information,

The instance of information that is contained in a physical system is generally considered to specify that system's "true" state. (In many practical situations, a system's true state may be largely unknown, but a realist would insist that a physical system regardless always has, in principle, a true state of some sort—whether classical or quantum.)

When discussing the information that is contained in physical systems according to modern quantum physics, we must distinguish between classical

²⁴⁶ <http://en.wikipedia.org/wiki/Information> - Retrieved 05/03/12

²⁴⁷ Though it is still a rare occurrence and not taken seriously by the mainstream scientific community.

²⁴⁸ http://en.wikipedia.org/wiki/Physical_information - Retrieved 05/03/12

²⁴⁹ And if we want to maintain realism, then saying it was the will of us acting as observers will not suffice since clearly our wills are not capable of creating the physical world, only observing it. The observer-causes-collapse type of interpretation of QM is dependent on the idea of a passive "Creator" (source of creation) reacting to the dictates of the creation.

information and quantum information. Quantum information specifies the complete quantum state vector (or equivalently, wavefunction) of a system, whereas classical information, roughly speaking, only picks out a definite (pure) quantum state if we are already given a prespecified set of distinguishable (orthogonal) quantum states to choose from; such a set forms a basis for the vector space of all the possible pure quantum states (see pure state). Quantum information could thus be expressed by providing (1) a choice of a basis such that the actual quantum state is equal to one of the basis vectors, together with (2) the classical information specifying which of these basis vectors is the actual one.²⁵⁰

We can describe this as the consequence of the fact that *the order inherent in nature allows for multiple possible outcomes*. As for figuring out how a particular outcome is “chosen”, that’s where most of the metaphysical debates surrounding quantum mechanics occur. We could go so far as to say a Will can also be seen as necessary to distinguish between essentially “like”²⁵¹ possible outcomes and decide which becomes the “real” outcome.²⁵²

Time (in Physics)

The concept of time in science, particularly physics, has undergone a significant change over the centuries.

Plato described time as created at the same moment God ordered the heavens,

...sought to make the universe eternal, so far as might be. Now the nature of the ideal being was everlasting, but to bestow this attribute in its fullness upon a creature was impossible. Wherefore he resolved to have a moving image of eternity, and when he set in order the heavens, he made this image eternal but moving, according to number, while eternity itself rests upon unity; and this image we call Time.

Aristotle, writing as a pure philosopher, first notes that you can’t have time without change and vice-versa,

²⁵⁰ *Ibid.*

²⁵¹ Referring to the fact that although possible outcomes are different there is nothing inherent in the nature of one which requires its having occurred over another. The principle of least action, for example, only describes what usually happens, not why it happens. It just means that the Will choosing among the possible outcomes is consistent but still, frustratingly for us, not entirely predictable.

²⁵² The alternative being a multiverse scenario where all possibilities are seen through.

...not only do we measure change by time, but time by change, because they are defined by one another...

The problem was in avoiding asserting that time *was* actually change or motion. So he defined time as,

...a number of change in respect of the before and after...

A good description of his view of time follows, as taken from [the blog of Paul Nadal](#),²⁵³

Aristotle defines time as “a number of change in respect of the before and after” (“*arithmos kineseos kata to proteron kai husteron*,”). Time is not change; it is a number, more exactly, a number of change. Time is not movement, but that by which movement can be numerically estimated. It is important to note here that by defining time as a number of change, Aristotle does not mean that time is a number with which we count, time is *not* a number as such. Rather, time is a number *of* change, that by which we can quantitatively express the qualitative modification of something undergoing change. More succinctly, time is not a number, but of the number that is *numbered*.

Earlier in *Physics*, Aristotle conceptualizes change as “the actuality of that which potentially is, *qua* such”, as for instance in the coming-into-being (*energeia*) of that which is capable of coming-to-be (*dunamis*). With this definition of change in mind, Aristotle argues that time is that by which we measure the progressive realization of a potentiality *qua* potentiality. Of this we can illustrate with the concept of motion (*kinesis*). When an object moves from point A to point B, the movement from point A to point B indicates an alteration in location, a change in place (*topos*). Obviously we can measure the change in location in terms of spatial distance, say one yard. But Aristotle’s point is that we can also measure it in terms of the amount of time it takes for the object to move from point A to point B, say five seconds. Five seconds would hence be the *quantitative* measurement of the qualitative change of the object’s movement from point A to point B. This is what Aristotle means by time being a number of change.

Aristotle’s definition was so robust it served as the essential foundation for most of the definitions of time that followed.

As was mentioned earlier in the Nasafi Creed, the “natural philosophers” (who tended to follow the lead of Neoplatonists) defined time as a measure of motion. A definition too simple for philosophy but understandable for what passed for physics at the time.

²⁵³ <http://belate.wordpress.com/2011/02/17/aristotle-definition-of-time-in-physics/>

The Islamic theological definition, and that used by the orthodox Muslim scientists or natural philosophers as well, was a slightly optimized version of Aristotle's idea which essentially said that time was *something changing by which something else changing is measured*. The actual word used in the Nasafi Creed is "renewed" whose relation to the idea of "change" was already touched on in a previous section. Renewed implies that even passing from one instant of time to the next, while seemingly undergoing no change at all, can still be a change. The "rest accident", in other words. Things do not exist of their own accord because they do not possess this power in themselves. Things are created and are constantly dependent on the source of creation (the Creator) for sustained existence so the very idea of a "sustained existence" must therefore be an illusion as there can only really be continuous (re-)creation. That's a bit of a simplification as we can conceive of sustained existence where there isn't actually a continuous (re-) creation. But time for these things shall start to behave differently. Therefore inherent in this definition of time is the idea of relativity.

The best example to illustrate this is the modern understanding of "physical light".²⁵⁴ The quantum of light is the photon. Let's assume here the photon then is also the *jawhar* of light. The photon is an excitation of the electromagnetic field and the force carrier particle for the electromagnetic force.²⁵⁵ The photon is an example of an "immaterial" creation of Allah in that it has no mass (it is not matter) but occupies space. It can be considered "pure energy".²⁵⁶ According to the modern understanding in physics, time can be said to "stand still" from the perspective of a photon.

Theologically we can, at a cursory glance, interpret this as Allah creating a photon a very few amount of times, perhaps even just once. From this we would deduce that such a thing would be "fixed" in time. When trying to reconcile it with apparent movement in space, we would potentially run into problems. Earlier theologians might have tackled the issue by quantizing space, saying the photon is (re-)created at various points in space (so it is moving "laterally" through spatial dimensions, not "forwards" through time). But then they would run into the problem of using multidimensional time.²⁵⁷ And then they might have thought that since we can see photons move, that must mean they don't actually stand still completely with time. And if we were to tell them that, yes, they do,²⁵⁸ then there would be only one conclusion left... That space and time are woven

²⁵⁴ The light we see in this world; as opposed to metaphysical light like that used to describe God, angels, or souls, about which we can only speculate.

²⁵⁵ Hence light is a form of electromagnetic radiation.

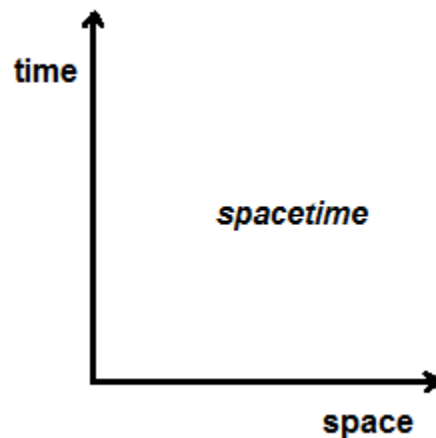
²⁵⁶ By "pure" it is simply meant that it is not in the form of mass. Mass is also energy.

²⁵⁷ In that the spatial dimensions are now describing change and have become spacelike dimensions of time. So instead of 3 spatial dimensions and 1 time dimension we'd have 4 dimensions of time, 3 of which were spacelike. This is not a problem in and of itself for our theology but not something we set out to do.

²⁵⁸ Keep in mind we have no way of empirically measuring or observing how a clock traveling at light speed would really behave but we do have other evidence for time dilation as predicted by Einstein's theories of relativity.

together as “spacetime” and that there is a specific quantity describing this, what we call the speed of light (which is the speed of any massless thing) or the “maximum speed limit” of our universe.

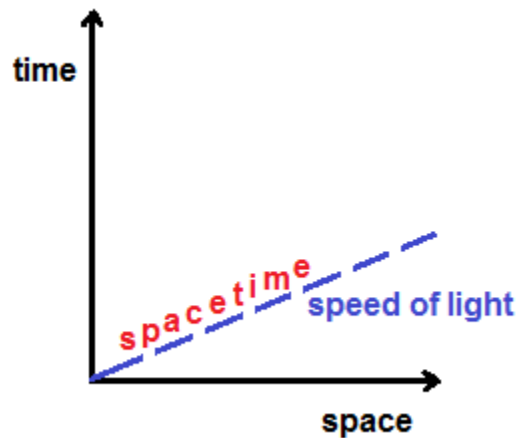
The speed of light describes the maximum speed which for us means it is describing the slope of the line formed by graphing creation in time versus creation in space. Recall the “light cone” of Minkowski spacetime. If space and time were separate entirely (with no maximum speed limit and with multidimensional time²⁵⁹) then there wouldn't be a cone, it would be like this:



What would happen in such a world is that light wouldn't appear to move, it would be everywhere at once already. There would also be no definitive physical way to discern causal relations because there would be things (massless) for which “before” and “after” were meaningless since they didn't have to ever move forwards in time with us.

Instead, it's like this,

²⁵⁹ Multidimensional time means that causally-related events can move purely “sideways” on this graph, like Hawking's imaginary time (at right angles to the normal arrow of time).



The speed of light represents the boundary of the observable (detectable) spacetime continuum. Allah wouldn't normally (in our universe) create some things without a "history", things which would behave instantaneously, which were created everywhere all at once (at one instant or "now" of time). Instead all physical things, including massless things like photons, would be subject to time (staggered creation in a "history"). Light would be forced to "travel", not just be everywhere at once.

According to an occasionalist atomist metaphysics, by looking at that second picture we might deduce that time should not be standing still for a photon of light. Just as there is a maximum speed, there would be a minimum time (the maximum time would correspond to our calculations for the age of the universe which indicate that the *maximum* amount of time which could have elapsed anywhere in the universe is ~13.7 billion years... for a photon it would be much less, but not zero). There is, however, no way to physically measure this. Recall our definition of time as "something renewed by which something else renewed is measured". That "something renewed" by which we measure other things (in physics today) is light whose own "rate of renewal/creation" can not be gauged by us because there is nothing else yet known of by which to measure it. So when trying to figure out the amount of time elapsed for a photon, we get zero. If we try to figure out the amount of distance the photon traveled, we also get zero. But even if the photon were to have its own internal rate of renewal, it could experience everything else as instantaneous anyway. It's indeed difficult to conceptualize.

Of course there is no reason that we should assume God would create according to the simplistic perpendicular dimensions of those hastily made graphs. In actuality the photon really could be experiencing no passage of time or distance at all (not just an impression of instantaneity). This would imply that the photon was created once for the entire duration of the universe's history. Then it would not be the photon that is *moving* through spacetime, it would be us. In fact, that is how it would appear from the photon's perspective, assuming it experienced even the slightest amount of time at all. A physicist would say only the latter, speaking in terms of one reference frame or another.

From the point of view of our metaphysics, since we believe a Creator is creating things relative to each other, the “truer” perspective is probably that of the photon! Everything is created “around” light. It would be akin to saying a photon is “fixed” in spacetime. It is unchanging. Our physical light, therefore, is our best example of at least one aspect of what transcendental “unchanging” existence could be like (transcendental implying outside of space and time). Though it doesn’t really help us understand this concept much, it simply gives us an example in nature which seems to behave similarly.²⁶⁰

In relativity, we call the effect of time slowing down, “time dilation”. With it is the notion of “length contraction”. For the photon this means time slows down to a single instant and all of spacetime (including all of our universe’s classical history) seemingly contracts into a plane (perpendicular to its axis of motion). We, in our “normal” reference frame, would see length elongation and time contraction of that photon.²⁶¹ Which is why when we try to imagine things from the photon’s perspective we still often think from our own perspective and describe all of time “contracting” into the photon’s experience and its spatial experience “elongating” to include its entire worldline in that instant.

Returning to that second graph, the area between the time arrow and the blue dotted line representing the speed of light would correspond to the “classical spacetime” of our observable universe. The spacetime in which we observe and detect all classical events which have “timelike separation” (what we called causality in physics as represented by the light cone in the previous section).

The area between that blue line and the axis representing the spatial dimension would represent non-classical spacetime (including FTL or faster-than-light causal relations).²⁶² We would be tempted to think that is not real, that reality starts with the speed of light. However, we do observe some quantum events which seem to have “spacelike separation”, which seemingly describe one thing existing in two places at once. So far quantum mechanics has been rigorous in preserving traditional causality and barring faster-than-light communication, though there are fringe theories put out there embracing such non-traditional concepts.

The main concept to recognize for Islamic occasionalist metaphysics is the idea that time represents change. If there is no change, there is no time. God does not change, therefore there is no “God time” associated with His attributes. Creation changes by being continuously recreated (in an ongoing continuous creation process) and thus

²⁶⁰ Thus why God is described by His divine “light”, or *Nur* in Arabic.

²⁶¹ The effect is depicted in science fiction when a spaceship travels at high speed as it appearing to elongate into the distance from the viewer’s perspective (the subsequent contraction can be described as the ship eventually simply passing or the viewer’s perspective catching up to the spaceship’s).

²⁶² Whether of our own universe or a separate causal patch.

time becomes a property of this process.²⁶³ It's almost, one could say, a "side effect" of creating. Any creating implies change which implies time in one way or another.

Now compare this view of time, as reflected not only in the orthodox theological doctrines (i.e, God's statement "I am Time"), but in the Qur'an's language itself (*Al-Asr*). How do we measure time today? In effect through randomness. The vacuum, a source of seemingly random energetic activity (continuous creation/annihilation) reflecting the arrow of time is the key behind radioactive decay by which we can tell time. What does this process tell us, beyond just the amount of time gone by? That we can fundamentally not know the future and our time is running out, no more than what *Al-Asr* said (but quite less than it too).

Time being a measure of change for us means that it can be "spacelike", so long as it's basically achieving the same goal (a renewed thing by which something else renewed can be measured). We might not be able to understand how such a spacelike dimension of time would be experienced but we do know it's still a measure of the change occurring in the system.

Imaginary time can therefore simply be seen as creation occurring in a pattern dissimilar to how it occurs in our current "classical" experience of the world.

Some physicists and philosophers will act as if time can move "sideways" or as if imaginary time is a separate thing or a more desirable or more "authentic" version of time. None of these affects our view of time which is as being a property of the creative action of God. Anything created is change and time is a measure of change so God's creating generates time.

Thus our main issue with ideas like Hawking's No Boundary proposal is that it is highly theoretical and speculative while being inconsistent with nature. We certainly disagree with Hawking's philosophical musings that "imaginary time" is any more "legitimate" than our classical time. Going by what we can tell about light (as massless "pure energy"), the most "legitimate" notion of time would be no time at all. This implies, by precedent, ideas of something constant and unchanging which could then be responsible for change (including the biggest change of all, creation). This, in turn, implies will (and our idea of a Creator).

The use of a photon above as an example of a "*jawhar*" was arbitrary. In reality we do notice what might pass for internal change in a photon with regards to its spin projection, however the spin projection of a photon is set at its creation (inherited from the physical order of the circumstance of its creation) and does not change thereafter until it interacts

²⁶³ Whereas the original theologians probably imagined a sort of background "rate" of creation for all matter which served as our real clock, modern physics centers on the idea of an unchanging (in time) quantity's maximum spatial rate of change as our ultimate "clock".

with something else.²⁶⁴

Timeless Physics

There is a small school of thought in modern physics centered around the idea that time, as we perceive it, does not exist as anything other than an illusion. The idea is that some of physics' problems are a result of false assumptions about time.

Physicist Julian Barbour is a proponent of such a view,

He argues that we have no evidence of the past other than our memory of it, and no evidence of the future other than our belief in it. "Change merely creates an illusion of time, with each individual moment existing in its own right, complete and whole." He calls these moments "Nows". It is all an illusion: there is no motion and no change. He argues that the illusion of time is what we interpret through what he calls "time capsules," which are "any fixed pattern that creates or encodes the appearance of motion, change or history."

Barbour's theory goes further in scepticism than the block universe theory, since it denies not only the passage of time, but the existence of an external dimension of time. Physics orders "Nows" by their inherent similarity to each other. That ordering is what we conventionally call a time ordering, but does not come about from "Nows" occurring at specific times, since they do not occur, nor does it come about from their existing unchangingly along the time-axis of a block universe, but it is rather derived from their actual content.

The philosopher J. M. E. McTaggart reached a similar conclusion in his 1908 *The Unreality of Time*.²⁶⁵

He also is involved with "Machian physics", a school of thought with a very heavy empirical outlook,

Barbour also researches Machian physics, a related field. The Machian approach requires physics to be constructed from directly observable quantities. In standard analytical dynamics a system's future evolution can be determined from a state consisting of particle positions and momenta (or instantaneous velocities). The Machian approach eschews the momenta/instantaneous velocities, which are not directly observable, and so needs more than one "snapshot" consisting of positions only. This relates to the idea

²⁶⁴ Becoming absorbed or scattered implying, theologically, that it had to undergo new creation.

²⁶⁵ http://en.wikipedia.org/wiki/Julian_Barbour - Retrieved 05/11/12

of snapshots, or "Nows" in Barbour's thinking on time.

Along with physicist Bruno Bertotti, Barbour developed a technique called "best matching" for deriving gravitational equations directly from astronomical measurements of objects' spatial relations with each other. Published in 1982, the method describes gravitational effects as accurately as Einstein's general relativity, but without the need for a "background" grid of spacetime. According to physicist David Wiltshire at the University of Canterbury in New Zealand, such a truly Machian or relational approach could explain the appearance of an accelerated expansion of the universe without invoking a causative agent such as dark energy.

It's named after Ernst Mach (1838-1916) whose legacy includes the Mach number (usually associated with aircraft speed), research on shock waves, and "[Mach's principle](#)", a cosmological view of gravitation which associated local inertia with global mass distribution. It served as a guiding factor in Einstein's general theory of relativity (in fact, Einstein even coined it "Mach's principle"). The idea is actually older than him, the basic gist of it appears in the writings of George Berkeley, the European occasionalist.^{266 267}

He first formulated it as a criticism of Newton's idea of absolute motion,

In Mach's idea this concept of absolute motion should be substituted with a total relativism in which every motion, uniform or accelerated, has sense only in reference to other bodies (i.e., one cannot simply say that the water is rotating, but must specify if it's rotating with respect to the vessel or to the earth). In this view, the apparent forces that seem to permit discrimination between relative and "absolute" motions should only be considered as an effect of the particular asymmetry that there is in our reference system between the bodies which we consider in motion, that are small (like buckets), and the bodies that we believe are still (the earth and distant stars), that are overwhelmingly bigger and heavier than the former. This same thought had been expressed by the philosopher George Berkeley in his *De Motu*. It is then not clear, in the passages from Mach just mentioned, if the philosopher intended to formulate a new kind of physical action between heavy bodies. This physical mechanism should determine the inertia of bodies, in a way that the heavy and distant bodies of our universe should contribute the most to the inertial forces. More likely, Mach only suggested a mere "redescription of motion in space as experiences that do not invoke the term *space*". What is certain is that Einstein interpreted Mach's passage in

²⁶⁶ http://en.wikipedia.org/wiki/Mach%27s_principle#cite_note-2 - Retrieved 05/11/12

²⁶⁷ There is thus a strong link between an occasionalist metaphysical worldview and the development of both relativistic gravitational models *and* particle physics, despite the troubles we've had reconciling the two with each other.

the former way, originating a long-lasting debate.

Most physicists believe Mach's principle was never developed into a quantitative physical theory that would explain a mechanism by which the stars can have such an effect. Although Einstein was intrigued and inspired by Mach's principle, Einstein's formulation of the principle is not a fundamental assumption of general relativity. There have been attempts to formulate a theory which is more fully Machian, such as Brans–Dicke theory, but most physicists argue that none have been fully successful.

More reading,

http://en.wikipedia.org/wiki/Brans%E2%80%93Dicke_theory

http://en.wikipedia.org/wiki/Self-creation_cosmology

Returning to Barbour's book, *The End of Time*,

The book begins by describing how Barbour's view of time evolved. After taking physics in graduate school, Barbour became obsessed with the idea that time is nothing but change.

[...]

Cognizant of the counter-intuitive nature of his claim, Barbour eases the reader into the topic by first endeavouring to persuade the reader that our experiences are, at the very least, consistent with a timeless universe, leaving aside the question as to why one would hold such a view.

Barbour points out that some sciences have long done away with the 'I' as a persisting identity. To take atomic theory seriously is to deny that the cat that jumps is the cat that lands, to use an illustration of Barbour's. The seething nebula of molecules of which we, cats, and all matter are made is ceaselessly rearranging at incomprehensibly fast speeds. The microcosm metamorphoses constantly, therefore one must deny there is any sense to say a cat or a person persists through time.

Early on, Barbour addresses the charge that writing with tensed verbs disproves his proposal. The next revolution in physics will undermine speaking in terms of time, he says, but there is no alternative.

If a universe is composed of timeless instants in the sense of configurations of matter that do not endure, one could nonetheless have the impression that time flows, Barbour asserts. The stream of consciousness and the sensation

of the present, lasting about a second, is all in our heads, literally. In our brains is information about the recent past, but not as a result of a causal chain leading back to earlier instants. Rather, it is a property of thinking things, perhaps a necessary one to become thinking in the first place, that this information is present. In Barbour's words, brains are 'time-capsules'. He investigates configuration spaces and best-matching mathematics, fleshing out how fundamental physics might deal with different instants in a timeless scheme. He calls his universe without time and only relative positions 'Platonia' after Plato's world of eternal forms.

Why, then, is the instant in configuration space, not matter in space-time, the true object and frame of the universe? He marshals as evidence a non-standard analysis of relativity, many-worlds theory and the ADM formalism. Since, he believes, we should be open to physics without time, we must evaluate anew physical laws, such as the Wheeler-DeWitt equation, that take on radical but powerful and fruitful forms when time is left out. Barbour writes that our notion of time, and our insistence on it in physical theory, has held science back, and that a scientific revolution awaits. Barbour suspects that the wave function is somehow constrained by the 'terrain' of Platonia.

Barbour ends with a short meditation on some of the consequences of 'the end of time'. If there is no arrow of time, no becoming only being, creation is equally inherent in every instant.

There is no general agreement that the ideas expressed in the book have any predictive power and thereby constitute a scientific theory.²⁶⁸

This is interesting, even exciting, from the perspective of Islamic occasionalism. Some aspects of this view totally fit with ours, however there is still a deeper metaphysical disconnect since we do justify a traditional realist perspective of time through teleological theological reasoning whereas he's left with a completely strange world. I do not even know how he answers all the philosophical and metaphysical conundrums that result from an occasionalist view regarding the existence of order in the creation: Why does this order exist? It cannot be merely a property of thinking minds, it reflects on the real observed world, which even makes the existence of our brains possible, so why does the world exist in such a way? Why is there an actual arrow of entropy (appearing as an arrow of time) if it is not necessary? Really, nothing about the creation can be considered necessary from such an honest view. The arbitrariness problem of his worldview must make other physicists quite uneasy. I have yet to read his book but perhaps he just stays out of metaphysics. This also gives new meaning to the hadith qudsi in which God says "I am Time", for this confers a new real meaningfulness to the notion of Time (as we instinctively would like it to be) but only in its proper context of theology. Time is an illusion, what we observe, as we observe it, is actually the work of

²⁶⁸ [http://en.wikipedia.org/wiki/The_End_of_Time_\(book\)](http://en.wikipedia.org/wiki/The_End_of_Time_(book)) - Retrieved 05/11/12

God.

While Islamic occasionalism is compatible with the standard models of modern particle physics and general relativity (really any model that works), it's possible this sort of view might actually hold some keys to unlocking the trouble we've had developing a theory of everything, as much as one is possible.

I can't say much more about this except this is an area of physics which Muslims should pay attention to and contribute to.

I'll close with another summary of this general perspective,

Recently, there is suggestion that time is just an illusion. Time as such does not exist. There is no invisible river of time. But there are things that can be called "instants of time", or "Nows". As we live, we seem to move through a succession of Nows. The idea is that when we think we are seeing actual motion, the brain is interpreting all the simultaneously encoded images and playing them as a movie - frame by frame. Conceptually, it is similar to plot points in the phase space, which is also known as configuration space where the element of time is left out. [Figure 18a](#) depicts a very simple configuration space for an universe of three particles A, B, and C. The lengths of each side (of the triangle) form the three grid axes AB, BC, and CA. The seven triangles represent several possible arrangements or NOWs of the model universe. The black diamond indicates the position of each of these triangles or NOWs in the configuration space. In general if there are n particles, the configuration space will be constructed with n grid axes. We have no access to the past and future. The past is only in our memories or some sort of records. They are actually a present phenomena. The future is the not yet realized events equally inaccessible. We only experience a continuous sequence of NOWs one after the other. Time was invented for the convenience of human to keep track of the changing NOWs. Note that the represent-ation in phase space is background independent. The spatial coordinates x, y, z are absent in the picture, and so is the time. Essentially, this is the foundation of the so-called relational theory in which all that matters is the relationships or links between the events. It plays a crucial role in the formulation of loop quantum gravity, in which space and time are discrete quantities and evolve dynamically like the atoms.

This idea was originated more than 100 years ago by Ernst Mach (honored famously by the Mach number = v/v_{sound}) known as the Mach's Principle. The relationship between objects in space is "relativity" in its original sense. Einstein's "relativity" is different in that it only "relates" space with time.

Then along came Julian Barbour who forewent an academic career to pursue

Mach's idea. The task was highly unrewarding as no funding agencies would support such activity. He had to make a living by translating Russian text in scientific articles and lived in an idyllic farmhouse at South Newington. A March 2012 article in the Discover magazine presents the progress of his work on the subject since 1969. He is now a visiting professor at Oxford. In 2008 he won his first-ever official research grant and used the money to travel to conferences, as well as funding collaborators. Following is a summary of the progress:

- General Relativity - By adopting a curved 3-dimensional space (without the rigid grid), Barbour's shape-based calculations generate results similar to Einstein's in general relativity.
- Dark Matter - A Barbour collaborator is trying to use the long-forgotten Weyl's model, which does not require absolute measurements of scale or distance making everything relative, to determine whether it could explain away the need for dark matter. The detection of dark matter particle would rule out such initiative.
- Dark Energy - Another collaborator argues that dark energy is an illusion because in general relativity, time ticks differently according to the amount of matter along the light path (from the Type 1a supernova). A formulation without time may have this kind of illusion removed.
- Quantum Gravity - A third collaborator was skeptical at first. He and his friends at the Perimeter Institute (in Waterloo, Ontario) tried to pick apart Barbour's formulation without much success and finally became a convert. He is betting that quantum mechanics and gravity without time would allow the two theories to merge successfully though the math is tough.²⁶⁹

One of the benefits of this for our metaphysics is that it reduces the need to explain things “multidimensionally” in the context of standard model physics (as I had to do earlier in this section) and thus avoids confusion. This is a consequence of the “pure relativity” inherent in occasionalist metaphysics (whereas, as mentioned in the excerpt above, Einstein’s GR only relates space to time).

Power

Power in physics is defined as the rate at which energy is used, transferred, or transformed. Energy transfer can be used to do work, so power is also described as the rate at which work is performed.²⁷⁰

The integral of power over time defines the amount of work done. The dimension (units)

²⁶⁹ <http://universe-review.ca/R15-17-relativity.htm>

²⁷⁰ [http://en.wikipedia.org/wiki/Power_\(physics\)](http://en.wikipedia.org/wiki/Power_(physics)) - Retrieved 05/06/12

of power is energy divided by time.²⁷¹

Whatever is the source of power of a system then dictates the behavior of that system. For most natural processes these events proceed as you would expect. Except with life, particularly intelligent life like us. Our physical power, the rate at which we use energy, is not some easily discernible deterministic constant. It varies according to our will. What's notable about this is that the difference between, say, the Sun or a lizard or a human is most obviously manifested as the unpredictability of the human in applying power. It can start or stop. A lizard starts at its first moment (birth²⁷²) and stops at its last (death), without choice. The same goes for the Sun and the other stars. Life with will however can arbitrarily start or stop movement or any change in behavior. Indeed humans can choose to stop living at pretty much any arbitrary point in time. Not, like some animals, for the fulfillment of a greater biological imperative,²⁷³ but just for any or no reason at all. Likewise other animals, notably primates, exhibit will in some of their decisions as well. A gorilla can choose to do things according to his or her mood, which we might consider predictable.

The point here is that the only example we have, in all the universe, of the ability to dictate power itself, to start and stop it, is with will (associated with life and knowledge or intelligence). From the evidence of our own wills we can surmise that the potential exists for an even more pure or "free" form of will (the less dependent it is on the physical world). If we look at all natural processes we will notice the one which seems least natural, least connected to the fundamental natural processes of physics, is will. Physics is compounded into chemistry, which is compounded into biology, which is compounded into psychology.

It should be no surprise that there are those who arrived at faith in God or a Supreme Being through this realization that what exists apart from all possibly existing natural worlds or processes must not be nothing but in fact be nothing else than pure (free) monistic will. Perhaps Krauss was on to something and we should abandon notions of pure, absolute "nothingness" because no thing in nature suggests it. There is no such nothing. Non-existence, on the other hand, is okay to mention since that is a relative term. "Nothingness" is the idea of an existing emptiness. There is only something (physical things), and apart from that something, there would have to be will instead of

²⁷¹ *Ibid.*

²⁷² Technically whenever it becomes a "lizard" as we know it, which could occur during development before birth. Likewise when a lizard dies it's no longer a lizard "as we know it", it's the body of one minus its life.

²⁷³ The idea that any other animals do genuinely commit suicide at all is a controversial one and not an idea I accept without debate. I only do so here for the skeptic's sake (the skeptic who is only applying their skepticism to me and not these rather flimsy claims about animals committing suicide).

nothing.²⁷⁴

Or one could claim, as the naturalistic atheist must, that there is no thing apart from something (nothing exists beyond the natural world) which results in all the usual conundrums about establishing how “something” began arbitrarily, going from non-existence to existence, in a finite amount of real time²⁷⁵ without will which is the only explanation we have for arbitrary applications of power *with actual precedent in our natural world*. The fact that the natural world seems to evolve towards willful life and this “towards” represents a direction of decreasing connection to the natural world and increasing control of power over the natural world ought to indicate that if there is anything beyond physical existence, it’s willful existence, and this has all control over all power in the natural world (even explaining the issue of starting it).

As discussed earlier the atheist has to answer the question about a beginning by appealing to the notion of a multiverse. If we look closely though, what is a multiverse? The actualization of all possibilities. It is an abstract symbol acting as a lightning rod to absorb and dissipate whatever minimum amount of unsightly faith is required for the atheist who would otherwise prefer to be a metaphysical naturalist as much as possible.

There is something familiar in the idea of a multiverse, however. For one thing, God is often defined as “containing” all possibilities. With us we say His knowledge encompasses these, not that He “contains” them in any other way as distinct attributes apart from knowledge. Some other definitions of God would say that He contains the possibilities and from there one could keep going further, saying that these possibilities are distinct attributes, eventually turning God into less the active willful Creator of Islamic monotheism and more like the passive emanating First Cause of Neoplatonism. You could take it still further until the idea is deprived of all traits or attributes corresponding to life and will, and each possibility must necessarily be actualized resulting in an infinite physical scattering of what remains of God’s essence, relegated to not even a “container” of possibilities. Where once was the idea of a Creator now stands the abstract “physical” (physics-ified), naturalised representation of the concept, now known as the multiverse. God’s essence of Existence is dispersed among the fragmented possibilities, giving each a necessary existence, so even the attribute of “creating” becomes unnecessary and gets cut away by the knife of reductionism. “Creator” becomes a misnomer, though that was the original source for the idea of an essence or essential attribute encompassing all possibilities (at first just an essential attribute, now it is the essence itself of the concept of a multiverse).

This might sound like philosophical “deicide”, but naturalists hardly tend to be

²⁷⁴ A similar concept is found in one understanding of *dunya* as not merely “world”, but as anything apart from God. As for what this will subsists in, since will requires life and knowledge, then the only candidate is existence itself or existence as pure essence (which must necessarily be described by our terms ‘life’ and ‘knowledge’).

²⁷⁵ Or any amount of whatever imaginary notion of time one desires.

existentialists in the vein of Nietzsche. It's actually the corollary in metaphysics (using the language of physics) of a more familiar and traditional physical act. When one constructs an abstract physical representation of an idea or possibility, devoid of its essence (particularly the essential attributes relating to life), that is what creating a statue or idol or graven image is all about. The multiverse is actually *the* idol of God, of Allah. It should perhaps be of little surprise that this particular idol is made out of the equations of physics (describing the behavior of the entire physical world) and not physical matter like stone. Just as Abraham (as) insisted that there was no power in the statue we have to remind ourselves that there is no power inherent in any equation or geometric model. These only describe nature's behavior and do not determine it (and shed no light on what does). The idea of "predictive power" is a misnomer because that is merely referring to the accuracy of a theory or hypothesis and any power behind it is from nature's behavior remaining consistent, something completely outside our control.

When we think about the theological debates in Islam and other religions over anthropomorphism, it's not hard to see that the metaphysical notion of a multiverse (when invoked *primarily*²⁷⁶ to serve as that "lightning rod to dissipate faith") is just carrying anthropomorphism to the extent where God is not taken to resemble just man, but the actual universe (which can be summed up conveniently and quite neatly in a very finite amount of equations). Except the actual multiverse is closer to pantheistic roots since each possible world is a fragment of God's split essential existence (which is of no surprise since historically atheism has either followed from pantheism or been conflated with it). The "shape" of the "statue" (model) is based off the equations describing the behavior of nature, identifying nature with God (so we can see the multiverse as the next evolution of naturalistic pantheism). It's not surprising either to see that a viewpoint centered in naturalism or materialism will treat "supernatural" things by reducing them to natural or material things, by "physics-ifying" (in the case of naturalism) or "physicalizing" (in the case of materialism) them.

Does Science Describe Reality?

From earlier,

Is the multiverse purely a metaphysical (and therefore non-scientific) phenomenon?

Actually it is possible to pose a specific falsifiable theory involving a multiverse if that theory predicts interaction between the universes, assuming those phenomena can not be described in any other way. This makes it an extremely remote chance. String theory is not even entirely there yet, though the possibility exists for different branes to interact through gravity. And, as

²⁷⁶ There is nothing idolatrous about the idea of a multiverse in itself, only in its usage of course.

noted, even if multiple universe interaction is posed as an explanation for an observable phenomenon, it doesn't mean it has to be *true*. Another model that doesn't invoke other universes could conceivably explain it just as well.

This illustrates the nature of falsifiability in science, the hypothetico-deductive logic behind the modern conception of science, and reveals clearly its shortcomings on the issue of explanatory power versus predictive power (when positing unobservables to explain observables). Due to this and the mathematical nature of modern physics in particular, modern scientific theories significantly lack the ability to explain reality. There is no getting around that. Trying to conform scientific models to reality consists almost entirely of philosophical maneuvering to redefine reality (as even Hawking has done when talking about imaginary time) as some unknowable and fundamentally subjective entity (calling to mind the anti-realism of European pseudo-occasionalists and empiricists).

The Metaphysics of Imam Maturidi

I left this for the tail end of the sections describing physics rather than discussing it earlier with Imam Ash'ari's atomism because to fully appreciate the logic of its usage one inevitably needs to draw parallels to modern physics.

The fundamental difference between the two schools over the primacy of empiricism or rationalism is evident when we consider, for example, how the Maturidi/Hanafi tradition in jurisprudence tends to place a greater responsibility on people for their acts whereas the Ash'ari theology reflected a slightly greater emphasis on juristic procedure or methodology. One would imagine that orthodox Ash'arites might be more comfortable using modern means of forensic evidence and the like, and establishing a rigorous legal structure for their use. Likewise Imam Maturidi, like the Ash'arite theologians who often engaged in debates (such as Imam al-Ghazali), liked to point out the fallibility of *taqlid* when applied outside its very limited domain in jurisprudence (especially in theology). Ash'arites in general preached a more open philosophical acceptance of *taqlid*,²⁷⁷ focusing on the more immediate threat of neglecting *taqlid* in jurisprudence. In this case we could say the Maturidi viewpoint had more applicability to empirical methodology in the sciences. In general Imam Maturidi was an empiricist, as virtually all Islamic theologies tended to be (even the Mu'tazilite), he just emphasized that truth could only be reached by the cooperation of rationality with empirical knowledge (and consensus of multiple viewpoints), as reflected in our discussion of the Nasafi Creed earlier. So in a way the Maturidi view lays the groundwork for a more modern understanding of science

²⁷⁷ In fact, modern Islamic legal culture of all 4 schools of jurisprudence tends to inherit the Ash'arite viewpoint. The Hanafis no doubt influenced by the years of experience and legal precedent that came with being the official legal school of most of the Caliphates and Sultanates. Furthermore since both Imams of theology consolidated that field so well it was easier to simply discourage people to stray from them.

itself, even if it did not emphasize it as overtly as the Ash'ari view.

Even though Imam Maturidi did not place as much of an emphasis on metaphysics, preferring to emphasize the connection between man's rationalism and God over the physical world and God as the more effective tactic in debating the particular heresies he ran into in Central Asia, he did use a coherent metaphysical model where necessary. Particularly when debating theologies such as those of the Manichean dualists. The Manicheists also tended to favor a materialist spin on dualism, talking about opposing flavors of "substances" (in the metaphysical sense of the word like *jawhar* or Leibniz's monad) which were constantly in a struggle for supremacy over each other. They correlated to good (light) and evil (matter) and were the source of motion.

The polar opposite of this view was the general Neoplatonist viewpoint of other groups in Central Asia like the Ismailis, or some of the pantheist/atheist philosophers. This view, based on Plato's idealized forms, thought of the material world as a mere projection of the idealized world of forms (drawing strong comparisons to Descartes).

The typical reaction on behalf of Islamic theology by initially the Mu'tazilah and later the Ash'arites was to use atomism as a compromise, where the ideal principle of the world of creation was monistic, real, and also reflective of the description of God in the Qur'an (as having omnipotence over a quantified material world with ontological externality in the context of real existence). Imam Maturidi generally favored this view, especially some of the philosophical implications of the idea of a "rest accident" granting spatio-temporal meaning.²⁷⁸

In general though he saw no point in going too far into detail in trying to identify a particular elementary constituent substance. He spoke of matter in its colloquial, "continuous", sense as we could hypothetically go about arbitrarily dividing it into "substance" ad infinitum without any empirical accountability. So he only did it as much as he needed to, which is to say quite rarely. He instead used the idea of "natures" or "*taba'i*".

This was an expansion of existing ideas of "constitutive accidents" (a class of accidents common to all bodies, playing a role similar to substance but having no spatial reality of their own). Imam Maturidi used the term *taba'i* by which he referred to the "primary qualities" of bodies. They are part of the *essential attributes* of a thing.

The root of the word is the same as that of "*tabeehat*" which is used today to refer to one's health.

[The] root *Tab'* means nature, as well as pressure; it reflects an idea of animal instincts or four humors, on whose equilibrium Galen defined

²⁷⁸ Simko, Ivan (2008). *Parallels of Stoicism and Kalam*, University of Vienna

health.²⁷⁹

These natures corresponded to the ancient attributes of heat, cold, moisture, or dryness which were derived from the more familiar ancient idea of four elements (fire, water, earth, air). The essence of the relationship is what's useful for Maturidi, that they are in mutual opposition and have a divisive effect. On the other hand, their transient interactions are also seen as constructing all other accidents. He used this to argue against Manichean dualist metaphysics by pointing out that four natures were not enough, substances (in which the other four would interact constructively) had to be considered as a fifth principle,²⁸⁰ effectively negating any theology which tried to join dualism with materialism.²⁸¹ Furthermore, he reasoned, there had to be yet another influence to explain the creation and interaction of such inherently opposite natures into the order we see in the world today, which he identified with God. In fact, the existence of such natures in a logical order unto themselves also indicated the need for God.

Imam Maturidi compared this idea to humans and our own natures (i.e. *fitrah*). We have varying tendencies, dispositions, emotions, desires, etc and our rational mind controls and orchestrates them by weakening some and focusing others to form more coherent motivations.²⁸²

This is similar to the “naturalistic panentheism” of Roman Stoics who posited an active God configuring passive matter composed of four elements²⁸³ however a strong distinction must be made between the idea of an “element” and Imam Maturid's idea of a “nature”, the latter being a class of accident or *'aradh* and the former being a class of substance or *jawhar*. This translates into our understanding today of elementary particles and the fundamental forces of nature. *Jawhar* most literally correspond to elementary particles,²⁸⁴ *'aradh* to the general idea of properties, states, or attributes and *taba'i* to the fundamental forces of nature.

The fundamental forces of nature, also called the *fundamental interactions* or *interactive forces*, also happen to be four. The electromagnetic force, the weak nuclear force, the strong nuclear force, and gravity. There is a remarkable and uncanny parallel between these and Imam Maturidi's idea of natures which focused on them predominantly as constitutive interactions forming the fabric of material existence.

Imam Maturidi's natures are, as mentioned, derived from the ancient elements. Though

²⁷⁹ *Ibid.*

²⁸⁰ *Ibid.*

²⁸¹ So the interactions *within* a specific nature could be seen as synonymous to the idea of parity or rather polarity within one field of interaction. The interaction between different natures on the other hand is the “fifth principle” responsible for materiality.

²⁸² *Ibid.*

²⁸³ *Ibid.*

²⁸⁴ And the Stoic notion of “element” would correspond to what we define as element today.

the ancient notion of element corresponds, in Stoic metaphysics and perhaps others, to the same way we use our modern elements today, they were not the same thing. Our elements can be more aptly called substances (only one kind of atom makes up each element). The ancient elements were a mixture of substances and accidents. Imam Maturidi didn't use elements, he used their *interactions* which he called natures. If we think of natures as the tendencies or dispositions (dispositions is the word I use often as it most reflects the definition) then they obviously describe interactions. It doesn't even matter what elements you use, but he (no doubt for convention when debating old religions) used the old four. So the natures were like dryness, moistness, heat, cold, etc. Each elemental nature was thus divided into specific polarized interactions, usually two opposite tendencies. There was also a sense of parity, or symmetry in their constructive interactions. The point is that the functional use thereof (and end result of his logic in using them) is the same as our modern concept of the fundamental interactions.

With regards to the current fundamental interactions of nature studied in physics, they too represent fields of interactions and separate forces themselves interact and in fact join in symmetry under higher energy conditions. The electromagnetic and weak nuclear force join to form the electroweak force. The electroweak and strong nuclear force join to form what's known as the "Grand Unified Force" (of GUT or Grand Unified Theory). That combined with the force of gravity is known as "supergravity" which existed in the extremely high energy conditions near the Big Bang. In accordance with our view of energy, what Imam Maturidi said about only God being able to hold the divisive and opposite natures together in bodies becomes clear.

There was "spontaneous symmetry breaking" as the forces decoupled. The separation of gravity from the other unified force is associated with the beginning of "real" time (before this the dimension of time could have been spacelike or "imaginary" rather than timelike as we perceive it today). The symmetry breaking of the grand unified force into the strong nuclear force and electroweak force is associated with the inflationary epoch and reheating. This marks the start of the "electroweak epoch" or the radiation dominated era of the universe.

One of the most significant features of Imam Maturidi's metaphysics is the idea of the "rest accident of existence" granting spatio-temporal meaning (i.e, real existence and ontological externality within that context) which was the result of the constructive interaction of these natures. This is how substances, and in turn bodies, existed. This accident, being transient and fleeting, required constant "renewal" through God's creating for anything to have sustained existence.

The end of the electroweak epoch signified the breaking or decoupling of the weak nuclear force and electromagnetic force. Like the inflaton field, there is a posited scalar field called the Higgs field.²⁸⁵ The spontaneous electroweak symmetry breaking interacts with the Higgs field causing excitations in it which take the form of elementary particles

²⁸⁵ In early inflationary cosmology, the inflaton field was thought to be the Higgs field.

(Goldstone bosons) which are absorbed by the elementary particles of other fields, giving them mass.²⁸⁶ Thus begins the “matter dominated era” of the universe, when the fundamental particles acquired mass.

One of the scientists who shared the '79 Nobel Prize in physics for the discovery of the electroweak unification was a Pakistani physicist who quoted the Qur'an during his acceptance speech,

*“Thou seest not, in the creation of the All-merciful any imperfection,
Return thy gaze, seest thou any fissure? Then Return thy gaze, again
and again. Thy gaze, Comes back to thee dazzled, aweary.”*

“This, in effect, is the faith of all physicists; the deeper we seek, the more is our wonder excited, the more is the dazzlement for our gaze.”

The Metaphysical View of Creation in Light of Modern Physics

People assume the God of rationality is that of Aristotle or Plato, or perhaps the God of ambiguous new age interpretations of ancient Eastern panentheistic faiths (some pantheist, some atheist, or something else altogether). The tendency is to assume that the Biblical God of Abraham is the opposite: irrational, purely “faith” based, invented by the clergy specifically to not be understood rationally.

In Islam they are one and the same, Allah, who can be understood rationally insofar as our limited rationale allows and who can be related to personally through emotion and spirituality. And who relates to us personally through direct communication in the form of revelation which we deduce as necessary in order for us to understand our purpose and fit into the natural order of things. This comes back to the purpose of this work, to relate between religious and scientific mindsets, to bridge the gap that has formed. From both inactivity in the scientific sphere and inactivity in the religious sphere.

The fact of existence, action, and motion and the presence of order in the behavior of all things implies for us a creative Will²⁸⁷ and the necessary conclusion that we, too, must have an order for our behavior and that this Will would not have neglected to inform us of it. The idea that we, unlike the rest of creation, are “special” in that we must be informed by an external source of a large part of our natural order and have the choice to obey or disobey is implicit in our view of the world and even our own individual

²⁸⁶ The Higgs boson would be a leftover elementary particle from this interaction. The elementary particles of the Higgs field are called, somewhat ironically in the context of this section, the “God particle”.

²⁸⁷ For what else can create order? By each of our own experiences there is only one piece of established evidence. Our own wills.

existence.

I will begin this by continuing with the theme of the previous section (this was originally the end of the preceding part). Let's start with mention of verses from the Qur'an applicable to the metaphysics of Islamic orthodoxy.

First, 7:54 from *Surah al-A'raf*,

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

السَّمَاوَاتِ وَالْأَرْضِ فِي سِتَّةِ أَيَّامٍ ثُمَّ اسْتَوَىٰ عَلَىٰ عَرْشِ يُغْشِي اللَّيْلَ النَّهَارَ يَطْلُبُهُ حَثِيثًا وَالشَّمْسَ وَالْقَمَرَ وَالنُّجُومَ مُسَخَّرَاتٍ
تَبَارَكَ اللَّهُ رَبُّ الْعَالَمِينَ بِأَمْرِهِ ۚ أَلَا لَهُ الْخَلْقُ وَالْأَمْرُ

- VERILY, your Sustainer is God, who has **created** the heavens and the earth in six aeons, and is established on the throne of His almightiness. He covers the day with the night in swift pursuit, with the sun and the moon and the stars subservient to His **command**: oh, verily, **His is all creation and all command**. Hallowed is God, the Sustainer of all the worlds! [M. Asad]
- Indeed, your Lord is Allah , who **created** the heavens and earth in six days and then established Himself above the Throne. He covers the night with the day, [another night] chasing it rapidly; and [He created] the sun, the moon, and the stars, subjected by His **command**. Unquestionably, **His is the creation and the command**; blessed is Allah , Lord of the worlds. [Sahih International]

The specific part of the verse I want to draw attention to is emphasized.

The word “*khalq*” (خَلَقَ) is translated here as “created” and “creation”.

The word “*amr*” (أَمْرٌ) is rendered as “command” (as the root A-M-R is known to mean). In quite a few other translations it is rendered as “law” or “order”.

Both can be associated with the act of creation. *Amr* is mentioned in 2:117 in the context that when Allah wills something, He simply commands it to “Be” and it is. So this act can refer to a sudden creation *ex nihilo* or from nothing.

Khalq, on the other hand, is taken to mean creating in the sense of forming out of something else (or in “stages” or in the sense of a process or evolution). You and I, for example, were created in the sense of *khalq* by the process by which we were conceived by our parents and born from our mothers' wombs. This happens upon the command of Allah (so *amr* can be seen as the initiation of creation and *khalq* the process by which it comes into being).

The essence of Islamic atomism is the idea that the substances (*jawhar*) underlying all bodies (matter) are created anew at every moment of time (time itself being a marker of each act of creation, our experience of this process). This has sometimes been traditionally thought of as referring to actual elementary particles being continuously created and annihilated in a void. Indeed that description bears much resemblance to modern particle physics. In fact, Islamic theology has been predominantly characterized by foreign commentators throughout history for its “particle metaphysics”, both from within the Muslim world and without. Mostly due to the strange and novel nature of the doctrine (which, unlike many other concepts in Islam, wasn’t copied or emulated too much by others). Even Maimonides treated it like a curiosity.

On the one hand, this must be the case, for bodies have real existence made of matter. So the *jawhar* has to be real, implying there are elementary particles (substances, indivisible constituent pieces of matter) being created from nothing on the command of Allah. On the other hand even this definition can be slightly ambiguous in the context of *khalq*. Is the *jawhar* created purely from God’s command (*amr*) or also in the sense of *khalq*? But how can it be created in the sense of *khalq* if it is to be the prime unit of matter which cannot be further divided and is itself constantly created anew?

According to the metaphysics of Imam Maturidi, the ‘*aradh* (accidents) clearly dominate and even form the basis for the substances. Yet his view is actually additive to the traditional atomism of Imam Ash’ari. It does not rewrite it, it just expands on the idea in a different direction. The key to understanding this lies in the idea of “*ex nihilo*”, or “from nothing”. As the Qur’an itself says in places that things could exist yet be in a state of nothing, for example how the particles which we are made of came together to form us, but were already present before we were. We were “nothing” even though the constituents of our bodies were actually here.

This is getting back to the essence vs. existence of Plato and Aristotle. The Islamic orthodoxy’s view is that for all created things the essences are real and exist within the created things (similar to Aristotle’s viewpoint). The essence of a thing does not precede its existence (in opposition to Plato). The slight twist on this comes with God’s creating in that God’s command, the *amr*, can be considered an example of the essence of a thing existing, in the command of God, before it comes into existence. Where the orthodoxy draws the line here is with regard to semantics. We do not say that the essence of a thing has *real existence* before the real existence of the thing in question. So, in a way, we can acknowledge that the essences of things have some kind of existence through God’s command and timeless knowledge, but it’s not “real existence”. Even the “real existence” of the essences still lacks ontological externality because these exist within the things themselves, constituted of their *essential attributes or properties* (simply put, characteristics which make something what it is, which constitute its identity).

To quote the commentary on the Nasafi Creed (*Sharh al-’Aqaid an-Nasafiyyah*) from

earlier,

And it may be said further that that which constitutes the identity of a thing is, with respect to its being verified as having external reality, a real essence; and with respect to its being individualized, it is a certain particular thing (*huwiya*), but without respect to either of these it is a quiddity.

Thus in our opinion the term *shay'* (a thing) is identical with the term *al-mawjud* (that which exists); and the terms *al-thubut* (real existence), *al-tahaqquq* (being verified as having real existence), *al-wujud* (existence) and *al-kawn*¹⁵ (coming-into-existence) are synonymous, and the meaning of them is immediately perceived (*badihi al-tasawwur*).

So even though we can say the essences of things “exist” timelessly in God’s knowledge and then even immaterially in God’s command (*amr*), this is not “real existence” and thus this isn’t a “real essence”, not until God’s command is executed and the thing created (*khalq*). This isn’t a “spiritual world” or “world of Forms/Ideals” unto itself like that of Plato, Descartes, and other essentialists. We would rather not even call it “essence” just for the sake of avoiding confusion. Simply calling it God’s knowledge or foreknowledge is enough. But with regards to the immaterial essence “contained” in God’s command, this excerpt from the *Ma’ariful Qur’an* commentary sheds some light,

In Sufi thought, '*Khalq*' and '*Amr*' are two domains. '*Khalq*' relates to matter and '*Amr*' to the refined abstract. The Qur'anic verse: (Say, "The soul is a command from my Lord." - 17:85) points out in this direction that "*Ruh*" (soul, spirit) has been identified as a command from the Lord. The sense of the creation and the command being exclusive to Allah Ta'ala would, in this light, mean that everything between the heavens and the earth is from matter and its creation has been called "*Khalq*." And what is beyond these, free from matter, its creation has been called "*Amr*." (Mazhari)

The translation of 17:85 is in the sense that the soul is *from* or *of* the command (that is how it’s translated usually, in fact). We must always keep in mind when trying to understand the Qur’an that the language can sometimes hold multiple meanings, especially in different contexts, but often evoking similar or related principles. Thus the phrase “in this light” in the above commentary. Everything here is just one way of looking at it (in fact it’s an attempt to unite a few different ways of looking at it by principle).

The commentary goes on to indicate that where Descartes or Plato had their other secret worlds of forms, we have a loose correlation in that there is the world of physical creation (*khalq*) and then there is God’s command (*amr*). The latter is not thought of as a separate “world” typically, and its influence is reduced to the behavior of natural laws in most cases. I will expand on this idea shortly.

We will actually not speculate any further beyond the literal text here as to how *Ruh* relates to *Amr* because the Qur'an also indicates in 17:85,

- ...of knowledge it is only a little that is communicated to you, (O men!) [Yusuf Ali]
- ...and [you cannot understand its nature, O men, since] you have been granted very little of [real] knowledge. [M. Asad]

Which indicates that we have not been giving knowledge of how exactly God's command or *amr* relates to the idea of a soul, or *ruh*, just that it does.

What we can say, though, is that *ruh* is sometimes translated as "inspiration", which does make more sense in the context of the terms "essence" and "command" (*amr*). We should at this point marginalize the term "essence" because it is not like the more philosophically important "real essence" just mentioned. It's kind of a philosophical stand in term for soul or spirit. It is abstract in philosophy and in theology it takes on a spiritual connotation.

So, from that we can only conclude that there seems to be some association with God's command, in at least some sense, having immaterial existence.

We need to carefully define exactly what is meant by "immaterial existence" at the end of the previous sentence. It is not meant "massless", like how a photon or some other elementary particles may be massless. The word "immaterial" can be used to describe that too but that usage is not what is meant here. What is meant here is immaterial in the way that *the laws of nature* are immaterial. This is the best way to conceptualize it, by associating it with other things we know and have experience of which behave similarly.

The fundamental forces, sometimes associated with laws of nature, are not actually laws of nature. They are fundamental forces or interactions. We traditionally think of them as like laws of nature (i.e., "the law of gravity") but when it comes to the three other than gravity at least, we have reached the point of measuring physical effects which we explain as virtual particles (acting as force carriers). Though these are not "real" and are merely how the energy seems to behave, there is still some material aspect involved in how we measure or detect these phenomena. It's very close, and it's something we'll move to shortly, but the fundamental idea here is that God's command, *Amr*, is at least or at most immaterial in the way the laws of nature are. You can even *feel* the laws of nature if you think about it, in spite of their lack of material, tangible form. They have real, measurable, material effects.

This brings us full circle, after a few hundred pages, in finally uniting the underpinnings of "natural philosophy" or philosophy of science with Islamic theology in the latter's terminology.

The laws of nature are just the *Amr* of God. The law(s) of God. The (natural) order of

God (orders or commands given by God).

The description I had been using up until this point was a very conservative one, saying that the laws of nature merely describe the *behavior* of God, whatever that behavior was. In this case, the behavior of God's creating, the Customary Way. This had a degree of arbitrariness to it, depending on whether you believed in God or not. It's been the desire of philosophers and scientists to keep the word "law" because with that word came a connotation of stability, that the laws of nature wouldn't simply upend themselves. And the occasionalist perspective seemed to be the opposite of that. Nature was only as stable as God made it. For people of faith, this became a non-issue. For people without faith, this became a source of alienation and confusion. This confers to the idea a slightly greater feeling of stability by virtue of the language used. As was described earlier, laws describe behavior, the laws of nature therefore describe the behavior of nature. Nature, according to any panentheistic theology, is either God (pantheism) or the work of God (occasionalism). Thus the laws of nature are the behavior of God (of God's creating). The Qur'an, however, does not use the term behavior or even Customary Way, it uses the term *Amr*, God's command or decree (also translated as law or order). So we come back to the term "law" except now we say that it is more appropriate to call it *God's laws* and *nature's behavior* if anything. What that distinction does is bring to mind the natural order and man's place within it.

For when we talk about gravity, then whether we call it behavior or law (of God or nature, depending on your faith) doesn't matter. It is the same. Likewise the various types of life also follow the deterministic laws of nature (i.e, God's decree or predestination). Unchanging behavior is preferred to be known as "law". It is only mankind which, in its own *social order* (which was one of the preferred definitions of religion given very early on in this document), exhibits free will. Our "laws" are seen by most as self-defined and our behavior can conform or deviate from them (believers obviously say that we should follow God-given laws and rights over man-made ones). I said before that Islamic theology uses the idea of our metaphysical soul (*ruh*) to act as the "seat" of our true nature as free willed beings. This is what I was referring to.

The *Ruh* of man is from the *Amr* of Allah. Our soul is a command, it is *like a law of nature*, but an inconsistent one. It's like a command given by Allah *which can try not to execute*. Allah made this distinct or special type of command to be free by design. In other places in the Qur'an the Archangel Gabriel (as) is called the Holy Spirit (where the word *Ruh* is also used). The idea is that the command which executes of its own accord is better than the one which has no choice in the matter. This is where we reach the limit of our knowledge regarding *Ruh*. What does it mean for a command to have its own accord or will? How is this possible? Is the *ruh* entirely synonymous with *command* or only partly so? We do not know.

It's traditionally related by Sufi shaykhs that our souls are created in a pure state and that through our physical behavior or actions, our connected souls can thrive or even

with and become “stunted”. When a soul is so deformed it alters one’s perception, eventually to an irrevocable degree (what the Qur’an mentions as the hearts being sealed). The soul and its heart (*qalb* or the “heart of the soul”, which acts as almost like the mind of the soul) is a source of spiritual intelligence or where we can now aptly use the term *inspiration*. The way I have been mentioning it thus far is to say that we have to use our free will to conform to the natural order, and our natural order is given to us not by traditional physical information (DNA), but in language from God. This is a restatement of that same concept. Our souls, the seat of our free will, are (effectively) laws of nature. Each individual has their own soul and thus is like an independent law of nature from every other individual. The “essence” of a law of nature is that it is the command of God.

In Islamic tradition it is related that the *Ruh* is made of *Nur*, which is often translated as “divine light”, or the “light of Allah”. This does not mean that God is literally made of light, as it is sometimes assumed. The other usual notion is that this “heavenly substance” makes up angels and our metaphysical souls. While the latter is true, God is not material. A verse of the Qur’an elaborates on this,

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

اللَّهُ نُورُ السَّمَاوَاتِ وَالْأَرْضِ ۚ مَثَلُ نُورِهِ كَمِشْكَاةٍ فِيهَا مِصْبَاحٌ ۚ الْمِصْبَاحُ فِي زُجَاجَةٍ ۚ الزُّجَاجَةُ كَأَنَّهَا كَوْكَبٌ دُرِّيٌّ يُوقَدُ مِنْ شَجَرَةٍ مُبَارَكَةٍ زَيْتُونَةٍ لَا شَرْقِيَّةٍ وَلَا غَرْبِيَّةٍ يَكَادُ زَيْتُهَا يُضِيءُ وَلَوْ لَمْ تَمْسَسْهُ نَارٌ ۚ نُورٌ عَلَى نُورٍ ۗ يَهْدِي اللَّهُ لِنُورِهِ مَن يَشَاءُ ۚ وَيَضْرِبُ اللَّهُ الْأَمْثَالَ لِلنَّاسِ ۗ وَاللَّهُ بِكُلِّ شَيْءٍ عَلِيمٌ

- Allah is the Light of the heavens and the earth. The Parable of His Light is as if there were a Niche and within it a Lamp: the Lamp enclosed in Glass: the glass as it were a brilliant star: Lit from a blessed Tree, an Olive, neither of the east nor of the west, whose oil is well-nigh luminous, though fire scarce touched it: Light upon Light! Allah doth guide whom He will to His Light: Allah doth set forth Parables for men: and Allah doth know all things. [Yusuf Ali]

First we notice that it says Allah is the Light of the heavens and the earth. Again, this does not mean that Allah is literal, tangible, or like actual light. Light, as discussed in a previous section, is characterized by being 1) unchanging and 2) illuminates other things, allowing them to be perceived. Allah is unchanging and His existence “illuminates” the existence of other things (in that it is all dependent on Him and His will).

The parable given is perfect for understanding. The *Ma’ariful Qur’an* first relates it to the example of the *Nur* in the heart (*qalb*) of a believer. Consider the heart in its place (niche) in the chest. Within it is the *Nur* given by Allah (through the *Ruh* we could say).

The glass here then refers to the heart which becomes illuminated brilliantly by the *Nur* within. Since the heart or *qalb* is like a source of intelligence or inspiration for the soul this is reflected in the clarity of man's perception and insight (his inspiration), and in his decisions (choosing to conform to Allah's order). The *Nur* of the *Ruh*, connecting the *qalb* of the *Ruh* to the physical body and mind of the human, manifests most naturally as the instinct to see God in or behind (as cause) of nature. It is thus present in all humans but to varying degrees of manifestation. As mentioned earlier, the soul can become stunted or deformed, which means the *nur* in the heart gives altered perception. In spite of that, the belief in some form of mystical or spiritual underpinning to the natural world characterizes the overwhelming majority of all humans who have ever lived. Even among those avowed naturalists signs can still be seen of it in those with a strong sense of inherent morality, justice, etc.

I would like to draw a distinction between atheism and naturalism here because naturalism is more like a psychological mindset which filters the spiritual intelligence as it reaches the rational level. In Islam the philosophical or psychological "Self" is called the *Nafs*.²⁸⁸ Naturalists, especially those with sincere passion for science, will tend to express this inherent nature in ways that subconsciously evoke God (i.e, multiverse, faith in the unchanging laws of nature, primacy of truth over falsehood, etc). On the other hand atheism can overlap with naturalism but doesn't need to (since naturalism can overlap with panentheist theologies). The forms of atheism that overlap with naturalism are more like the "spiritual atheism" that evolved from some pantheistic or naturalistic-pantheistic traditions. Other forms of atheism are just outright denial and rejection of God, and these don't need to have anything to do with science or philosophy, it's just a person's own emotional reaction and belief, often as irrational as the faith they decry in theists. We see examples of this among the ignorant and uneducated just as often (if not moreso) than we do in intellectuals. In our day it is hard to distinguish between the two, especially in the West where religion is seen through a Christian filter.

Another example of that parable to understand the idea of "Light" as it used with Allah in this verse is actually the example of supermassive black holes in the center of galaxies. These suck in everything, including light, so the invisible black hole is surrounded by a cover of brilliant light, looking very much like the opposite of what we'd expect of a black hole. A black hole is seen as a destructive force, its opposite, a white hole,²⁸⁹ would perhaps appear similarly, but light (energy) would be emerging from it, not going in. Allah is the source of all creation, of all existence, and His creative action (His creating) is manifested in its purest or simplest form as pure energy. Allah does not have a location or a physical body, like a black hole or white hole does or like the lamp in the parable does, but the light of existence/creation is similarly brilliantly reflected among all created

²⁸⁸ Sometimes *Nafs* is used synonymously with *Ruh*, other times it means the psychological/philosophical Self which is very different so it can be a source of confusion depending on the author.

²⁸⁹ Purely hypothetical. We have no evidence of their existence or any reason to assume they are at the other ends of black holes. They are just allowed by Einstein's equations.

things (light being a significant metaphor for aforementioned reasons) and creation similarly “obscures” our view of the source of existence, like how the light obscures our view of the interior of the lamp.²⁹⁰

Returning to the topic of creation, we can say that God’s command corresponds to the laws of nature. But how, then, does creation arise? Does it arise from this command in some kind of tangible manner (*khalq*), or is it really from nothing? The best answer to this actually comes from science. Some laws of nature turned out to be more like fundamental forces or interactions, which had physically perceptible or materially detectable energetic activity which could be described in the language of particle physics.

It would seem that there is some connection between God’s command (*Amr*), the laws of nature (what we might call metaphorically the “soul” of nature), *Nur* (Allah’s Light), and *‘aradh* as Imam Maturidi described them (in that progression or order).

The *jawhar* of Islamic atomism, therefore, would be of two kinds.

There would be a fundamental *jawhar*, which must be something massless (immaterial and without the accident of spatial meaning, dimensionless), unchanging (for it exists in only one instant of creation and experiences no time, though the duration of this instant can vary relative to other things), and representing the pure creative action of God (energy). It would be a particle (or “unit” to put it more aptly) of pure energy, very similar to a photon of light (except that a photon already has the *‘aradh* which gives it spatial meaning whereas that would not be a given here). It would be difficult, if not impossible, to distinguish this *jawhar* from an *‘aradh* by its nature (because an *‘aradh* is required to have spatio-temporal existence or meaningfulness). In fact, in both our metaphysics and in much of actual physics, it’s easier to not describe it as a “particle”. This is similar, in behavior, to quantum field theory, where elementary particles are described as excitations of fields (which also allow us to better model the “wave nature” of creation at this level). Or a better fit would be similar to the vibrating units of pure energy in string theory (described by frequencies). This *jawhar*, by such a description, must occur below the Planck scale and is not detectable empirically by any instrumentation we currently have. In fact, it cannot exist without at least the accident of existence, so this is, without any accidents, more like a potential substance. We’ll at least give it the minimum accident of a limited existence so it is like a unit of pure energy or creation/existence.²⁹¹

Then there would be the compounded traditional *jawhar* (let’s call it “material *jawhar*” for our purposes here) which has mass and/or takes up space, like many of the current elementary particles described. This is the *jawhar* of matter (whereas the previous was

²⁹⁰ Orthodox theology believes in the Beatific Vision, that believers in Paradise will get to see God, without knowledge of how that will occur.

²⁹¹ We cannot say to what degree it must have spatial and/or temporal existence, this would be a job for physics were it possible to investigate phenomena smaller than the Planck scale.

more like a *jawhar* of energy, or creative action of God, or even just existence). This more or less actually corresponds to modern quantum field theory which describes the levels at which energy takes on mass and gains spatial and temporal meaningfulness (ontological externality in the context of real existence as we would say).

Physics does not have a solidified picture of reality at these levels yet. For example, virtual particles. But we can grasp the essential relationships of the occurring interactions.

What we're left with is a picture of 'aradh and "fundamental *jawhar*", beyond our empirical reach (metaphysics), compounded in *taba'i* (natures, fundamental interactions) and "material *jawhar*" which are now coming within empirical reach (particle physics).

Before continuing, let's add another verse to the picture. 36:36 from *Surah al-Ya-Sin*,

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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

- Limitless in His glory is He who has created opposites in whatever the earth produces, and in men's own selves, and in that of which [as yet] they have no knowledge. [M. Asad]
- Glory to Allah, Who created in pairs all things that the earth produces, as well as their own (human) kind and (other) things of which they have no knowledge. [Yusuf Ali]

The meaning of this should be apparent. Nonetheless, here's the *Ma'ariful Qur'an* commentary,

Here, the word: (*azwaj*) is the plural form of: (*zawj*) and means pairs. A pair is two things of the same kind and refers to a couple, or a match of the other. For example, a married man and woman is a pair, hence, each one of them is the *zawj* of the other. Similarly, males and females of animals are pairs. In the botanical kingdom, many trees have been found as having males and females among them. Date palms and Papaya are common examples. Others may also be like these as is the case with all trees bearing fruits and flowers in which, according to modern scientific information, procreation has been identified. In the same way, it is not improbable if the same arrangement of male and female exists in solids, minerals and other elements of creation, though in a manner not discovered as yet - towards which the text points out in: (*and from that which they do not know - 36*). Generally, commentators refer to: (*azwaj*: pairs) as categories and kinds

because the way male and female are called pairs, similarly, two contrasting things are also referred to as pairs, like chill and heat, land and water, sorrow and happiness, health and sickness, then, within each of these, many further degrees, categories and kinds come up in terms of high, low and the average. Similarly, there are many categories and kinds in human beings and animals in terms of color, form, language and way of life. The word: (*azwaj*: pairs) is inclusive of all these categories and kinds. In the present verse (36), mentioned first is: (all the pairs of whatever the earth grows,) - These are the categories and kinds of vegetation. After that, in: (and of the humans themselves,) mentioned there are the categories and kinds of human selves as such. And after that, in: (and from that which they do not know) included there are thousands of such creations as have not yet unfolded before human beings. Allah Ta'ala alone knows how many categories and kinds of living forms, vegetation and minerals exist under the layers of the earth and in rivers and in mountains.

The reason I like citing the *Ma'ariful Qur'an* commentary, aside from its authority coming from some of the oldest and well known commentaries, is that it explains the logic of the interpretation in terms which are free from any accusations of anachronism. We can clearly see here that the classical interpretation of this verse encompassed philosophical concepts of symmetry among various categories/kinds. So it's no surprise that this was applied by Imam Maturidi to his *taba'i*. And we could therefore also apply it to (material) *jawhar*.

When virtual particles are created and annihilated out of the vacuum, it's always in pairs (particle and antiparticle). What is actually being described is the wavefunction of quantum field theory undergoing a "canonical quantization procedure" briefly mentioned in previous sections. Instead of a wavefunction, creation and annihilation operators are used to describe the quantized amplitude of a field. So when there is an "excitation" in a field of a certain amplitude, that excitation corresponds to the creation of particles. When that disappears (like a ripple in the field, described mathematically as oscillation²⁹²), that corresponds to the annihilation of the particles. This is explained as opposite particles meeting and annihilating. This is just an intuitive description of the math, however. What the math actually depicts is just the "ripple" in the field. Describing this ripple as a particle is not literal, only functional (the reason is that the same principle applies to actual particles, they too are excitations of fields, but not fluctuating in and out of "physical" form). There is a minimum amount of energy or energetic activity always present, so the vacuum is not empty.²⁹³

²⁹² Think of something bobbing up and down in water as waves pass. The height of the movement is the creation "state" (there is enough energy to exert an effect akin to existing particles), the dip is the annihilation.

²⁹³ In actuality, the "ripple" refers to the stable, existing particles. Virtual particles are the results of mere imperceptible disturbances in the field that occur such as when two ripples pass by each other or interact, so they are not even ripples. I used that language just to aid conceptualization.

So it cannot be argued that the creation and annihilation of particles out of the vacuum, upon a closer look, bears no resemblance to the Islamic metaphysical notion of elementary particles being continuously created and annihilated. The metaphysics of the Islamic orthodoxy were more expansive than that simple picture and even the detailed description of virtual particles only appears to further reinforce a fundamental compatibility between our theology's metaphysics and modern physics. People simply neglect the role of *'aradh*, the other half of atomism, when theologians have in fact been placing more importance on its role than on *jawhar*. Imam Maturidi's understanding of *taba'i*, fundamental constitutive interactions (*'aradh*) of fundamental *jawhar* (corresponding to units of pure energy most likely), seamlessly arrange between symmetric constructive configurations (giving rise to Imam Ash'ari's material *jawhar* of empirically measurable existence) or asymmetric destructive configurations (annihilation of *jawhar*)... all according to the command (*Amr*) of God (God's laws of nature).

This much is in full agreement with established orthodox theological views of the past several centuries.

If we wished to become highly speculative, we could wonder about whether there is metaphysical existence, of sorts, for God's *Amr* from which the fundamental *jawhar* are derived. We could wonder whether the pure energy spoken of corresponds to *Nur* and whether we could consider what we observe of it with respect to nature and its fundamental forces and laws, as nature's own kind of real "soul", or whether these correspond to angels (i.e, whether angels are the "soul(s)" of nature). And whether our own souls have a similar existence, though that much at least is going to be out of our reach in this life (the Unseen or *al-ghayb* as it is called, referring to the world of souls, spirits, angels, etc).

I would like to discuss for a moment that verse of *Surah al-Mulk* mentioned at the end of the previous section (in the statement of the physicist who won the Nobel in '79).

The full verse actually refers to cosmology. Allah says He has created the seven heavens, described as in layers or in harmony with each other depending on the translator, and then says there is no flaw, incongruity, or disproportion in its construction. He asks man to make repeated inquiring looks at the heavens (the literal Arabic word, translated as sky or as heaven, means that above us), our gaze comes back to us, worn out (there is no better description for the effect of looking at how large the universe is compared to us). The next verse begins by saying that the lowest heaven is the one adorned with stars and these act as a barrier, driving away "the evil ones" (*djinn*) for whom a penalty of blazing fire (like missiles²⁹⁴) has been prepared, referring to stars.

Djinn in Islamic theology are equivalent to spirits, demons, or fallen angels in other

²⁹⁴ This language is from 7th century Arabia where our modern ideas of missiles, rockets, bombs, etc did not exist.

theologies. They are spirits of free will, like ourselves, but who do not subsist in physical matter like we do (where our brain is the seat of our consciousness, our rational mind, and our willful activity). In 15:27, after mentioning the creation of man in the previous verse, Allah says about the *djinn*,

- whereas the invisible beings We had created, [long] before that, out of the fire of scorching winds. [M. Asad]
- And the Jinn race, We had created before, from the fire of a scorching wind. [Yusuf Ali]
- And We created the ones who are spirits before from the fire of a burning wind. [Bakhtiar]
- And (the race of) jinns', which We had created before, from the smokeless flames (of fire). [S. V. Ahamed]
- And We created jinn before this from a smokeless blazing fire. [Tahir ul-Qadri]
- And We had before created the devil of [subtile](#) fire. [George Sale]

Regarding the meaning of this,

Djinn are created, it's related, from the smokeless and invisible tip of fire. This very obviously is referring to the convection currents you see when during a hot summer day there is shimmering above the pavement. The shimmering is from the light refracting as it passes through an altered medium, a mass of air which is not uniform in heat, and the shimmering takes the appearance of the patterns of heat dispersed in the air.

Just as our consciousness subsists in the firing of electrons, a mixture of chemical and electrical energy, within the closed system or mass of our brain, the *djinn* subsist on what we believe to be heat energy of an open system (not within a closed physical system). Thus their consciousness is disembodied and "floats" around, traveling on turbulent patterns of convection currents.

We don't know what their tolerance is to what temperatures but it's assumed that any amount of energy at all would do as a medium since it's assumed they (or at least some) can travel through the cold reaches of space. So it's not actually heat per say that distinguishes them from us, since energy can be converted from mechanical to chemical to heat, but the fact that "heat energy" is a more pure form of "unrestrained" energy. It's the simple movement of energy from "one body, region, set of components, or thermodynamic system to another in any way other than as work."
(Wikipedia)

Whereas we must perform work (and toil, exerting great effort) to engage in manipulation of energy (i.e, transfer), the *djinn's* will is more directly

connected to its mode of self expression which becomes comparatively effortless.

We do not know how limited the *djinn* is because in theory if a consciousness can subsist in that fashion it could also theoretically subsist in all manner of energy transfer, including electromagnetic or even gravitational energy. It's likely the *djinn* are limited to overt thermodynamic forms, however.

[...]

The *djinn*, unlike man, were of a mischievous disposition, prone to chaos and evil. There are good believers among them but the majority are of this former *fitra* (disposition). This was also tied in to the nature of their being. It's easy to become drunk on power and forget that God alone is the true agency of power when your will is so directly connected to your means of self expression. Humans, walled off from the outside world by our subjective interpretation of limited physical experience, are more predisposed to appreciating their own utter lack of agency...²⁹⁵

They are sometimes described, somewhat sensationally, as beings of pure chaos or disorder. That is itself not really a coherent concept but the relation to heat and fire in the context of entropy and disorder shows what the thought process is behind that.

When exactly they were created is pure speculation but one idea I've come upon recently is that they were created during a much earlier time of the universe, when it was in a hot, primordial, chaotic phase. Another idea is that they were created during an earlier period of our planet's history when it was in a hot, chaotic, and barren state.

As such they can be seen somewhat as the polar opposite of angels who are made of *nur*, or light. Comparing the connection between our own souls (*ruh*) as the command (*amr*) of Allah and *nur*, it is not surprising that the *djinn*, being composed of heat or fire, are far more prone to disobey Allah.

God mentions in the Qur'an that they too will be judged and will face a severe flaming chastisement (Hell) that even they, beings made from fire, cannot stand. This adds a significant amount of context to the verse about stars being used to bar them from the far reaches of our observable universe (the lowest heaven, assuming that's the only one we can see). They would be killed rather easily in them.

The Qur'an (and the hadith) indicate that the *djinn* travel to the reaches of the lower heaven to "eavesdrop" on the angels and pick up information regarding future events, which some of them then use to mislead or trick humans with.

²⁹⁵ <http://maarifah0.blogspot.com/2012/02/adam-iblis-and-evolution.html> (See also: [here](#) regarding the relationship between *djinn* and mankind)

This brings up the curious relationship between angels and the command (*Amr*) of Allah and their role in relaying information about the command or decree of Allah to the creation. This was mentioned in passing earlier but I didn't say anything further on the subject. According to what we've just covered, it would seem that angels are more than simply "like laws of nature" (as the phrase was used to describe our souls earlier), but are actually involved in some manner with the function of the physical laws of nature. This lends some support to the idea that the command of God can be granted the ability to somehow take form at times. Compare this with what was mentioned in the earlier section on Leibniz and how he posited "perception" (or a type of passive will) of all things, to different degrees. And as we know from our scriptural texts, God will give voice to ordinarily inanimate or non-intelligent things on the Day of Judgment to stand as witnesses. It could be that the highest form of physical existence is as *nur*, the Light of Allah, which represents the actual laws or commands of God. It can take living form like angels.²⁹⁶ Our souls' perception and will might be connected to our social order (how we treat each other and our rudimentary experience of the physical world) while the angels could be connected to the actual physical or natural order of the creation (which has no free will). While we have the potential to swing either way, obeying the order or laws God set out for us or refusing, and angels must always obey, *djinns* represent free willed creation from a more disordered physical form which usually disobey.

Some might be tempted to try and reduce these concepts about the *Al-Ghayb* (the Unseen) into metaphor, by saying that angels are metaphors for the laws of nature. From there the only logical course of action is to reduce everything, even God, to a metaphor. This is a denial of orthodox Islamic *'aqeedah*. Belief in the Unseen is a part of the religion, thus the reality of angels in their intelligent and communicative forms (which the Qur'an describes and which the Prophet (saw) interacted with) must be upheld. The issue is that this is trying to reduce the "supernatural" to the natural, which is the typical naturalist non-Islamic practice. Our goal is not that, but the reverse of that. To expand the meaning of the natural world via the Unseen "supernatural" world without in any way denying the natural world. So if we say there is a link between the laws of nature and angels, we mean to not deny either anything we know about the laws of nature, nor anything we know about angels from the Scripture. We cannot reconcile the two without significant speculation, but it could hypothetically be done. We don't, however, go to that extent since this is the other end of metaphysics, the part which borders on more pure theology, and speculation in this regard is a pointless exercise.

Rather than speculation, what is being discussed here are various ways to conceptualize the matter from different angles, to give us a better sense of what is going on, even if we don't know *how* it is going on.

If we consider that our souls are somewhat like laws of nature themselves, in how they

²⁹⁶ The one point about which we have no foundation from which to even speculate as to how this occurs.

manifest in this world as unseen influences governing our physical behavior, but laws which are inconsistent and change of their own accord. Each soul is a law for that body it represents or is connected to. This way we can conceptualize the idea that a seemingly abstract “law” can be given voice, will, perception, and so on and so forth (as it happens within us).

Similarly, from another angle, the angels could represent the “souls” of the larger laws of nature (or other natural laws we have not described), the *actual* natural laws governing the physical order of the universe. These laws are the ones whose consistency and uniformity we take comfort in, and upon which all science is based. Just as a law representing each will associated with each physical body of a human can be seen as having intelligent, communicative form, so too could even those natural laws be given such form.

The simplest example is how natural non-living or non-intelligent things will be given “voice” on the Day of Judgment (i.e, there is an illusion of them being non-perceptive in our experience, but they have perception and possibly even (non-free) will). Which is to say that it does happen but we do not know how it happens.

What we observe of the laws of nature might simply be an artifact of our limited perceptive faculty. The reality could involve willfully perceptive angels but what we observe is just indirect effects on the behavior of the world. The same goes for the human soul (we do not see it, but we see its effects and we see that sentience and will is one of its manifestations). It would, at least, concur with the Prophet’s (saw) account of his witnessing of the Archangel Gabriel’s (as) “true form”.²⁹⁷

The point of this section is to show that Islamic occasionalism is truly a part of Islamic theology, that all of Islamic theology, particularly with regards to the *Al-Ghayb* (Unseen), seamlessly fit with our occasionalist conception of Allah. The idea that angels, spirits, souls, etc are like the completely imaginary figures from the minds of European artists (humans with wings, or horns, or tails) is completely alien to Islam. Nor do these things possess causal agency in themselves. It is still Allah controlling nature. These entities from the Unseen are manifestations of Allah’s command or laws, not independently acting agents. In fact, our own souls are like this.

Regarding the popular association with such forms, both angels and spirits have the capability to affect the perception of man (such that the vision of Gabriel (as) was a change in the Prophet’s (saw) perceptive faculties, not a physical change in state of Gabriel otherwise not only would everyone else in the world have seen him too, it could have upset the natural/physical order of the world). They also have the ability to take on physical form, and it is these which are the cause for the aforementioned associations in modern culture (as humans or animals). How the physical form is taken is unknown,

²⁹⁷ The Prophet (saw) said, “I saw Jibreel descending from heaven, and his great size filled the space between heaven and earth.” (Reported by Muslim, no. 177).

but it does not represent their true nature or state. So skepticism of accounts of seeing spirits or angels in human form is perfectly fine, just not in principle (because according to our theology, it can happen and the most undoubted cases involve the Prophet (saw) and his companions in the hadith canon, there is no compulsion to believe any other account without satisfactory proof²⁹⁸).

With regards to our souls and thinking of them in the manner of each human being's behavior being governed by his or her own specific "law", this is manifested most clearly in the incredible difficulty involved with scientific study of human behavior. We can study the behavior of the rest of the world (the laws of nature) so closely such as to deduce the Big Bang or the expansion of the universe, but our "social" philosophy has progressed very little throughout human history. Indeed, if our behavior is governed by natural laws, they are not like the other laws of nature and lack what makes those so predictable (uniformity). This is consistent with the idea of individual free will. Our entire progress in these fields has been limited to exploring our natural dispositions (*fitrah*) which we all generally share to one extent or another, but we have no way of describing in mathematical/logical terms our rational thought beyond that. Rather, we try to willfully conform our thought to mathematical/logical terms which we pick up through experience and by nature.²⁹⁹

To summarize then... there is the physical world which we can call the physical creation (*khalq*) and there is God's command (*Amr*). God's command is by God's light (*Nur*) and the spirit (*Ruh*) is from this. This includes our souls, which are the command of Allah which govern the behavior of our physical bodies, and angels which are the command of Allah which govern the behavior of *at least some of* the rest of the natural order (to what degree and detail is unknown). The former have free will while the latter do not. We do know that they are at least involved with the relay of some information regarding the physical order. Information in turn is gained by us (after the fact) through derivation from the order inherent in the physical world.

With regards to information, any variable quantity allows for multiple values and thus information. These usually manifest in some oscillatory or wave-like fashion (think Fourier transform to aid in conceptualization), from the vibrations of strings of energy, the quantized angular momentum of particles, all the way to the double helix of DNA. Information conveys the laws governing behavior (it informs as to what action to take). This then extends to our languages which have physical form in our writing, speech, and thoughts, which also communicate information and also communicate our laws. And we believe the Qur'an is an example of this (it contains the laws not encoded into our physical makeup so that we might choose whether to obey them or not). The exact relationship between information and the command of Allah and the angels is unknown

²⁹⁸ Which for many people means unless they see such a thing with their own eyes.

²⁹⁹ The idea of *a posteriori* and *a priori* knowledge being parallels cannot be correct. At the very least there must be a point of origin for each person where both emerge from the same union (during some stage of our development).

but we can speculate that since the information is not inherent in our souls, our soul being that “law” which governs our behavior and makes us who we are (our essence) and which is thus “uninformed” by default, this disconnect is involved with our free will.

The “world” of God’s command is the *Al-Ghayb* (Unseen). The entire physical world (*khalq*) is governed by God’s command, which can have correlating “forms” (of *Nur*) in the Unseen, but the two are distinct modes or phases of creation (one is not simply a projection of the other, implying redundancy... the *purpose* of God’s command is often the *khalq* or physical creation). Therefore we uphold in all facets of theology the real existence of the physical world as necessary (and would seek to do the same in philosophy³⁰⁰). Keeping this in mind, God’s command governs the physical world of creation through the continuous renewed creation of substances and accidents.³⁰¹ The substance is the raw creative action of God (*khalq* in its purest and simplest form, pure “energy”, or what was termed “fundamental *jawhar*”) and is made by God’s command (*Amr*), which manifest physically as immaterial constitutive accidents (like forces or interactions) including the accident of existence and rest which is the emergence of matter (*khalq* with spatio-temporal meaning and real external ontological existence, forming “material *jawhar*”).

This view would expect the current status quo where the the physical world at the most minute probable scales appears "fuzzy" or "grainy" in that it would be hard to *empirically* distinguish between substance, accident, and the law which governs them. This is not a limit on God or a flaw in His creation nor does it indicate anti-realism. It only indicates a veil of separation between the physical world and what lies beyond, which in Islamic theology is the Unseen world of God’s command and God’s light. It also reflects the idea that there are multiple possible outcomes of the natural order, and this may or may not correspond to the seven worlds described in the narration of Ibn ‘Abbas (ra).

Describing nature as the behavior of God(‘s creating) is essentially accurate and suffices as a succinct statement of Islamic theology (i.e, occasionalism). The Qur’an does not give us knowledge of the Unseen beyond what we have discussed of its existence and its effects that we can perceive in our physical world. The physical world does take primacy (in this life at least) from a teleological perspective as it is the end result or goal of God’s command. When a person dies, truly dies, their soul loses its governing influence over their body and becomes fully perceptive in the Unseen.

In a manner similar to its creation, the entire physical world, all worlds, all universes, will be destroyed on the Day of Judgment. It will then be recreated anew in a similar fashion, which is described in the Qur’an in a manner similar to the Big Bang. Those souls which adhered to the order of God shall dwell eternally in Paradise whereas those souls who sought to create disorder in this life will be given a taste of their own medicine by being

³⁰⁰ In philosophy, which is an open arena of differing worldviews, we cannot use the Qur’an as grounds for proof without first proving it, which is done through the doctrine of *ijaz al-Qur’an*.

³⁰¹ A theological proof of the necessity of this is in 35:41.

subjected to disorder of the highest degree, a raging inferno (Hell).³⁰²

To restate it in even simpler form,

In the “natural” world (*khalq*), we observe “laws of nature” (going beyond the physical sciences and including the social sciences). These laws are the physical manifestation of the command of God (*Amr*), which in the “supernatural” world (*Al-Ghayb*, the Unseen) are described by God’s Light (*Nur*) and at least some of which³⁰³ take the form of (or we could say “act as”, or even “are”³⁰⁴) spirits or souls (*Ruh*). They are the same thing just seen from two different perspectives on either side of the “veil” that is created between us and the Unseen (refer to the parable of God’s Light in the Qur’an).

The term “supernatural world” is disliked because these are not two separate worlds, they are the same world. Our perception is what is cut off from the Unseen. Our essences (our souls, the source of our perception and free will) are, after all, rooted in the Unseen so we are obviously not in some other world. When a person dies and their soul loses its connection to the body, the “veil” is effectively lifted from their perception. They will recognize the true nature of existence as well as what is in store for them. We call it “reward” or “punishment” in our language but it is not so arbitrary, it’s the same natural order carried over, order (for those which upheld order) versus disorder (for those who spread disorder). Those who obeyed the will of Allah in this life would have their wills indulged by their Creator in the next life (Allah would create order specifically for them). Those who spread disorder in this life, Allah would create disorder for them, making them experience it in a raw and unbridled fashion.

In fact the order we witness in this life is only the tip of the iceberg. The entire “design” of the physical world, of our natural lives, was to condition us and prepare us for that world and for understanding God. Thus various aspects of the human experience, our spiritual or mystical emotions, our social orders, our observance of the physical order of nature, are all not arbitrary at all but meaningful reflections or extensions of the large part of the iceberg hidden below the water. So even the disbelievers will be equipped to fully understand the state of affairs after death.

Leaving our theological perspective for a moment, the secular way to consider religion is as an outlet for our yearning for a meaningful existence. Spirituality is associated with the injection of meaning into our lives. We associate meanings with the events in our lives. The “ideal” religion, from a modern secular perspective, would be one which does this without inhibiting or threatening knowledge regarding the order of the physical world. Islam goes above and beyond this, it adds an incredible amount of meaning to every natural occurrence, without threatening our rational understanding of those natural

³⁰² The point of Hell is the pain caused by disorder. There will even be a part of Hell which is cold or frozen and inflicts punishment through that.

³⁰³ If not all, only God knows.

³⁰⁴ This is knowledge we are not given.

occurrences... in fact, only doing the opposite by giving us a metaphysical context which allows us to *improve* our rational understanding,³⁰⁵ as borne out by history. It not only facilitated a revolution in scientific thought,³⁰⁶ it did so for the “social sciences” as well.³⁰⁷ The fundamental spiritual yearning in Islam is for truth, objective truth, in all domains of knowledge. Islam changed the way people thought by applying this to the natural world which was previously unheard of for religion (on such a scale).

³⁰⁵ In that our rationality is itself given spiritual meaning.

³⁰⁶ By now the issue of Islam’s “compatibility” with science should be a moot point.

³⁰⁷ It even had a role to play in the development of secularism itself. The issue of Islam’s relation as it stands today with newer Western social orders will be touched on in a later section.

PART 3

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Orthodox Theology Versus the Other Sects Today

It is necessary to discuss, at least in brief, the issues between the theology of the *Ahlus Sunnah wal Jamaah* otherwise known as Sunni Islam or Orthodox Islam and the theologies it had competed with.

Of primary focus is the theology of the Shi'a which resembles the views of some of the old Islamic Peripatetic philosophers. The Shi'ite sect is the next largest after the Sunni, making up just under 10% of the world's Muslims depending on your source.

While some of these differences (regarding the Neoplatonist-type metaphysics of the Islamic philosophers adopted by the Shi'a which include the eternity of the universe) are irreconcilable, one issue which can be reconciled is the different approaches to causality.

Among groups sharing such views, the idea seems to be that the Ash'arites' denial of causality, in effect, refutes all causality including the proof *for* God (of Ibn Sina and the like). It's seen as incomprehensibly silly. This view arises from a misunderstanding of the orthodox stance. Causality in principle is not denied. Nor is necessary causation denied, in principle. What is denied is that the necessary causal relationships exist wholly in nature. There *are* "causal" relationships between natural events, but this is not seen as necessary since God creates these causal relationships (the order in the universe) and is under no obligation to uphold them. God's Will is truly free, not bound. Therefore the only necessity which can be attributed to God is His existence (as the Necessarily Existent, the Being whose essence is existence itself).

The issue arises because if the causation in nature is not *necessary* then how can the conclusion of Ibn Sina's cosmological argument be held necessary? This criticism is based on the cosmological argument being viewed through the perspective of the non-Muslim analyzing it, step by step. If the falling of an apple from a tree is not necessary, how then can the Big Bang be necessary? Or the cause of the Big Bang be necessary? How can the final conclusion of a First Cause be necessary? And without necessity, it can be denied.

This criticism is valid. That traditional notion of the cosmological argument does not work with the redefined causality of Sunni theology. That does not mean there is no such argument. The argument itself shifts into one of the type discussed at length in previous sections, Mufti Yusuf Mullan of Deoband.org's "*Clearest Rational Argument for the Existence of a Creator*". The issue should have been settled upon reading that but not everyone is entirely clear on what the opposition was in the first place so that they

could notice when that opposition was resolved. Now, *existence itself* necessitates the conclusion of the Necessarily Existent Being because all existent things are contingent on God to provide for their existence (at every moment).

What it amounts to is just a drastic difference in terminology but the same concept of Allah elucidated within those different terminologies. From the little I have read of some philosophical works of recent Iranian Shi'ite scholars, their view of causality appears to be extremely close to the Ash'arite idea, with just a slight change in terminology. The slight change, however, has large ramifications in various philosophies based on it (like the cosmological argument).

One other problem is understanding the idea of "creating", of something going from non-existence to existence. This is not a real philosophical problem for the Shi'ites as they have resolved this in their own philosophy, as any Islamic theology must have already. Secondly, just use the terminology where a thing is described as going from *a state of non-existence* to *a state of existence* to resolve any conceptual problems. Existence (or the lack thereof) is not in the essence of any created thing. So the non-existent table is not a wholly categorically different species from the existent table. A table is still a table, whether it exists or not. A particular table can be in a state of non-existence, and then in a state of existence. The Qur'an itself speaks like this about man so this concept is known to them.

The orthodox disagreement with the Peripatetics like Ibn Sina and Ibn Rushd was not spiritual. They had the same basic goals. The orthodox's theology was just better philosophy. It did not allow for abuse by those who sought to use theology for their own agendas (and Ibn Sina and Ibn Rushd were not such people). The nature of the world required such an evolution in philosophy and it was eventually mirrored in the West as well.

Two criticisms, if they can be called that, which we level at our Shi'ite cousins are,

1. The issue is one of terminology. The nature of language is such that thought must be expressed in language and the limitations of language can become limitations on thought. The Qur'an was not a book of philosophical terminology. Muslims chose Aristotelian terminology and language to express philosophical ideas. This meant that, initially, the Muslims were limited to Aristotelian ideas as well. But we had to eventually move beyond these once we mastered the intricacies of language that were required and were more freely able to express the ideas of the Qur'an in philosophical terms. The Shi'ite scholars know full well that their views are not staying truer to the Qur'an than ours, only truer to Aristotle.

2. A large part of the theological difference is played up for political purposes. Calling Hanbalite (Athari) theology "literal" is already an intentionally misleading phrase. Calling Ash'arite theology the same is just pure intellectual dishonesty. Even the untrained

Orientalist would see past that. No Jewish scholar of the medieval age would have even used that description. Everyone used the opposite, in fact, to describe Sunni theology. It was the most radical departure from traditional metaphysics anyone had seen. It is literal only in the sense that it reduces straight to Qur'anic language and how could that ever be a fault? That is the goal. It is better to be literal to the Qur'an than literal to Plato or Aristotle. It is our view that the Qur'an speaks straight to the people and their hearts and is not couched in obscure or esoteric symbolism beyond the reach of anyone who seeks knowledge. To assert this outdated Neoplatonist notion openly in our day and age is to essentially chase the demographic of believers and potential believers away. Anyone who does this does so at the peril of their own tradition. This warning also goes to those who seek to create a new, modern, Mu'tazilite tradition. Though the terminology and even metaphysics may change, the difference in demographic attitudes does not; it underlines and undermines your entire approach.

Islam's Impact on Ideas

I do not intend to explore in depth the various specific ways in which Islamic civilization impacted ideas, that would be a subject for several volumes by itself. Not to mention you can easily find this information on the internet or in any school or university.

The context in which I'd like to comment on this is by touching on an idea coined by Richard Dawkins during one of his earlier forays in applying concepts from evolutionary biology to other philosophies. The meme.

A meme is "an idea, behavior or style that spreads from person to person within a culture." A meme acts as a unit for carrying cultural ideas, symbols or practices, which can be transmitted from one mind to another through writing, speech, gestures, rituals or other imitable phenomena. Supporters of the concept regard memes as cultural analogues to genes in that they self-replicate, mutate and respond to selective pressures.

The word *meme* is a shortening (modeled on gene) of *mimeme* (from Ancient Greek μίμημα Greek pronunciation: [mí:mɛ:ma] *mīmēma*, "something imitated", from μιμῆσθαι *mimēisthai*, "to imitate", from μῖμος *mimos* "mime") and it was coined by the British evolutionary biologist Richard Dawkins in *The Selfish Gene* (1976) as a concept for discussion of evolutionary principles in explaining the spread of ideas and cultural phenomena. Examples of memes given in the book included melodies, catch-phrases, fashion and the technology of building arches.

Proponents theorize that memes may evolve by natural selection in a

manner analogous to that of biological evolution. Memes do this through the processes of variation, mutation, competition and inheritance, each of which influence a meme's reproductive success. Memes spread through the behaviors that they generate in their hosts. Memes that propagate less prolifically may become extinct, while others may survive, spread and (for better or for worse) mutate. Memes that replicate most effectively enjoy more success, and some may replicate effectively even when they prove to be detrimental to the welfare of their hosts.¹

I would recommend reading through the rest of [the Wikipedia article](#) before continuing.

I was responding to a person once who suggested that the Qur'an's intuitive appeal to people could perhaps be described by mimetics (since many features of religions could generally be reduced this way they reasoned). The obvious flaw with that assertion is that the Qur'an cannot be reduced to a meme, though one could try and treat the ideas in it as "memes" to analyze their impact on society.²

The Qur'an would be unique because it is the sole progenitor of the religious/theological "memes" for Islamic culture. In recent times there has even been an internal conflict to root out "memes" of non-orthodox origins ("*biddah*" or theological innovation). So these ideas do not spread by self-replication, mutation, etc as analogous to genes. They are spread secondary to the appeal and inspiration of the Qur'an (by which one becomes a Muslim) and they resist change and it is this which has actually sustained Islam as a cultural force. Islamic theology, and all of its ideas, does not evolve. It does not mutate or fundamentally change though it does "evolve" in the domain of *fiqh* (law) in an ambiguous sense that newer interpretations are added to older ones as newer scenarios are encountered (extrapolation really). Any evolution in theology would not really be an evolution per say, but more related to updating the metaphysics to reflect newly established knowledge of reality through empirical means (what much of this work was concerned with).

So it doesn't behave "naturally" like other human ideas.

Furthermore, when its ideas do turn into memes and mutate and spread, they are no longer Islam. And some ideas spread into Islam, mutate, and stick around (not as religious ideas since, as just mentioned, those are resisted). And some of these are then sent back out to other cultures.

But you do see these everywhere in the rest of the world. The scientific method, for example, whose history was discussed earlier.

More memes altered by Islamic civilization (either by the Qur'an's inspiration directly

¹ <http://en.wikipedia.org/wiki/Meme> - Retrieved 05/10/12

² And of course the appeal of the Qur'an has always been related to first hand experience.

or just in general by the culture/civilization built around the Qur'an) include Arabic numerals, secularism (Averroes' influence on Europe), empiricism (Abubacer's influence on Europe)... pretty much every development in Islamic civilization that spread anywhere else. Very few ideas came into Islamic civilization and were not altered or mutated, for the better. It was one of the best periods of human history for the evolution of ideas.

Many of these ideas which spread as memes into other cultures were not subsequently altered, only embedded themselves to serve as foundational principles for future thought built on top of them. Like seeds.

Of course in Islam those ideas were always secondary to the culture built around the Qur'an so as that culture declines everything falls apart (Muslims didn't just forget science, they forgot religion first).

Comparing it to the modern day is difficult in that most of the ideas and information in circulation today are utter nonsense spread by a consumerist/capitalist culture. These aren't "memes" that spread on the power of ideas, they are memes that have gone *viral* and either serve no purpose or serve a harmful purpose (to manipulate people's actions through psychology). These drown out the great amount of honest work done which, we fully acknowledge, is massive and beyond anything achieved in previous ages upon which it was built (one can easily refer to our apparent material and technological progress).

Seeing the material success of a materialistic philosophy is easy for anyone who can look at the world, but it doesn't mean they understand it. Gauging ideological success is much more difficult but one of the simpler means of judging it is the prevalence of the idea among people (which also doesn't require being able to understand it).

That barometer, however, wouldn't apply to the ideological effectiveness of Western materialism as that is not spread by ideological means but by materialistic means (means of an economic/military/political nature).

A few of the ideological components behind the success were actually present in Islamic civilization too, as I mentioned. These ideas were a little too connected to religious knowledge and weren't culturally ingrained as "memes", but when they left the Islamic world it was as "memes" picked up by non-Muslims who absorbed these as a matter of culture and not ideology, some of which went "viral" in Europe. Europe was influenced by economic ideas they learned during the Crusades from a fully fledged Islamic banking system and these soon mutated into forms which could not have occurred under Islamic orthodoxy. Combined with discovery of the Americas they provided fuel for exponential growth.³

³ But in order to sustain it they switched over to fraudulent means in the 20th century which had a large influence over our current global economic state.

The popularity of Islamic philosophy of science is a more clear cut example of meme-like behavior. It took centuries for Europeans to pick up on it, they only did so when they became "culturally receptive" (started questioning Christianity and outdated philosophy). It did not take long for it to form an extremely strong bond with the other philosophical principles of capitalism and materialism. The secularism of Averroes for example seeded into Germany (around the 13th century with Frederick II) and France first whereas the empiricism seeded primarily into England in the seventeenth century (right in time for 17th-18th century British empiricism). Of course these ideas got into Europe before this but the "seeding" happened when those particular areas became receptive to these ideas.

Islam as an ideology sits out of the materialistic successes competition because it isn't centrally a materialistic ideology. Materialistic success is a higher order gauge of some peripheral concepts in the religion, so there is just a loose association (but it's definitely there, and was there in strong force during its early days when the entirety of the religion was expressed in all domains). While Islam is compatible with materialistic success it by no means hinges on it. Morality always outranks other goals and all other expression is within that context. This can have an effect on the pace of development of technological progress (particularly if that pace is dependent on immoral means), but no fundamental effect whatsoever on science aside from the former indirectly affecting the latter (through technological development in instrumentation).⁴

The Falling Out Between Islamic Civilization and Science

To continue that last thought, it's why people are always arguing about whether to try and instill ideas into Muslim cultures independently of religion (because if religion goes, those ideas will go too) or instill ideas *into* religion (because religion doesn't truly ever "go" in the case of Islam⁵). Science (scientific pursuits, a collection of ideas) was not a meme in Islamic culture, it didn't spread culturally "naturally" and take hold. It was dependent on a high level connection to the religious sciences (esoteric theologians, mystic spiritual movements: these were characteristic of many of the Islamic scientists of history). Though it did become a meme when it left the Islamic world for other receptive cultures.

Muslims did indeed lose their passion for science. They lost it, in fact, at the same time they lost their passion for religion and theology. With Imam al-Ghazali they didn't turn

⁴ It would also be foolhardy to presume that the moral way is always the slower or more difficult way.

⁵ This perplexes many people. The source of this is the personal appeal of the Qur'an.

to religion over science. That work, for the general irreligious population, just shored up their insecurities when religion came under attack. They liked their religion but didn't really adhere to it. The same situation exists today. People are satisfied with an answer to attacks on their religion, no more. As long as someone addresses philosophical attacks on religion, they're satisfied, but they're not inspired to study theology, philosophy, or science (whether the physical sciences, social sciences, or religious sciences as we've always called them). They often won't even read the substance of the attack or the retort! They are just content to know one exists.

Which leads us to our current state today and the need to step back and make a sobering assessment of the state of Islamic culture. It should not be considered "throwing in the towel" to acknowledge the state of the Ummah and work around that. Faith is one thing but there is little reason to have faith in our faith. As far as anyone can tell the Muslim world is not about to return to an honest or sincere approach to religion anytime soon. Religion mostly exists as culture. Therefore we need to encode certain things into our culture that were formerly based on rational and spiritual foundations because we can no longer assume that everyone, or anyone for that matter, will have those rational and spiritual foundations that would have otherwise been borne out of *ikhlas* (sincerity) and *taqwa* (God-consciousness). Science is one such issue. What's needed is an introductory level curriculum that can be widely implemented in Islamic education programs which teaches students a lot of the basic topics, some of which were covered in this work. Philosophy, theology, and metaphysics. With a firm rational grounding of faith, those who are religiously motivated don't have to reinvent the wheel for themselves and those who aren't, aren't left to wander in the dark. Science is an industry and an important one. It should be promoted like any other. An introductory level "theology and science" course, one available through secular education paths and another more comprehensive one for religious education paths, would go a long way to addressing the lack of commitment to a scientific tradition in the Muslim world today.

Religious education is a field with some tough decisions ahead of it. On the one hand the number of students seeking graduate level education in the religious sciences is as disproportionately small today as it has ever been. On the other hand the population of Muslims has grown so much that this relatively tiny number is, in fact, quite huge when compared directly to history. But this very numbers game also works against it because each of those scholars produced seems to be needed to serve the needs of the public. The easy decision is to include a basic philosophy of science type course which contextualizes their theology in modern science and philosophy. The harder decision is to promote career paths into the physical sciences for some graduates, like how some institutions are promoting dual education programs with degrees in *fiqh*, Shari'ah financial law specifically, and also a secular study path in economics (which is actually the most pressing need of the Muslim world at the moment, though science is probably second to that). What science has going for it that economics and law do not is that there are no obstacles or hindrances to religious involvement. As long as you're doing good science and following the age old methodology it doesn't matter who you are or

where you are from. Nobody cares where your metaphysical inspiration comes from so long as it pans out into a worthwhile scientific theory that makes good physical predictions. It's also a much more rewarding personal spiritual path. Unlike the case with the "social sciences" (or "human sciences"), the natural world is a much less fickle subject. Always consistent, always dependable. Even the medieval problem of people fearing or misunderstanding science as a threat to theology is mostly gone from the traditional religious Muslim world and especially from the popular perception of the public. At this point everyone is repeating the same thing: Muslims need to return to science. Teaching a strict and plain demarcation of theological metaphysics from philosophical metaphysics pretty much ensures there will be no controversy that would not have otherwise erupted anyway. More importantly there are already many theological controversies which can be cleared up just with better education and understanding and which are not going away. They are the result of a concerted attack on theology and religion from certain sectors of the scientific community sharing a common philosophy. So, these problems already exist due to inaction. Taking any kind of action at all would only help.

In the end, dealing with runaway materialism in society, the root of many of the problems mentioned above, would actually be best dealt with by putting the holy grail of materialistic culture back in the possession of the spiritual and religious.

The power of a scientific tradition to beneficially impact society is multifaceted. It is even a vehicle for tolerance and avoiding sectarianism. As it stands one component of sectarian strife is the basic idea that one party does not need the other. After all, what can one sect offer another religiously? And economically, politically, legally, culturally there isn't anything free of contempt or moral scorn and free from foreign influence either from the perspective of religious differences. The only appeal for unity and tolerance is based on abstract pragmatism. The only true arena left today for positive moral competition⁶ is in the field of social services and even that is neglected and turned into a means of division. Pursuit of knowledge has all the positive effects but is by its nature a unifying force in a society since people need one another for this endeavor.⁷

The Further Evolution of Philosophy

⁶ Qur'an 2:148 - ***"for, every community faces a direction of its own, of which He is the focal point. Vie, therefore, with one another in doing good works..."***

⁷ Additionally the orthodox's, or *Ahl-e-Sunnah-wal-Jamaah*, theological hold on the Ummah of something like 90% or greater is under no threat even if all the wildest predictions of the apocalypse came true. Even on the widest scale our failings are, and always have been, individual. Something its opponents furiously seek to deny, even resorting to historical revisionism.

What we will discuss in this section is the further evolution of European thought into the current or modern age.

Distinguishing Islamic, Christian, and later Western Civilization

Another thing which needs to be kept in mind is that these discussions on philosophy and the “Age of Reason” are only really relevant to Western civilization during the Enlightenment and afterwards. So when we speak of, for instance, the impact or significance of epistemology on a civilization’s view of history and subsequently the world and its place within it, we transition from the first Arab historians to the later generations of Muslim scholars and eventually to the intellectuals of the later Western tradition. Religion did not play a huge role in European affairs of reason, being that the predominant religious force in Europe during the Middle Ages was the Catholic Church and the Age of Reason on that continent was ushered in by a sort of “Age of Occasionalism” which came with the knowledge from the East, and which had no real support from the Catholic Church or its doctrines.

To be sure, very important intellectual personalities emerged from within the Catholic Church and were a part of the “Age of Reason” and Enlightenment, but it cannot be said that they were representative of the Catholic Church as an institution nor, for that matter, the various Protestant or Evangelical churches that cropped up in England, Germany and other such nations.

This is because the Catholic Church was a political force but not a real national entity unto itself. It was not so much concerned *primarily* with affairs of state or affairs of academia, these were only ancillary concerns. In truth, the Church was more akin to the first truly multinational corporation. Its primary aim was the acquisition of wealth or profit, and to use the power gained thereby to influence events across an entire region composed of many different nations. The Church dictated politics to the ruling class and culture to the masses. A role very much similar to that taken up by the large multinational corporations of today (in what might be called our current age of corporatism, at least in the West). The Church acted as kingmaker, not king.

As such, there was little concern with academic pursuits the further up the hierarchy of power in the Church you went, much less philosophical concerns about epistemology, science, or even morality/ethics. It was a business—an unchecked and extremely powerful one—and was rife with immorality and corruption (relative to the very ideals it espoused). This is not to say there was no relation between the Church and moral/ethical philosophy. Among other things, it was in the business of dictating culture and this naturally meant dictating moral/ethical philosophy to the population but the primary

goal of its philosophies were the subsequent impact upon the behavior of the population, not any principled concerns. There is truly little functionally separating the Church of that age with the influence of corporations today. The culture being dictated might have changed to take into account the new influence of the age of reason, but the “final causes”, so to speak, of the cultures being dictated are the same: to put the population at the service of the elite, the ruling and wealthy classes.

Contrast this with Islamic civilization where, after the first few Caliphs, religious power became consolidated with the fiercely independent body of religious scholars (*‘ulema*). Two of the four Sunni Imams of *fiqh* (law) were imprisoned and tortured by the Abbasids, with Imam Abu Hanifah (ra) even perishing as a result. The religious power delegated to the Caliph was limited to declarations of war (*jihad*), the enforcement of religious law (but not so much its legislation), and financial or economic concerns (taxation, trade, etc).

Granted, religious power over culture *was* at times abused institutionally, but it wasn't nearly on the scale of what happened in Europe and occurred mostly late in Islam's history (such as at times during the Ottoman period when mystical and passive interpretations of Islam were promoted amongst the populace to encourage blind adherence to the State). Even political and judicial proceedings at the highest levels were influenced by philosophical/theological/legal discourse amongst the scholars conducted according to scientific methodology, however prototypical these attempts might have been. The “age of reason” in Islamic civilization in fact began with Islam itself.

In Europe such high brow discourse on political, economic, social and religious affairs did not truly begin until the 16th and 17th centuries (the tail end of the Renaissance segueing into the Enlightenment).

Individualism

The first major shift we see is the trend towards individualism. I don't mean to discuss individualism in all its complexities, particularly when contrasted with collectivist political and ethical philosophies.

Some might be quick to assert that Individualism developed as a natural consequence in the metaphysical vacuum left by an ever shrinking “God” or “God-consciousness”. This is certainly one part of the story. In actuality though there is a certain degree of individualism which is inherent in our nature. It is a part of man's natural disposition. The individualists would obviously agree and they're right. Except it's nothing special and pretty much self-evident. After all, we are individuals with individual consciousnesses. We are not a collective “hivemind”. Where difference arises is in assessing the extent of that.

One of the problems with European or Western philosophy is in conflating the issues of “how much of an individualist is a person by nature” with “how much of an individualist *should* a person aspire to be”. The latter is the focus of the varying individualist philosophies and they all start by axiomatically declaring themselves the answer to the first question as well. Each philosophy goes above and beyond merely arguing in favor of its own merits and tries to convince us that it is in fact the natural state of affairs and has been so all along. This results in a very absolutist perspective.

The truth is our individualist capabilities can vary quite a bit by nature. Human beings can be extremely individualistic or even extremely collectivist. They are both accessible to our nature and quite easily so. A degree of collectivism is also inherent in us by psychological nature due to the fact that we are a biological species with reproduction and intraspecies harmony an imperative (even if that imperative usually extends no further than our immediate community).

So whatever the answer is to “how individualistic *should* we be”, it has to be in the context of that reality. It has to acknowledge what man’s capabilities are and what his tendencies are. This means any effective philosophy of individualism would have to be quite variable to account for the range of human experience and tendencies. And none really are. Sure, they allow anyone to be whatever they like but their foundation is still the premise that our nature is entirely individualist and any actions taken contrary to that nature are purely voluntary and rational, in effect reducing collectivist sentiment to individualism in the end anyway.⁸

This is somewhat reflected in how Western philosophy views the “Self”. Freud’s famous tripartite division gives us the id, ego, and superego. The superego is this extension we build up whereas the former two are truer to our nature. This view takes individualism as a certain axiom so it seeks to affirm individualist tendencies in our nature.

This brings up the first difference with Islamic philosophy or psychology. We acknowledge that the Self represents our nature and as the Self changes, our nature effectively changes. We also acknowledge that our behavior affects our sense of Self. Indulging one particular notion of Self by behavior consistent with it will only cause that to become the predominant notion. Behavior can sort of become a feedback loop in this regard. If we divide the Self into two, an animal self and a rational self, then taking one step towards either will, in that moment, increase the hold of it over the entire Self. Which, in turn, leads to an increased likelihood of further behavior manifesting it which then reinforces it even further. Simply put, we can get “stuck” in a way of thinking. This thinking can be pretty much of any form, even collectivist. If we take the animal self as inherently egoistic and individualistic and our rational self as focusing on a collectivist

⁸ In ethics the now common idea that altruism is inherently selfish for example. Altruism is not treated as the opposite of egoism, it is explained as a manifestation of or in terms of the latter. Meaning the latter is being taken as axiomatically true.

ideology (let's say communism or something similar), indulging the latter will lead to it dominating the Self overall and that person begins to behave that way by nature since that is actually now his nature. Where the nugget of truth lies in individualist philosophy is in acknowledging that the "animal Self" (or whatever corresponds to it in any philosophy, theology, or culture) is hard to ever truly overcome or send away, since it is tied to our biological nature. However, it *is* routinely overcome by people. Forcing it into a minority share of control over the Self (let's say 10%) is not easy but it is common. Working a day job to provide for your family isn't easy either but everyone does it anyway. That it seemingly never truly goes away is no justification for putting it on a pedestal.

Rather, the embrace of that "egoistic Self" is a result of the metaphysical vacuum left by a receding concept of God in Western culture. Personal existentialism fills the massive void and puts the only thing it finds left standing on the pedestal.

Curiously though, that is not how things played out in the history of Western philosophy. Individualism, while definitely capable of occurring as a natural or logical consequence of removing God from the metaphysical scene, actually (but briefly) surged *with* God during the period from Descartes to Hume (the same time when occasionalism showed up in Europe). Occasionalist metaphysics (on the more personal end) emphasize the individual and his or her relation to God. Not only is God given even greater metaphysical importance or responsibility, so too is man (contrary to what non-occasionalist thinkers seem to believe). In Europe this was seen with occasionalists removing the world itself from reality, leaving only the Self and God. That this occurred at all (in the West no less) is problematic for traditional Western individualist philosophy. In Islam this is the idea that the Self can grow and transform into something new, even while the animal or egoistic Self is marginalized.

It was only after this sudden growth of the Self, of the individual, that people began to remove God from the equation (and thus surrender a larger vacuum to the egoistic Self). There was, after all, something peculiar about the extreme degree of individualism that developed in contemporary Western culture. It most definitely wasn't "natural".⁹ There are plenty of cultures in the world who seek to indulge the baser Self and these cultures were all upstaged by the new Western individualism (which came *after* the West's ascendancy in scientific, economic, and military affairs... it had no causal effect on it though it is attributed it by historical revisionists).

The initial movement towards a greater emphasis on the individual occurred as a consequence of the repressive status quo in medieval Europe. On that much, at least, everyone can agree. The theology emphasized a distant God but promoted total surrender through a series of political and clerical intermediaries. It's one thing for the

⁹ I actually ran into a forum post online where a proponent of individualism tried to argue that it was tied into some particular gene whose ground zero of prevalence was in England and then radiated outward across Europe.

individualist-leaning egoistic Self to be outshone by something else, as occurs when it is “properly” dealt with, it’s another to try and repress it with nothing at all. Which leads to personal and psychological frustration.

The first response was to get back closer with God and play up the role of the individual in the relationship, without intermediaries. This predominated among the intelligentsia as it was a fundamentally esoteric outlook without the backing of popular religion (they had the Bible, not the Qur’an). They kept the moral outlook that the baser Self should be suppressed and man must grow into a more enlightened individual to be worthy of this closer relationship with God. Thus the increased promotion of knowledge (in all domains) and the individual’s own rationality.

This proved fairly effective but it too had minor, if any, responsibility for the West’s initial materialistic successes. Rather, expanding into the vacuum left by an Islamic civilization in decline and distracted by Eastern threats and colonizing the New World is all the fuel it needed. These economic factors are what drove progress. The first representatives were veterans of the Crusades who returned to Europe with new ideas about how to conduct commerce and make profit.

However, the new rational/spiritual turn to God in Europe was still instrumental in laying the groundwork for the further development of knowledge, particularly science.

With materialistic success came the opportunity for consolidating that success and compounding it. The story of the West’s success is the story of capitalism and that surprises no one. There was a shift towards populism. The intelligentsia increasingly began to reflect the masses. The elite began to concern themselves with economic profits more and more, and outdated notions of monarchic legacy less and less. Among the average public, the egoistic Self reigned supreme. Cynicism and disillusionment with the Catholic Church was parlayed into a reaction against religion in general by the ruling elite who wanted to get out from under the Pope’s thumb. There came the rise of Protestantism in Western Europe (the same areas where Individualism became popular). Within a generation or two the intelligentsia went from rational and enlightened religion to reflecting populist will. Hume’s use of occasionalist philosophy with God “divided out” of the picture was the epitomic manifestation of this. The metaphysical road from panentheism and pantheism to atheism is actually quite a short one.

The subsequent cultural developments played out along similar lines. The emancipation of women wasn’t for the sake of women, and those advocating it were from the traditional old guard of patriarchy, hardly ever considered women’s advocates. It just became a way to double the consumer base; a new opportunity afforded by a culture evolving away from traditional Catholic morality. One anecdote which I think perfectly encapsulates the rise of individualism in the context of economic exploitation is the case

of 18th century London¹⁰ where crime and murder, already rampant, were joined by the quick growth and development of one of history's largest prostitution industries, fueled by a constant stream of young women encouraged to move to the big city to seek out their own fortunes¹¹ (prostitutes eventually made up one in five of the women in the entire city¹²).

Western Metaphysics

Along with the shift away from traditional Roman Catholic theology came a rapid evolution of metaphysics. The pantheism of the Enlightenment by and large produced anti-realists of varying degrees, with philosophers like Leibniz being notable exceptions.

This inherent anti-realism in the Western intellectual tradition reasserted itself with the advent of quantum physics which, due to its famous quandaries, lent itself to non-traditional metaphysics.¹³

Anti-realism poses a philosophical problem. That the Western philosophical tradition is so reluctant to openly acknowledge this inherent character is evidence of that.

The problem is simple. Society now runs on a deeply rooted existentialist-materialistic ideology whose foundation is "scientific naturalism", a kind of pseudo-positivist spin on naturalism. Anti-realism actually undermines this in the mind of the average person. Anti-realism could probably be "rationally" reconciled with this philosophy in a number of ways but it carries no intuitive appeal. It just feels counterintuitive to rest so much of your ideology's rational justifications on existentialism and materialism and then say that none of it was real to begin with. The entire appeal of the current view is that it seems to appeal to the authority of the scientific tradition and all of its successes. People desire that kind of objectivity because it implies a moral authority. When the truth about the Western tradition's anti-realism is made apparent, all of that feels nullified. People want to avoid the troublesome world of moral relativity, it stagnates consumption (particularly with regard to foreign policy where foreign markets, rights, even territories are fair game for consumption). The appeal of having such a moral standing on which to base an ever evolving set of views, where one can justify just about anything through self-important sounding jargon (pseudo science like evolutionary psychology), is perhaps too

¹⁰ Which happened to be "ground zero" of the genetic map of individualism from that previously mentioned person.

¹¹ Cruickshank, Dan, *The Secret History of Georgian London: How the Wages of Sin Shaped the Capital*, 2010

¹² "Emancipation" of women without first engendering a culture of increased education and career opportunity amounts to nothing more than exploitation.

¹³ I would consider Islamic metaphysics to be "non-traditional realism" by the standard of Western philosophy.

tempting to let go. Or it could be that the thought of having to rely on arguing hedonism unapologetically for its own sake is unsavory even to those who make it the anchor for their lives.

The false assumption made by the common person is that the success of science somehow acts as a proof for the material reality of the world that science describes. That isn't the case at all. It won't stop people from believing that anyway, however. Even pointing out that their philosophers (or what passes for passes for philosophers these days in pop culture) follow a different sort of atheism than the kind whose metaphysics are seen in the scientific tradition is met with blank stares.

Perhaps making metaphysics (watered down as it is) a part of culture has the result of ingraining science into the culture. To the logical detriment of science but to the benefit of the society which then becomes culturally involved with science. This didn't happen in the Muslim world and might be responsible for why, although their philosophy was very good, science as a tradition never took hold in the cultural consciousness in the way it has in the modern West. Ideological challenges can simply be put out through other materialistic means (while waving the standard of propaganda and duplicitously blaming the opponent for not being able to meet the challenge).

The Trend Towards Atheism

Since a lot of the philosophy behind empiricism, rationalism, even naturalism was lifted from other cultures (including classical Western civilization, Greek/Roman) and since the primary motivations of contemporary Western philosophical tradition was to deal with the materialistic successes they were now enjoying, a reductionist attitude was taken. Not unlike a shrewd customer given a limited time shopping spree at a store. They tried on various things, took what worked and *only* what worked, divorced from the context in which the ideas had originated. After all, that context wasn't needed to make these things *work*. So, as time went on, we notice a decreasing resemblance to the original context of these ideas.

Atheism in particular wasn't just some culturally spontaneous move driven solely by disillusionment towards the Catholic Church.

Let's go back to Imam al-Ghazali and his *Incoherence of the Philosophers*. In this work he off-handedly mentions atheists several times as a specific sub-group of the philosophers holding to Neoplatonist viewpoints. Who were they? Well, they certainly weren't from the West. The Western Neoplatonist tradition was exemplified by Christian gnosticism in the former Byzantine lands and there's no evidence to indicate there was a strong atheist movement there. Secondly, what kind of atheism upholds Neoplatonism?

Atheism had actually developed in the East as a specific branch of some Vedic spiritualities in India (whose constituents also moved to Persia). As a literal offshoot of pantheism. Such groups were mentioned in Imam Zahid al-Kawthari's *A Flash Through the Formation of the Sects* and the Nasafi Creed.

Jahm ibn Safwan is credited as founding two theological offshoots. The first were the Jabriyyah or "Fatalists", then another group developed from them known as the Jahmiyyah who were pantheists.

From the earlier sections,

As Imam al-Kawthari says,

And the *Jabreeyah*, the callers to immobility and the herald of ruin, resulted from an unscientific discussion. Their roots (*'ulooq*) were from the neighborhood of the *Samaneeyah*, the *Baraahimah*

Al-Barahima were simply the Brahmins of Hinduism. Al-Sumaniya (*Samaneeyah*) were those who spread Indian skepticism in Persia. *Encyclopedia Britannica* makes a brief mention of them in the article on Humanism:

Other Indian movements of a broadly humanist orientation in India include the Ajivikas and the Sumaniya, about whom little is now known. The Ajivikas flourished between the 3rd and 6th centuries BCE, and their influence can be traced for more than 1,500 years. Like some early Jains and Buddhists, the Ajivikas went about naked, to indicate their contempt for worldly goods. In the main, they upheld a principle of nonaction, denying that merit accrued from virtuous activity or that demerit from wicked activity. Coupled with this was a thoroughgoing determinism and skepticism regarding karma and any sort of afterlife.

While the Barahima (Brahmins) likely referred to those from a pantheistic tradition of Hinduism, the Sumaniya could have been from an atheistic tradition of Hinduism. The Ajivikas are described by Wikipedia as atheistic and fatalistic. The fatalist doctrines of the Jabriyyah were influenced by these.

Eventually, the followers of Jahm (who himself was of the Jabriyyah) (and some of, it's said, the Murji'ah), not surprisingly, turned to a form of pantheism and became known as the **Jahmiyyah**.

Hamza Yusuf says about them,

The Pantheists (al-jahmiyaah) are followers of Jahm b. Safwan (d. 128/745); known for their negation of divine attributes, Pantheists believe that "God is everything." They also claim that Hell is not eternal and that human beings are forced to act, a doctrine they share with the Determinists (Jabriyyah).

The specific theological doctrines of these sects have not yet been elaborated upon because that will be covered under the Mu'tazilah, who took ideas from all of them. Those who were strongly influenced by the Jahmiyyah included those reputed to be the atheists (in line with the heritage of the influence from the Indian skeptics) and "freethinkers" of the era, such as Abu Bakr Muhammad ibn Zakariya al-Razi (Rhazes), Ibn al-Rawandi, and Al-Ma'arri. Though their definite attribution to this sect or the other is beyond the purpose of this short document, these are how they are popularly attributed. I am only pointing out here that they displayed the obvious signs of influence from Indian philosophy/theology.

So from the East and Indian/Persian philosophy we see the emergence (in the Islamic philosophical arena) of the Pantheistic/Atheistic Fatalist-Skeptics. Also from Persia we had Materialistic Dualists (Manichaeism). Imam Maturidi squared off against these and quite a few atheists, as was mentioned earlier. Imam al-Kawthari mentions the "Persian Dualists" and Atheists in the same breath (likely referring to the Indian/Persian Skeptics just mentioned).

The Mu'tazilah, originally upon the aims of the orthodoxy, were tasked with refuting their arguments using Rationalism (influenced mostly by Aristotle). Their opponents, as mentioned by Imam al-Kawthari, included Christians, Jews, Sabians, Agnostics (various flavors of "agnostic atheism" or "sophist agnosticism"), Dualists, and the Dahriyyah (existentialist materialists).

The Dahriyyah were the atheists living in lands closer to Iraq, the home of the Mu'tazilah, slightly further West than Persia.

We can consider here, then, two main types of "gnostic atheism". The first (and which will henceforth be referred to as "the first type") was an offshoot of pantheism from the East, and this was typified by beliefs in determinism, skepticism, and more importantly, rationalism. These were philosophers, through and through, so they typically were intellectuals.

The "second type" of atheism was a type of "existentialist materialism". It existed in Arabia before the advent of Islam so there may be links to Eastern spiritualities (some theorize that the pre-Islamic Arab pagans followed various Eastern polytheistic deities). But for the most part this is "cultural atheism", because these Arabs were not philosophers or intellectuals. It is even described in the Qur'an,

They say, 'There is nothing but our present life; we die, and we live, and nothing but time destroys us.'

(45:24)

From the earlier quoted commentary by Ibn Kathir,

Al-Shaafa'i, Abu 'Ubaydah and others said, in their commentary on the hadeeth of the Prophet (peace and blessings of Allaah be upon him), "Do not inveigh against time for Allaah is time" – During the Jaahiliyyah (pre-Islamic time), if some difficulty, trial or disaster befell them, the Arabs would say 'Woe to time', attributing those events to time and inveighing against it. But the One Who brought those events to pass is Allaah, so it was as if they were inveighing against Allaah, may He be glorified, because in fact He was the One Who caused those things to happen. So it was forbidden to inveigh against time in this manner, because Allaah is Time, i.e., He is the One Who is controlling it, but the Arabs were attributing those events to Time.

And from the tafsir of Maulana Daryabadi (these were quoted in full in an earlier section on Time),

'The South Arabians believed as little in a life after death as in spiritual blessings.' (Hell, The Arab Civilization, p.7)

The Arab pagan, carefree, materialistic, and indifferent to spiritual impulses, had little if any religion at all. To him, it was the immediate present which was full of meaning and of real consequence. He cared little for the past and showed even less interest in the future. Undisturbed by any serious thought or care for the morrow, his life was one emotional orgy, like most of the modern Europeans. 'The hedonistic Arabian character was too much absorbed in the immediate issues of life to devote much thought to the hereafter. In the words of an old bard;

*We spin about and whirl our way through life.
Then, rich and poor alike, at last seek rest
Below the ground in hollow pits slate-covered;
And there we do abide.'* (Hitti, op. cit., p.102)

...ad-dahr was applied by the Arabs to Fortune, or fate; and they used to blame or revile it.' (LL) 'Time' as an abstract deity was personified by the Arabs, and formed perhaps a regular part of their pantheon. 'Time in the abstract was popularly imagined to be the cause of all earthly happiness and especially of all earthly misery... The poets are continually alluding to the action of Time, for which they often substitute 'the days,' or 'the nights.' Time

is represented as bringing misfortune , causing perpetual change, as biting, wearing down, shooting arrows that never miss the mark, hurling stones, and so forth. In such cases we are often obliged to render 'time' by 'fate' which is not quite correct, since time is here conceived as the determining factor, not as being itself determined by some other power, least of all by a conscious agent.' (ERE. I. pp. 661, 662). 'The people of Central Arabia, to judge from the poetical and other remains, were indifferent to religious ideas. The utmost they could attain to was a vague deism or belief in Fate.' (El. I. p.999)

Now quoting an earlier part from this work,

The Dahriyyah (*Dahreeyeen*) were a specific type of atheist who followed a metaphysical doctrine of materialism and therefore believed in the eternity of time and ascribed creation to time. In other words, they believed creation happened by itself over time (not unlike the modern ideas of evolution when used by atheists to refute Creationism (i.e, evolution as it is used in atheistic philosophy, not the scientific theory) or the idea prevalent among some atheists today that the universe spontaneously created itself).

This "second type" is characterized by vaguely invoking time¹⁴ to answer all metaphysical questions and typifies what has been traditionally considered the "cultural" or "non-rational" (or non-intellectual) manifestation of atheism. You can call it "cultural" because it is associated with a culture of materialism and not any specific theological or rational doctrine unlike the "first type" of atheism, that of the rational skeptics and philosophers from the East which was more often tied with pantheism (and better represented the views of atheist "natural philosophers" or scientists of that time as well).

The first type was often indistinguishable from pantheism since in the course of the philosophical and theological debates, accusations of atheism as the logical consequence of such a worldview might drown out the voices of the philosophers themselves. It was often associated, in the Muslims' time, with Neoplatonist metaphysics too although there were other metaphysical interpretations which could lend themselves to being modified for such a view. The "naturalistic pantheism" of the Stoics comes to mind though to my knowledge it wasn't associated with any atheist offshoots (it's harder to remove an active God from the picture) and it had all but died out by the time of Islam. This is the type of atheism and these were the types of atheists referenced by Imam al-Ghazali most of the time in the actual text of his *Incoherence*.

However the second type seems a more apt fit for the atheists he references in the introductory section where he talks about the cultural aims of such people to drive believers away from religion. There was undoubtedly an overlap. Those of the second type who concerned themselves with pushing specific lifestyles would be more likely to blur the lines between the two types. Those of the first type often seemed less interested

¹⁴ Hence "Dahriyyah", where the word '*dahr*' means time.

in such an endeavor but it's not unreasonable to suppose that those atheist philosophers who might have felt cornered or under threat from the prevailing ideology of the time might have reached out for allies wherever they found them.

The second type was indigenous to cultures which favored materialism over any other specific metaphysical doctrine and often hedonism over any ethical doctrine. The sort of culture that tends to arise naturally in wealthy societies.¹⁵ It was common among the pre-Islamic Arabian pagans and then all but disappeared for a while, only to reemerge as the growing Islamic nation became increasingly wealthy.

We see parallels with the course of atheism in Europe's history as well. The intellectuals, philosophers, scientists, etc tended to pursue atheistic worldviews which clearly derived from pantheistic traditions (the metaphysics being a dead giveaway). The culture of the common people, however, shifted massively in opposition to the Catholic Church, giving rise to Protestantism as one consequence (for those who weren't disillusioned with religion altogether) and a further shift towards materialism and hedonism for everyone else. A relatively rare and new phenomenon in history was the rise of populism in Europe, fueled by the development of new technologies to aid in communication and travel and political ideologies which emphasized the will of the people (unsurprisingly, Spinoza's pantheism which all but reduced to atheism anyway from our perspective and no doubt from that of philosophers like Leibniz also advocated democratic ideals). For the first time in a while the intelligentsia would begin to reflect the populist will. Slowly but surely materialism, hedonism, existentialism, and the "second type" of atheism began to predominate intellectual circles and these philosophies were given serious voice for perhaps the first time in history. It didn't happen overnight and it was more of an osmotic phenomena than one view displacing another. Although the philosophers espousing an "active pantheism" (like Leibniz or occasionalists) did sort of disappear overnight in the 17-18th century, the "passive pantheism", or pantheism, of philosophers like Spinoza took a longer time to eventually transition into various sorts of anti-realist pantheism-bordering-on-atheism ideologies, some of which continued to be pushed in the scientific community in the 20th century in the metaphysical views of scientists like Heisenberg, Planck, Bohr, Einstein, Schrödinger, Pauli, Bohm, etc all of whom are associated outright with varying notions of pantheism. Einstein, somewhat uniquely, did not really go for the mystical and anti-realist flavor of the others, his was more similar to "naturalistic pantheism".¹⁶ Planck was also notably a Christian who disfavored the Eastern-mysticism-leaning views of the others. He did however say this,

"There is no matter as such! All matter originates and exists only by virtue of a force. We must assume behind this force the existence of a conscious and intelligent Mind. This Mind is the matrix of all matter."

¹⁵ But obviously not only in that context, it typified certain aspects of bedouin lifestyle as well for instance.

¹⁶ He did say he believed in the God of Spinoza.

Which harkens back to the Western/Christian panentheism/pantheism of the 17th century and earlier. Schrödinger, by contrast, openly invoked the pantheistic language of the Vedas of Hinduism (the 20th century did see a freer flow of information between cultures).

Numerous other figures, especially in the generation immediately after these big names, were fully fledged adherents of populist atheism or the “second type” discussed earlier. Both generations were associated with a significant lack of care about philosophy so their views are not really fleshed out anywhere. We saw this transition sort of marked by the rise of positivism (a new spin on old empiricism) and logical positivism (a failed attempt at uniting empiricism with rationalism which became popular very quickly before collapsing). Logical positivism was an effort to go on the offensive against all metaphysics. It was succeeded by modern day naturalism which varies from the philosophically rigorous naturalism (focused on by Quine and others of his ilk) to the non-intellectual (or non-philosophical/non-rational) reflection of populist culture (“scientific naturalism” pushed by the “New Atheists”). The latter can generally be treated as positivists who never got the memo (they were too busy being angry).

In our day both “schools” of atheism reduce to the same principle. On the one hand you have the scientifically knowledgeable (not merely literate) individuals who realize the universe behaves panentheistically. On the other hand you have the common lifestyle of the day in which people are raised: an existentialist, materialistic lifestyle whose major foundation is reveling in one’s own subjective experience of the world (thus using hedonism as an ethical philosophy... one’s fleeting emotions and pleasures are the only existing thing worth acknowledging and the materialistic world indulges these) and denying an objective, external, truth (sometimes taken to its extreme in the denial of objective reality, giving us anti-realism). The foundation is the idea of a person defining a reality for themselves which suits them, which they want to believe and which particularly justifies their hedonistic approach to social order. In that context, the scientifically knowledgeable choose pantheism (whether of a mystical or naturalistic flavor) or atheism-via-pantheism to fulfill these desires rather than opt for a panentheistic ideology featuring a more active and personal God (like occasionalism). The prime example of this is Idealism, which often reduced to pantheism with the Self taking the place of God. The next section will be on that.

It might be hard for the believing Muslim to understand why anyone whose entire life experience revolves around studying “reality” would want to believe that *that* very same reality is fleeting, meaningless, and perhaps not real at all in the first place. The tradition of science certainly didn’t take off in this context. It arose among the occasionalists whereas the pantheist-atheist skeptics of India and Persia, the ideological forefathers of today’s intelligent atheists, were debating *against* the philosophical doctrines at the heart of scientific inquiry.¹⁷

¹⁷ That is, when they weren’t just aimlessly walking around naked to make a statement, the hipsters of their time.

Western Idealism

The strain of philosophy which connects or runs through all of the theologies of European intellectuals from the Enlightenment until the current period is Idealism. Almost every philosophy or theology has its own spin on this idea so for the sake of brevity I'll stick to conceptual analysis as much as possible.

I labelled this section "*Western* Idealism" because while it ostensibly started with Plato's Forms, there were full fledged Idealistic theologies and philosophies all over the East since before him¹⁸ and he was inspired by other Greek philosophers who preceded even him.

Plato's Forms are essentially "ideas". They are idealized forms "existing independently of any particular instance"¹⁹ as universals. Plato was also a realist. He believed the world of matter which we experienced was real, but was an imperfect projection of this realm of idealized Forms. This view also contains tinges of dualism.

This idea of a "world of Forms" corresponds to the idea of a "spiritual world" in other philosophies and theologies, including Descartes' (perhaps most notably) and even (to a much lesser, and more inaccurate, extent) the "*Al-Ghayb*" of Islamic theology.

The basis for this philosophy is the fact that we, as humans, experience the world as *ideas* (which is why we call them "ideas" now and not "Forms" or something else). This logically branches into two metaphysical paths. Assuming the world to be real (realism), or not going beyond our "ideas" and assuming the world is not real (anti-realism). There is actually a third, a middle way which, in Western philosophy at least, has often (and perhaps unjustly) been reduced to the anti-realist position. That is the idea that the world is real, but not real enough to warrant significant ontological importance.²⁰

The philosophies vary with respect to how exactly our "ideas" are measured or defined and what they correspond to, and what meaning they have.

Luckily a pretty easy naming convention is used, although there tends to be overlap so it still isn't so simple:

¹⁸ These are grouped under the label "monistic idealism" at the Wikipedia article.

¹⁹ <http://en.wikipedia.org/wiki/Idealism> - Retrieved 05/16/12

²⁰ This thought process has occurred many times in Islamic theology and similarly come under attack by reductionist logic (where one reduces it, logically, to an anti-realist position and then rejects that on principle).

Metaphysical idealism - Holds that reality itself is incorporeal (immaterial) or experiential (reduced to experiences). Idealism applied to metaphysics. This is a very vague umbrella term because the definition of “ideas” can vary drastically. We could, for instance, argue that the ‘*aradh*’ of Islamic metaphysics (accidents) are really “ideas” and therefore become metaphysical idealists (where reality in the sense of meaningful ontological externality is simply derived from this foundation). So metaphysical idealism can be realist or anti-realist. In spite of this, the view is often interpreted as “anti-realist” anyway. Leibniz, despite being a strong proponent of realism, can thus be classified as a metaphysical idealist. We shall not concern ourselves too much with reputation, stereotypes, or standing in Western philosophical discourse. We are concerned with understanding the meaning. So as far as we’re concerned even though the philosophy suggests anti-realism, if the intention of the philosophy is realism, it shall be taken as such. Without going into much detail it should be obvious the issue here is reducing all immaterial concepts to “ideas” which is fallacious reasoning because it presupposes idealism before attempting to judge other philosophies within that hidden context. For instance, it can be argued that “energy” is really just an immaterial “idea” and therefore all the naturalists and realists of Western physics are really anti-realist Idealists. We don’t want to argue this but it shows how such reasoning can be very disingenuous when the tables are turned.

Epistemological idealism - The view that all we can possibly know are ideas. Idealism applied to epistemology. This is strongly associated with empiricism (and to some extent naturalism) and is strongly reflected in Islamic epistemology as well. Obviously, rational human knowledge can be reduced to ideas. It does make sense after all and it’s lately been upheld by recent scientific findings which lend more support to the notion that our brain experiences the world (and probably memories) as a series of discrete “sense bundles” (corresponding to snapshots of time, or “Now”s).²¹ Epistemological idealism says nothing about metaphysics (so I also like the term “functional idealism”, as this can be one component of a worldview composed of different philosophies).

Subjective idealism - This view applies idealism to metaphysics but it proceeds from epistemological idealism. The reasoning goes that,

1. All we have access to in perception are the contents of our own experience.
2. The only epistemic basis for claims about the external world are our perceptual experiences.

therefore;

3. The only reality we can meaningfully speak of is that of perceptual experience.²²

²¹ <http://medicalxpress.com/news/2012-05-brain-oscillations-reveal-world.html>

²² As laid out by John Searle as cited at <http://en.wikipedia.org/wiki/Idealism>

Thus it is anti-realist. This is typical of the idealism of George Berkeley and speaks to why his occasionalism is so different from Islamic occasionalism. Unsurprisingly this has been attacked from all corners of the Western philosophical world. It's simply not a logically rigorous conclusion.

Some excerpts from the Wikipedia page on idealism,

Bertrand Russell's popular book *The Problems of Philosophy* highlights Berkeley's tautological premise for advancing idealism;

"If we say that the things known must be in the mind, we are either un-duly limiting the mind's power of knowing, or we are uttering a mere tautology. We are uttering a mere tautology if we mean by 'in the mind' the same as by 'before the mind', i.e. if we mean merely being apprehended by the mind. But if we mean this, we shall have to admit that what, in this sense, is in the mind, may nevertheless be not mental. Thus when we realize the nature of knowledge, Berkeley's argument is seen to be wrong in substance as well as in form, and his grounds for supposing that 'idea'-i.e. the objects apprehended-must be mental, are found to have no validity whatever. Hence his grounds in favour of the idealism may be dismissed."

The Australian philosopher David Stove harshly criticized philosophical idealism, arguing that it rests on what he called "the worst argument in the world". Stove claims that Berkeley tried to derive a non-tautological conclusion from tautological reasoning. He argued that in Berkeley's case the fallacy is not obvious and this is because one premise is ambiguous between one meaning which is tautological and another which, Stove argues, is logically equivalent to the conclusion.

And the most obvious criticism of the aforementioned reasoning (the statements numbered 1 to 3),

Whilst agreeing with (2) Searle argues that (1) is false and points out that (3) does not follow from (1) and (2).

The second argument runs as follows;

Premise: Any cognitive state occurs as part of a set of cognitive states and within a cognitive system
Conclusion 1: It is impossible to get outside all cognitive states and systems to survey the relationships between them and the reality they cognize

Conclusion 2: There is no cognition of any reality that exists independently of cognition

Searle contends that Conclusion 2 does not follow from the premises.

The connection to pantheism can be seen in the above. Conclusion 1 implies cognitive states and systems determine even our scientific study of the brains and minds of others. The success of this approach could only mean one of two possible scenarios in light of this. Either the content of these cognitive states (in which we are successful in our scientific endeavors) are projected by *our* mind (anti-realism without ontological externality, where our mind is God) or if one believes in ontological externality or distinction within an anti-realist context then they are projected by *another mind* (it has to be a mind because it is described as a cognitive system), which is traditional pantheism.

People still try to advocate subjective idealism today under different names. The more important manifestation of this to watch out for is people with shifting metaphysical arguments. Those whose only metaphysical goal is to attack others' views will tend to take shifting opinions, throwing out various ideas until one sticks. So it might be argued against occasionalism in the sense that "Berkeley's idealism is the logical consequence of occasionalism, therefore it is anti-realist". Even though such people do not subscribe to these views they are making the same logical errors its proponents did. What they say cannot be attributed to Islamic occasionalism at least.

Objective idealism - This is essentially Leibniz's point of view as seen by other Western philosophers. Reality is *real* and is itself composed of ideas. It can also be seen in modern form in various philosophies of quantum mysticism which assert that experience combines and transcends the reality of the object experienced and the mind of the observer.²³

Transcendental idealism - This proceeds from epistemological idealism as well but does not go to the extent of subjective idealism. Instead, extreme skepticism is professed about the existence of a mind-independent world but a firm decision on the matter is not made because it is fundamentally unknowable from within the context of idealism to begin with. They do not go into metaphysical idealism because they acknowledge that, according to their view, one cannot gain any metaphysical knowledge at all.

One characteristic of such a world view is the assertion that our idea of the world on the whole is shaped by our minds. So, instead of saying the world is pretty much an illusion in our minds they say the *form* of the world is an illusion in our minds. If the real world actually existed it might exist in a condition nothing whatsoever like how we perceive it. So, transcendental idealism can also advocate an immaterial but real reality (as in the various information or holographic universe philosophies) and a wide range of other interpretations. It is credited to Immanuel Kant.

²³ <http://en.wikipedia.org/wiki/Idealism> - Retrieved 05/21/12

The “compatibility” of this worldview with Islam comes down to the degree of skepticism that is being used. If the skepticism borders on sophistry, as it often is in philosophical or theological debates, then it won't be.

Now let's look at this worldview, hugely influential on Western thought, in its original context (that of Kant).

Immanuel Kant (1724-1804)

The thing about Kant's idealism is that it is very intuitively appealing. People like the results. Kant defines his idealism as "the assertion that we can never be certain whether all of our putative outer experience is not mere imagining".²⁴ To flesh it out a bit more,

The dictum of all genuine idealists, from the Eleatic school to Bishop Berkeley, is contained in this formula: “All knowledge through the senses and experience is nothing but sheer illusion, and only in the ideas of the pure understanding and reason is there truth.” The principle that throughout dominates and determines my [transcendental] idealism is, on the contrary: *“All knowledge of things merely from pure understanding or pure reason is nothing but sheer illusion, and only in experience is there truth.”*

— Prolegomena, 374

So the foundation of Kant's worldview is that we cannot go beyond experience for truth. We can not go to pure reason nor can we go to any notion of objective reality because we are trapped within a subjective world.²⁵

This distinguishes his idealism from other types. Other types of idealism either come down on the side of ideas in our mind (subjective idealism) or they come down on the side of ideas outside our mind (objective idealism, like that attributed to Leibniz). And of course this is opposed to all realist philosophies. Kant says the truth lies in neither. The truth only lies in experience. We cannot understand or even approach “things in themselves” (in other words, the reality of things or things as they are in reality), we only have our subjective perceptions of them (how they appear to us).

This would seem to kill any sense of “objective reason” (i.e, rationalism) but Kant, through a long, arduous, and oftentimes ridiculously convoluted series of justifications,

²⁴ *Ibid.*

²⁵ Kant was *very* strongly influenced by David Hume and his work can be seen as a reaction to Hume's skepticism. It starts off with basically the same idea but he seeks to salvage a justifiable sense of reason.

tries to show us that reason is only handicapped, not killed.

The reason Kant is popular is, as you can guess, that he was moderately successful in convincing a lot of skeptics that reason was indeed salvaged. The truth of the matter is that his logic or reasoning used wasn't the greatest or even that accurate. This is why even though Kant's rationalism is upheld as the picture of Western reason (and very often specifically, but casually, invoked against Islam) it's in the minority, even among Western scientists (various flavors of naturalism are the most popular).²⁶ Even though his defense of his opinions wasn't that great, his opinions actually were really quite good and really very useful. Some really interesting subsequent developments in Western philosophy (especially philosophy of science) are built on "Kantian" rationalism.

A pretty decent introduction is in the Wikipedia article on transcendental idealism,

Perhaps the best way to approach transcendental idealism is by looking at Kant's account of how we intuit objects, and that task demands looking at his accounts of space and of time. Before Kant, some thinkers, such as Leibniz, had decided that space and time were not things, but only the relations among things. Other thinkers, including Newton, maintained that space and time were real things or substances. Leibniz had arrived at a radically different understanding of the universe and the things found in it. According to his *Monadology*, all things that humans ordinarily understand as interactions between and relations among individuals (such as their relative positions in space and time) have their being in the mind of God but not in the Universe where we perceive them to be. In the view of realists, individual things interact by physical connection and the relations among things are mediated by physical processes that connect them to human brains and give humans a determinate chain of action to them and correct knowledge of them. Kant was aware of problems with both of these positions. He had been influenced by the physics of Newton and understood that there is a physical chain of interactions between things perceived and the one who perceives them. However, an important function of mind is to structure incoming data and to process it in ways that make it other than a simple mapping of outside data.

If we try to keep within the framework of what can be proved by the Kantian argument, we can say that it is possible to demonstrate the empirical reality of space and time, that is to say, the objective validity of all spatial and temporal properties in mathematics and physics. But this empirical reality involves transcendental ideality; space

²⁶ You'll rarely find Kantian inspired philosophers attacking Islam or other religions though. A certain degree of intelligence and effort is required in understanding Kant thoroughly enough that the riff raff tends to get sorted out. "Rationally enlightened" people don't typically take to such activities (as the philosophy itself doesn't justify or advocate it, rather warns against it).

and time are forms of human intuition, and they can only be proved valid for things as they appear to us and not for things as they are in themselves.²⁷

The salient element here is that space and time, rather than being real *things-in-themselves* or empirically mediated appearances, are the very forms of intuition by which we must perceive objects. They are hence neither to be considered properties that we may attribute to objects in perceiving them, nor substantial entities of themselves. They are in that sense subjective, yet necessary, preconditions of any given object insofar as this object is an appearance and not a *thing-in-itself*. Humans necessarily perceive objects as located in space and in time. This condition of experience is part of what it means for a human to cognize an object, to perceive and understand it as something both spatial and temporal. Kant argues for these several claims in the section of the *Critique of Pure Reason* entitled the *Transcendental Aesthetic*. That section is devoted to the inquiry of the a priori conditions of human sensibility, i.e. the faculty by which humans apprehend objects. The following section, the *Transcendental Logic* concerns itself with the manner in which objects are dealt with in thought.

Kant's observations from a logical and philosophical point of view are supported in modern thought by some empirical findings that go beyond the science available to Kant in his time, are not based on what might be called a Kantian ideology, and yet support Kant's conclusions on the grounds of novel discoveries. Kant argues, essentially, that incoming data must be organized into a form that human minds can process. At the dawn of the computer age it was assumed that robots would soon be capable of taking over for humans in many tasks. Unexpectedly, it soon became apparent that pattern recognition was not an easy goal to attain. The human brain seems to be hard wired for pattern recognition. A very telling indication of organic structures for pattern recognition came to light when researchers discovered that the image of a moving object in crossing the retina is processed at the first level of the human cortex and sends an almost instantaneous message: "Movement!" to the rest of the brain. So "movement" turns out to be an automatic processing of raw incoming data into a special signal having immense survival salience to the organism. Kant had to be satisfied with examining the functions of the mind and teasing out the functional dependencies without much if any help being derived from observable physical mechanisms in the brain. The mind imposes structures on incoming data. In the case of the rope perceived to be a snake, the initial structuring must be abandoned. The snake disappears from consciousness and is replaced by a rope. In various ways other philosophies have maintained this useful distinction between what humans conceive to be present and whatever

²⁷ Martin, *Kant's Metaphysics and Theory of Science*, p. 41

may really be there. Important schools of modern philosophy of science, a field from which Kant drew much, speak in terms of "models" or "convenient fictions" rather than asserting actual knowledge of reality.

This gets back to what I just mentioned in the previous footnote about modern day Kantian rationalists being generally intelligent enough to know what they're talking about (believe me this is very rare) so you don't see them as often using philosophy for polemical purposes but, following the lead of Popper, focusing on the philosophy of science. Of course not all Kantian rationalists are modern day Popperians (i.e., philosophers of science).²⁸ There was a time when Kantian rationalism almost dominated Western discourse and it is the "go to" version of rationalism spoken of in academia and the political world, particularly with regards to the Islamic world (and how they contrast). Recall all those criticisms of Imam al-Ghazali for "defying reason" or "destroying reason". This is hyperbole; the opinions of Western historians and commentators appropriated for polemical use. It generally means "in the Islamic world, faith won out over reason, but in the Western world, reason won out". Which itself is a huge misstatement. What faith did Kant's reason win out over? It wasn't put up against faith, it was put up against Hume's skepticism. Faith wasn't the enemy of reason, skepticism was. And it's not even like Kant's reason "won out". His arguments are tantamount to arguing for having faith in reason itself (a more "justified" faith, he reasons, than blind faith but faith nonetheless). Imam al-Ghazali's skepticism won out over "reason" and that's because al-Ghazali was no mere Hume. I loathe to even put it in those words because Imam al-Ghazali specifically targeted Neoplatonist metaphysics, not reason itself. The general position of reason versus faith in Islam that al-Ghazali adhered to was set out in the doctrines of Islamic theology, such as that of Imam al-Ash'ari (and of course these accusations are then hurled against the whole of Islamic orthodoxy).

Kant and our Imams of theology would agree on the futility of metaphysical speculation except for discussing the limits of our experience and knowledge attainable by it.

And they would be wrong. Well, Kant moreso than our Imams because where would physics today be were it not for metaphysical speculation? At least our Imams distinguished between impermissible and permissible speculation.²⁹ Were it not for Berkeley, Leibniz, Mach, and all the sources of the pan(en)theistic inspiration for the various metaphysical leanings of the physicists of the 19th and early 20th centuries, where would modern science be? Don't forget that Kant himself dared to criticize

²⁸ I would go so far as to say that the most well versed in philosophy among the scientific community follow this school of thought. They outnumber the naturalists here though there are a few very notable and respectable naturalist philosophers of science.

²⁹ Theological speculation was considered impermissible if it went outside the source texts of the religion and philosophical speculation (leaning towards physics and away from pure theology) was inherently okay because it was held to account by empirical verification and generally had nothing to say about the articles of faith or *'aqeedah*.

and even dictate (posthumously) metaphysics to Leibniz and Newton yet science is dependent on the work of the latter, not the former.

Returning to Kant's philosophy, as mentioned above, his metaphysics consisted of twisting existing metaphysics (particularly regarding our understanding of space and time) around his view of experience. Redefining them, so to speak, in terms that no longer described an objective reality but rather as a faculty of our *a priori* reasoning for ordering and making sense of our experiences (sense perceptions). The trouble here was that he had already rejected analytic reasoning, the usual source for *a priori* judgments, as a means to discovering truths. Truths could only come from experience. Therefore the only option left was trying to combine synthetic judgments with *a priori* justifications.

Kant's work was stimulated by his decision to take seriously Hume's skeptical conclusions about such basic principles as cause and effect, which had implications for Kant's grounding in rationalism. In Kant's view, Hume's skepticism rested on the premise that all ideas are presentations of sensory experience. The problem that Hume identified was that basic principles such as causality cannot be derived from sense experience only: as Hume argued, we experience only that one event regularly succeeds another, not that it is caused by it. In section VI (The Universal Problem of Pure Reason) of the introduction to the *Critique of Pure Reason*, Kant explains that Hume stopped short of considering that a synthetic judgment could be made 'a priori'. Kant's goal, then, was to find some way to derive cause and effect without relying on empirical knowledge. Kant rejects analytical methods for this, arguing that analytic reasoning cannot tell us anything that is not already self-evident (Bxvii). Instead, Kant argued that we would need to use synthetic reasoning. However, this posed a new problem — how can one have synthetic knowledge that is not based on empirical observation — that is, how can we have synthetic a priori truths?³⁰

In case the reader is unfamiliar with the exact definitions, according to Kant's idea of the analytic/synthetic distinction,

- analytic proposition: a proposition whose predicate concept is contained in its subject concept
- synthetic proposition: a proposition whose predicate concept is not contained in its subject concept

Examples of analytic propositions, on Kant's definition, include:

- "All bachelors are unmarried."
- "All triangles have three sides."

³⁰ http://en.wikipedia.org/wiki/Critique_of_Pure_Reason - Retrieved 05/16/12

Kant's own example is:

- "All bodies are extended," i.e. take up space. (A7/B11)

Each of these is an affirmative subject-predicate judgment, and, in each, the predicate concept is contained with the subject concept. The concept "bachelor" contains the concept "unmarried"; the concept "unmarried" is part of the definition of the concept "bachelor." Likewise, for "triangle" and "has three sides," and so on.

Examples of synthetic propositions, on Kant's definition, include:

- "All bachelors are unhappy."
- "All creatures with hearts have kidneys."

Kant's own example is:

- "All bodies are heavy," (A7/B11)

As with the examples of analytic propositions, each of these is an affirmative subject-predicate judgment. However, in none of these cases does the subject concept contain the predicate concept. The concept "bachelor" does not contain the concept "unhappy"; "unhappy" is not a part of the definition of "bachelor." The same is true for "creatures with hearts" and "have kidneys"; even if every creature with a heart also has kidneys, the concept "creature with a heart" does not contain the concept "has kidneys."³¹

And the *a priori* / *a posteriori* distinction,

- a priori proposition: a proposition whose justification does not rely upon experience. Moreover, the proposition can be validated by experience, but is not grounded in experience. Therefore, it is logically necessary.
- a posteriori proposition: a proposition whose justification does rely upon experience. The proposition is validated by, and grounded in, experience. Therefore, it is logically contingent.

Examples of a priori propositions include:

- "All bachelors are unmarried."
- "7 + 5 = 12."

The justification of these propositions does not depend upon experience: One does not need to consult experience to determine whether all bachelors are unmarried, or whether $7 + 5 = 12$. (Of course, as Kant would have granted, experience is required to know the concepts "bachelor," "unmarried," "7", "+" and so forth. However, the *a priori*/*a posteriori* distinction as employed by Kant here does not refer to the origins of the concepts but to the justification

³¹ http://en.wikipedia.org/wiki/Analytic%E2%80%93synthetic_distinction - Retrieved 05/16/12

of the propositions. Once we have the concepts, experience is no longer necessary.)

Examples of a posteriori propositions, on the other hand, include:

- "All bachelors are unhappy."
- "Tables exist."

Both of these propositions are a posteriori: Any justification of them would require one to rely upon one's experience.³²

According to Kant, then, there are three kinds of propositions combining the two distinctions. Analytic *a priori*, synthetic *a posteriori*, and now synthetic *a priori*.³³

So what Kant did, in effect, was to push empiricism into the metaphysical arena. By redefining formerly metaphysical concepts in epistemological language, they could become *a priori* true.

Kant's view of causality is inherently the same as Hume's. The connection of cause and effect must be a synthetic judgment as the subject never contains the predicate. The effect can not be deductively reasoned from the cause. Thus, for him, all mathematics is synthetic (as the empiricists would say), but also *a priori* (as the rationalists would say).

If we step back and look at the problem we can see what Kant was trying to do. The skepticism of causality was rooted in our subjective nature. Our consciousness behind our brain is cut off from the objective reality, forced to trust a steady stream of sensory input that it has no way of verifying. This meant that physics was simply a pattern analysis of this stream of sensory input. Physics was located within each snapshot of experience. Metaphysics would be anything outside this. Traditionally we assumed, without proper rational justification, that our notion of physics described the world well. And metaphysics described the world beyond that. So the problem of causality was a metaphysical one and seemingly insurmountable. Kant saw that the key to causality's vulnerability was that the vulnerability was not in the metaphysical realm but in our understanding of physics. It was a result of our assuming that our notion of physics, derived from the content of the sensory input, did describe an external world and describe it well at that. To address this vulnerability, then, we needed to first get rid of this assumption. This meant falling back to the empiricist position of philosophers like Hume. Still, though, causality was a problem. It was still not a part of physics, not in the content of the snapshots of reality that our stream of sensory input delivered, it was in the assumed connections between snapshots. This is pretty much where Hume left off. Kant picked it up here and realized that empiricism aptly redefined physics but had left

³² *Ibid.*

³³ Though he considers analytic *a posteriori* to be self-contradictory, it does apply to situations where one either does not have access to the meaning of the "subject" concept or is attempting to "find" a new one using some hypothetico-deductive process.

out metaphysics entirely, axiomatically. Traditionally causality was inevitably justified in the realm of metaphysics. It was a justification with problems but for the most part it was enough to suffice society outside of the ardent philosophers. Kant decided to bring over that heuristic rational metaphysical justification of causality. First, he needed to redefine metaphysics in the context of Hume's empiricism. The obvious move is to redefine metaphysics as covering the connections between the snapshots of sensory input. Now he had to try and rationally justify these assumed connections.

Bringing metaphysics into the mind afforded Kant an opportunity to bring it closer to rationalism and rational justification than it had ever been. The rational justification for causality in traditional realist metaphysics had been to assume first that we were talking about a real world and then based on that make another assumption that the world was a certain way. Now that we had rid ourselves of the first assumption, we had to do something about the second. We obviously cannot assume from a metaphysical picture consisting of connected snapshots anything about the world. The basis of that assumption in the traditional context was heuristic. Basically, most people would make that simple assumption (that the world was a certain way; effect always proceeded from cause) as a consequence of everyday experience. So now we have to make that assumption again... but now it is an assumption about ourselves and not the world. The assumption is that we (our minds) always connected the snapshots in a certain way.

This method of connecting the snapshots of sensory input was described by Kant in terms of "categories of understanding". These were pure *a priori* conceptions of "the understanding" (i.e, universal, necessary). "The understanding" here refers to what he called "the faculty of understanding".

Kant generally saw a division of knowledge into two kinds. Knowledge was either *sensible* (sensual) or *logical*. Or it can be divided into *perceptions* or *ideas*. This corresponded to his two faculties of reason. The faculty of sensibility, which has the capacity to receive representations of objects (and from which we get sensible knowledge or perceptions). And the faculty of understanding, which has the capacity to synthesize the former, via a rule-based structuring, into an order; a world of objects.³⁴ It gives us "logical knowledge".³⁵ These "rules" were the "categories of understanding". They are purely rational and not empirical. However, though they *exist* independently of empirical knowledge (experience), they are not *known* to us independently of empirical knowledge.

These categories, then, are the fundamental, primary, or native conceptions of the understanding, which flow from, or constitute the mechanism of, its nature, are inseparable from its activity, and are therefore, for human thought, universal and necessary, or *a priori*. [...] On the one hand, they

³⁴ http://en.wikipedia.org/wiki/Critique_of_Pure_Reason - Retrieved 05/17/12

³⁵ As "phenomena" or things-as-they-appear-to-us (as opposed to noumena or "things-in-themselves").

are exclusively involved in, and hence come to our knowledge exclusively through, the spontaneous activity of the understanding, but, on the other hand, the understanding is never active, until sensible data are furnished as material for it to act upon, and so it may truly be said that they become known to us "only on the occasion of sensible experience."³⁶

Likewise, the faculty of sensibility had two "forms of intuition"³⁷ which were space and time. Sensations, sensible knowledge, or perceptions were made of two components. The *matter*, referring to the content, and the *form*. These forms constitute "relations" that our faculty of sensibility automatically adds to our sense perceptions. From these sensations are thus derived appearances. Then our faculty of understanding takes those appearances and turns them into *phenomena*. So "space" and "time" for Kant are a *priori*, necessary intuitions.

So he believed these were not innate but were built into and derived from the mind's structure and activity.

This should be a familiar idea because it was discussed early on in this work but there I argued, from the position of Islamic theology, that the distinction between *a priori* and *a posteriori* and between subject and object was blurred as this constituted evidence of an external existence for our minds or at least for the brain as a physical medium for our "mind".

Kant, however, merely saw it as evidence that our perception of our own Selves, our "ego" (or "empirical ego"), is empirical and phenomenal. Meaning that since this perception or "knowing" of ourselves occurs in time (we don't instantly know everything about ourselves, essentially), it is an experience like any of the other senses. An experience representing an object (so our subject is indeed an object) but an object whose objective existence ("transcendental ego") is unknowable beyond indirect knowing through experience.

The faults in his logic begin to become apparent here. What most commentators seem to miss in trying to understand Kant is that here he is not using his reason to explore a concept, to seek truth, or any other such endeavor. He is using his reason, post-hoc, to rationalize a predetermined view. He did not see fit to write about the inner workings of the logical process behind determining that view (which makes this entire affair a case of disingenuous philosophy). When people then use Kant as an example of upholding reason as a method of free and skeptical inquiry, it is dubious and quite ironic. His philosophy functions exactly like a theology.

Kant will not admit that it is possible to realize the true nature of the existence of

³⁶ http://en.wikipedia.org/wiki/Critique_of_Pure_Reason - Retrieved 05/17/12

³⁷ So think of two faculties, sensibility and understanding. The first is divided into "forms of intuition" and the second into "categories of understanding".

anything. Yet anyone who happens on empiricism through a course of truth-seeking and free/open inquiry will have that as the primary goal (meaning if it were possible, they'd jump at it). So even when we have a situation where we have what can be empirically determined as a proper "phenomenal object" of experience and then we can subjectively *experience* that object, which is about the only proper rational proof of existence possible, Kant just pretends that didn't happen and trudges on with his preset goals. That's not skepticism, that's blindness.

Kant conjectures that our experience of our Self is phenomenal only and not subjective. That we do not subjectively experience it. He writes,

But the form of this intuition, which lies in the original constitution of the mind, determines, in the representation of time, the manner in which the manifold representations are to combine themselves in the mind; since the subject intuits itself, not as it would represent itself immediately and spontaneously, but according to the manner in which the mind is internally affected, consequently, *as it appears*, and *not as it is*.³⁸

He said earlier,

Now that which [...] is intuition; [...] when it contains nothing but relations, it is *the form of the intuition*, which, as it presents us with no representation, except in so far as something is placed in the mind, can be nothing else than the mode in which the mind is affected by *its own activity*...

He says much later,

Where action (consequently activity and force) exists, substance also must exist, and in it alone must be sought the seat of that fruitful source of phenomena.

So activity is evidence of action. I would have put it in my own words as arguing that our act of perception is, obviously enough, an act and implies an action is taking place. The action implies that something *is* happening. However, wherever, and whenever. This is not under our causal influence. We do not control it, it is not subjective, or as Kant would say, "spontaneous activity". If it is not spontaneous, it is therefore dependent. In this case he would have to either admit it is dependent on our internal intuition of time (time for Kant is the form of "inner sensibility") which is fallacious (because how can our intuition be dependent on itself?) or an actual cause which must exist in order for us to exist (that is, if we accept our existence we must accept the existence of this cause, simply defined here as that which is responsible for our internal intuition of time).

Continuing directly from that previous quotation,

³⁸ Kant, *Critique of Pure Reason*

Where action (consequently activity and force) exists, substance also must exist, and in it alone must be sought the seat of that fruitful source of phenomena. Very well. But if we are called upon to explain what we mean by substance, and wish to avoid the vice of reasoning in a circle, the answer is by no means so easy. How shall we conclude immediately from the action to the permanence of that which acts, this being nevertheless an essential and peculiar criterion of substance (phenomenon)? But after what has been said above, the solution of this question becomes easy enough, although by the common mode of procedure- merely analysing our conceptions- it would be quite impossible. The conception of action indicates the relation of the subject of causality to the effect. Now because all effect consists in that which happens, therefore in the changeable, the last subject thereof is the permanent, as the substratum of all that changes, that is, substance. For according to the principle of causality, actions are always the first ground of all change in phenomena and, consequently, cannot be a property of a subject which itself changes, because if this were the case, other actions and another subject would be necessary to determine this change.

So here he reasons that action implies effect which implies cause and this cause ultimately lies in "substance" which is permanent. We have no problems with his reasoning here, it's identical to the conception of causality in Islamic theology. The issue is the "target" of his reasoning. We don't believe substance is permanent.

He said earlier,

Now, upon this notion of permanence rests the proper notion of the conception change. Origin and extinction are not changes of that which originates or becomes extinct. Change is but a mode of existence, which follows on another mode of existence of the same object; hence all that changes is permanent, and only the condition thereof changes. Now since this mutation affects only determinations, which can have a beginning or an end, we may say, employing an expression which seems somewhat paradoxical: "Only the permanent (substance) is subject to change; the mutable suffers no change, but rather alternation, that is, when certain determinations cease, others begin."

So that is what he means by calling "substance" permanent but also the substratum for all change.

Going back to the excerpt before that, he continues,

From all this it results that action alone, as an empirical criterion, is a sufficient proof of the presence of substantiality, without any necessity on

my part of endeavouring to discover the permanence of substance by a comparison.

In other words, since action is sufficient to imply permanence, this is also sufficient to establish substantiality of phenomena (that they are rooted in substance, permanent existence). So this is how he justifies his assertion of noumena or things-in-themselves (the actual existence of an objective reality). This is pretty good and completely compatible with our worldview (which puts Kant in a far better light with regards to Islamic epistemology than perhaps any other recent Western philosopher).³⁹ The problem is that it is not good enough nor as good as it could have been. Kant was committed to preserving his predetermined ideas of knowledge and experience.

The other point to note is that though this reasoning can be challenged rather easily, one does so at their own expense. Science is continually expanding the borders of our knowledge of our brain and we are finding in our sensory experience the keys to understanding the function of our own subjective minds in gathering, deciphering, and interpreting those experiences (implying the subject is indeed an object). To deny that this is evidence of a real existence is at this point amounting to little more than sophist trolling. This is one reason for naturalism's runaway popularity in contemporary Western scientific culture and the incredibly low "approval rate" of philosophy in general among intellectuals from the scientific tradition (including, now, those from the social sciences). The culprits here are fundamentalist empiricists, positivists, idealists, and anti-realists.⁴⁰ Among intellectuals at least, Kantian rationalism is the only rational philosophy left in good standing.

He continues,

For that the primary subject of the causality of all arising and passing away, all origin and extinction, cannot itself (in the sphere of phenomena) arise and pass away, is a sound and safe conclusion, a conclusion which leads us to the conception of empirical necessity and permanence in existence, and consequently to the conception of a substance as phenomenon.

Which is, for the most part, no different than Islamic epistemology and even begins to sound like theological doctrine.

When something happens, the mere fact of the occurrence, without regard to that which occurs, is an object requiring investigation. [...] Such an event, [...] does not concern substance (for substance does not thus originate), but its condition or state. It is therefore only change, and not origin from nothing. If

³⁹ While writing the earlier sections of this work I had not read the *Critique of Pure Reason* at all, I was writing it purely from the perspective of Islamic epistemology and theology.

⁴⁰ This includes confused self-professed naturalists who aren't well versed in their own philosophy.

this origin be regarded as the effect of a foreign cause, it is termed creation, which cannot be admitted as an event among phenomena, because the very possibility of it would annihilate the unity of experience. If, however, I regard all things not as phenomena, but as things in themselves and objects of understanding alone, they, although substances, may be considered as dependent, in respect of their existence, on a foreign cause. But this would require a very different meaning in the words, a meaning which could not apply to phenomena as objects of possible experience.

There are two important things being said here:

First he says substances can only change and not originate (be created) because that would destroy "the unity of experience".

Secondly, he says that *if* he accepted the real existence of things as things-in-themselves only and not also as things-as-they-appear, then he would have to deduce that substances are dependent, in respect of their existence, on a foreign cause. Which is exactly what Islamic theology says. Except for the part where he claims that considering objects as phenomena contradicts this necessary deduction that arises from considering objects as noumena (things-in-themselves)

It's safe to say that part is actually wrong. There is no "unity of experience". Experience does reduce to essentially discrete bundles of sensory data, snapshots of moments in time. Kant's opinion here is outdated and irrelevant. The reason he even strongly chooses this opinion is because it is required to justify his understanding of time as the background for a continuous evolution of an object or substance from state A to state B.

Now the question arises how a thing passes from one state = a, into another state = b. Between two moments there is always a certain time, and between two states existing in these moments there is always a difference having a certain quantity (for all parts of phenomena are in their turn quantities). Consequently, every transition from one state into another is always effected in a time contained between two moments, of which the first determines the state which leaves, and the second determines the state into which the thing passes. Both moments, then, are limitations of the time of a change, consequently of the intermediate state between both, and as such they belong to the total of the change. Now every change has a cause, which evidences its causality in the whole time during which the change takes place. The cause, therefore, does not produce the change all at once or in one moment, but in a time, so that, as the time gradually increases from the commencing instant, a, to its completion at b, in like manner also, the quantity of the reality (b - a) is generated through the lesser degrees which are contained between the first and last. All change is therefore possible only through a continuous action of the causality, which, in so far as it is uniform,

we call a momentum. The change does not consist of these momenta, but is generated or produced by them as their effect.

Such is the law of the continuity of all change, the ground of which is that neither time itself nor any phenomenon in time consists of parts which are the smallest possible, but that, notwithstanding, the state of a thing passes in the process of a change through all these parts, as elements, to its second state. There is no smallest degree of reality in a phenomenon, just as there is no smallest degree in the quantity of time; and so the new state of reality grows up out of the former state, through all the infinite degrees thereof, the differences of which one from another, taken all together, are less than the difference between 0 and a.

Kant's view of time here is seemingly regurgitated from Aristotle's reaction to Zeno's arrow paradox.

Zeno's arrow paradox basically states that motion requires change in position and in any given durationless instant of time, there is no change in position and therefore no motion. Therefore, if everything is motionless at every instant of time and time is entirely composed of instants, then change (in position, a.k.a motion) is impossible.

Aristotle's response was that time is not composed of indivisible instants.

The problems with this retrograde conception of time is that in modern physics there are a number of ways to prove Zeno's paradoxes irrelevant to reality. First of all, matter and energy (and their change) are actually quantized. In fact we mentioned above how one of the Mu'tazilite Islamic theologians (Ibrahim an-Nazzam) had already discretized motion long ago in an attempt to resolve the paradox. Secondly, space and time can be treated as a continuum according to general relativity so Zeno's independent treatment of them could be argued against on that basis alone.

Likewise, Kant's assertion that change (time and any phenomenon in time) is continuous is outdated and in opposition to modern physics. There was no need to adopt such views when Zeno's arrow paradox, for example, is easily resolved when treated as a sort of category error. Time is *not* composed "entirely" of indivisible instants. You would have to say time is *measured* by those instants but actually is *the progression from one instant to the next*. The concept of time contains inherent within it the idea of its passing or the experiencing of time. Time is the union of all the instants of time into a new thing, time itself. An instant of time is not like time itself. Similarly, a point in space is not "space" by definition (since a point is dimensionless). Space is not merely composed of dimensionless points (because then you would still end up with something which is dimensionless). Space is *the dimension*, the "union" of all such dimensionless points into a new whole other thing with structure called "space". Space and time are therefore more than simply the sum of their parts. Zeno's paradoxes ignore dimensionality and

speak of time and space, which are dimensions, as non-dimensional entities (simply the sum of their parts) which is a clear category error.

The error is the same as saying a *coordinate system* is composed entirely of coordinates. This is not true and the word “system” is a clue. The definition of coordinate system is “a system which uses one or more numbers, or coordinates, to uniquely determine the position of a point or other geometric element on a *manifold*...”⁴¹ and manifold is defined as “a smooth manifold is a subset of Euclidean space which is locally the graph of a... *function*.”⁴²

A similar description can be found under the “mathematics” heading of the Wiki page on “Space”,⁴³

In modern mathematics spaces are defined as sets *with some added structure*. They are frequently described as different types of manifolds, which are spaces that locally approximate to Euclidean space, and where the properties are defined largely on local connectedness of points that lie on the manifold.

Emphasis mine. And structure is “a fundamental, tangible or intangible notion referring to the recognition, observation, nature, and permanence of patterns and relationships of entities.”⁴⁴

So inherent within the idea of dimension is function and inherent within the idea of space specifically is structure. Zeno ignored these. From the Wiki page on dimensionality,

In physical terms, *dimension* refers to the constituent structure of all space (cf. volume) and its position in time (perceived as a scalar dimension along the *t*-axis), as well as the spatial constitution of objects within – structures that have correlations with both particle and field conceptions, interact according to relative properties of mass, and which are fundamentally mathematical in description.⁴⁵

Also mentioned there is the finite and quantized spatial constitution of objects.

What we can say then is that the concept of Time contains inherent within it the notion of function, the progression from one instant of time to the next. This acts in a parallel manner to the “structure” of space. And since space and time are obviously related,

⁴¹ http://en.wikipedia.org/wiki/Coordinate_system - Retrieved 05/19/12

⁴² <http://en.wikipedia.org/wiki/Manifold> - Retrieved 05/19/12

⁴³ <http://en.wikipedia.org/wiki/Space> - Retrieved 05/19/12

⁴⁴ <http://en.wikipedia.org/wiki/Structure> - Retrieved 05/19/12

⁴⁵ <http://en.wikipedia.org/wiki/Dimensionality> - Retrieved 05/19/12

and treated as a continuum in modern physics, time too can be said to have a structure though modern physics was not necessary to arrive at this idea. It was possible in Zeno's time to deduce this nature of time and that he did not is an error. Kant has even less of an excuse since many works were written inbetween the two philosophers on the subject.

It should be mentioned that Zeno's paradoxes were his attempt to support the pantheistic-sounding doctrine of Parmenides, that "'all is one' and that, contrary to the evidence of our senses, the belief in plurality and change is mistaken, and in particular that motion is nothing but an illusion."⁴⁶

The single known work of Parmenides is a poem, *On Nature*, which has survived only in fragmentary form. In this poem, Parmenides describes two views of reality. In "the way of truth" (a part of the poem), he explains how reality (coined as "what-is") is one, change is impossible, and existence is timeless, uniform, necessary, and unchanging. In "the way of opinion," he explains the world of appearances, in which one's sensory faculties lead to conceptions which are false and deceitful. These ideas strongly influenced the whole of Western philosophy, perhaps most notably through its effect on Plato.⁴⁷

[...]

Parmenides' considerable influence on the thinking of Plato is undeniable, and in this respect Parmenides has influenced the whole history of Western philosophy, and is often seen as its grandfather.⁴⁸

[...]

Parmenides made the ontological argument against nothingness, essentially denying the possible existence of a void. According to Aristotle, this led Leucippus to propose the atomic theory, which supposes that everything in the universe is either atoms or voids, specifically to contradict Parmenides' argument. Aristotle himself proclaimed, in opposition to Leucippus, the dictum *horror vacui* or "nature abhors a vacuum". Aristotle reasoned that in a complete vacuum, motion would encounter no resistance, and thus infinite

⁴⁶ http://en.wikipedia.org/wiki/Zeno's_paradoxes - Retrieved 05/19/12

⁴⁷ <http://en.wikipedia.org/wiki/Parmenides> - Retrieved 05/19/12

⁴⁸ *Ibid.*

speed would be possible, something which Aristotle would not accept.^{49 50}

It seems the dualism which inspired Plato actually applies more directly to Kant and can give us some important context for understanding his phenomena-noumena distinction.

Parmenides' view⁵¹ is both pantheistic and dualist. His world of "what-is", the "Way of Truth", is described pantheistically. His attributes of the real world as timeless, necessary, unchanging, etc are classical attributes of God or the Supreme Being. His views would have been nothing new for India at the time. His view of reason or thinking as closer to being (reality) than sense perception ("*For thought and being are the same*") actually sounds very much like Idealism (at least its subjective variant).

The dualism is in how this real world is contrasted with the "world of appearances" or "The Way of Opinion (*doxa*)", which is derived from sense perception (*aisthesis*). So one can extract either the dualism, or the pantheism, or both. Plato took after his specific brand of dualism, the idea that one world (of appearances in this case) is a projection of the other.

So "subjective idealism" more or less invoked the sort of "rationalist pantheism" of Parmenides (without the Supreme Being, substituting one's own Self or consciousness in its stead... in effect conflating "The Way of Truth" and "The Way of Opinion" to say essentially that *Opinion is Truth*).

Kant's response was to retreat from this position of the subjective idealists, via philosophical skepticism, to the dualism of Parmenides whereby he emphasized our sensory experiences' variable or changing (as well as plural) nature as proof that "The Way of Opinion" had to be distinct from "The Way of Truth". More specifically, he asserts that our reason itself is dependent on our sensory perception, that The Way of Truth is not distinguishable by us from The Way of Opinion. So he too conflated the two but he anchored his view in The Way of Opinion, emphasizing the role of our sensory faculties in shaping our view of a changing reality. He was saying, essentially, that *Truth is Opinion*. The world of "what-is", of the Way of Truth, was inaccessible to us beyond our deduction of its existence. Acknowledging its existence frees Kant from some of

⁴⁹ *Ibid.*

⁵⁰ Atomism as a human concept is inherently tied to the idea of opposing pantheism. The very word "atom" or "atomic" represents the finite in opposition to notions of continuity or infinity. This captured the essence of Islamic metaphysics for a long time. With the advent of modern physics the word also came to include connotations of raw, real, active, power. "The power of the atom" is the connotation behind the Atomic Age ushered in by WW2. This only fulfilled the Islamic idea of atomism as the best representation of the power of an active and willful Creator. *Wa la hawla wa la quwwata illah billah*. Those who use quantum physics to push naturalistic variants of pantheism or idealism seem unaware of the irony in such a move.

⁵¹ Which, it should be mentioned, was in more of a mystical context rather than a philosophical one. The philosophy was derivative.

the problems that plagued such anti-realist ideologies while allowing him to keep what he liked about them. This deduction was done through the aforementioned means of deducing from activity or action the existence of permanent substance acting as the substratum for change. In this way Kant's noumena as defined in terms of substance bears some similarity to Parmenides' world of "what-is" (reality) except with God removed, thus allowing him to bring "change" back as an attribute of it. This process is similar to Leucippus' use of atomism (representing change) to reject pantheism. Kant used causality (representing change) to prove the notion of "permanent substance acting as the substratum for change" (which is essentially a spin on atomism) in order to reject subjective idealism (which had a lot in common with pantheism).

Kant's deduction is actually a very similar argument to the Islamic argument for the existence of God. Kant acknowledges that his deduction would go down a similar path if one treated the world as real and did not only concern themselves with experience.

Kant was more or less locked into the ancient Aristotle approach to Zeno's arrow paradox because he was focused on the end goal of making a case for treating space and time as *a priori* "forms" of intuition (which he wanted to use to justify causality *a priori*).

It is not our business to inquire here into the utility of this principle in the investigation of nature.

So he didn't care about how it affected science.

But how such a proposition, which appears so greatly to extend our knowledge of nature, is possible completely *a priori*, is indeed a question which deserves investigation...

Every addition to our empirical knowledge, and every advance made in the exercise of our perception, is nothing more than an extension of the determination of the internal sense, that is to say, a progression in time, be objects themselves what they may, phenomena, or pure intuitions.

Here he says that every use or "exercise" of our perception is an extension of our "internal sense's" determination. What he calls the internal sense (mentioned earlier) is our conscious Self or "empirical ego" in his terms (our rational thoughts occurring in time).⁵² He's saying that this "extension" of the internal sense is the progression in time that we perceive (whether applied to sense experience or to our internal rational/intellectual thoughts).

This progression in time determines everything, and is itself determined by

⁵² It is the same as what we call our Reason, our Rational Sense, or Sense of Reason. The source of knowledge in rationalism.

nothing else. That is to say, the parts of the progression exist only in time, and by means of the synthesis thereof, and are not given antecedently to it. For this reason, every transition in perception to anything which follows upon another in time, is a determination of time by means of the production of this perception.

So time is a measure of change in our perceptions. The “parts”⁵³ of the progression (individual perceptions let’s say) are synthesized. A product of this synthesis, derived from the synthesized whole’s form or structure, is a perception of time (perceiving change itself between the perceptions). So time only exists in (or you can say simply is) the form or structure of the synthesis of perceptions. The source of time is the sensory faculty, which produces our perceptions. The transition in our perception (between perceptions you could say) is a determination of time. The important phrase here is “by means of the production of this perception.”

And as this determination of time is, always and in all its parts, a quantity, the perception produced is to be considered as a quantity which proceeds through all its degrees- no one of which is the smallest possible- from zero up to its determined degree.

What that means is that time is simply a quantitative estimation of the change in our perception. Our quantitative estimation of the difference between one perception and another. If time is considered *no more than this* (not real), then it’s only natural to assume it is continuous, even if our sensory data isn’t. Time for Kant is an outright illusion. It is the form of change.

Now if our minds are responsible for time, it must obviously be *a priori*. Our minds can understand the concept of change before given any phenomena to manipulate. Time is like a property of our minds, of how we think, therefore it is known (*a priorily*) by our Self (the “empirical ego” or internal sense) *before* any sense experience. By known I mean it is known as a possibility (according to Kant). This knowing is actually a category of understanding (i.e, causality) whereas time is strictly the structure (form) of our intuition. So for Kant time is how we perceive (a form of perceiving, the structure of our perceptions) and causality is how we know (a form of knowing, the structure of our understanding or knowledge).

Both space and time and our conceptual principles and processes *pre-structure* our experience.⁵⁴

To put it as simply as possible, our mind packages together data from the various sensory faculties. This packaging is time. Our mind then stacks up these packages to form knowledge. The stacking is causality.

⁵³ Even he can’t resist using such language despite having just insisted on continuity of change.

⁵⁴ http://en.wikipedia.org/wiki/Critique_of_Pure_Reason - Retrieved 05/20/12

There are two main things to note here. Firstly, this isn't some original way of preserving causality. It's the way causality is explained in pantheism: it is explained as an internalized process. Instead of being a process internalized in a Supreme Being, it is here internalized in our ego.

Secondly, there are glaring weaknesses in the foundation of his rationale. Of these we shall only consider two. That he has not sufficiently justified how or why our mind uses these "forms of intuition" in so universal a manner. Simply saying it is so does not make it so. So his argument here is not an argument. It's more like an alternative viewpoint to traditional empiricism along with his rationalization. The appeal is that it might be "good enough" to suffice those who also want something a little more rational. Trading one undesirable set of weaknesses for another set that is more palatable.

In spite of this, the strengths of his view are quite obvious and they are indeed strengths. From an Islamic perspective Kantian rationalism is as tolerable as empiricism itself which is no small feat. Though I call it "Kantian" he would prefer to call it "critical" (Kantian rationalism today exists under the banner of "critical rationalism"). Critical for him is a term used as an alternative to "skeptical" by which he would describe Hume's empiricism. Being skeptical is of no use while being critical is more pragmatic. So, in essence, what Hume was being skeptical about is taken unapologetically on faith (well as we can see, it's actually very apologetic, he tried very hard to rationalize it) but we keep in mind that skepticism and instead remain critical (rather than throw religion and science out altogether). This spirit of "critical" philosophy is very compatible with Islam. Islamic philosophy and theology stand to gain by treating critically our faculty of reason. Reason already plays second fiddle to empiricism in Islamic epistemology, but has no real internal checks and balances of its own.⁵⁵ The way Kant did it is actually quite irrelevant now because empirical science has triumphed to such a degree that through the natural sciences we can understand our "internal sense" of reason that much better and proceed accordingly. However it remains to be seen whether there are potential applications for the principle of critical philosophy when it comes to the interaction of reason with spirituality. There actually already exists such an order within Islamic spiritual traditions, and many recent Islamic intellectuals (such as Muhammad Iqbal)

⁵⁵ Reason in Islamic epistemology is given freer reign than reason in Western philosophy. The irony is lost on those prominent Western personalities who always throw around the word "reason" in their criticism of Islam.

have argued that Islamic spirituality needs to be explored further in this context.⁵⁶ But since these spiritual schools of thought are no longer interested in philosophy it remains to be seen if this will go anywhere. Certainly they might not need to “publicly” explore something which is already internally structured quite efficiently but the benefit would be for the Islamic community at large for whom Islamic spirituality and mysticism are still strangers, including those active in the fields of natural, social, and political science who stand to gain the most from it.

Returning to Kant,

The more pointed weakness is that not only does he not explain how or why our mind uses these “forms of intuition” but in failing to adequately address where they come from, upon any sort of further analysis of this issue, these ideas lead to an even more lack of confidence in his position.

He says simply that the forms of intuition “lie in the original constitution of the mind”. Which he later elaborates upon by saying they are produced by the same faculties which produce our perceptions. But how can this be? How do we know that these forms of intuition are not in fact perceptions themselves? Their universality only means that what they are perceiving is incredibly consistent and that all human minds (assuming one accepts their reality) are sharing perception of the same world of noumena. What about any of the sensory faculties indicates that they can do the sort of intellectual/ rational manipulation necessary to order the perceptions they produce? What about them indicates they have the capacity to do anything more than simply register perceptions? The only way to justify this would be to pin a biological origin in the brain’s structure which could be studied and explored. Which sort of throws out Kant’s entire metaphysical goal since he very much wanted to disavow the notion that we could know anything about the noumena.

Kant aimed to rationalize the assertion that we do not derive the forms of intuition from our sensory perception of noumena. But he neglects the fact that one of these senses is not like the others. The internal sense. In fact, his justification for the noumena and what he said about the “constitution of the mind” further suggests that the forms of

⁵⁶ Even the esoteric spiritual and mystical traditions of Islam employ rational/empirical methodologies based on the same principles on which the scientific method is based. Reason is obviously given a higher place in Islamic epistemology than spiritual illumination so the latter naturally had to always have been held accountable to the former. Though there have been many deviated offshoots, the authentic orders, or *tariqas*, of the Sufis have kept remarkably consistent and efficient over the centuries. The first branch of the “spiritual sciences” (as they have always been called), Islamic moral development, is not a vague or ambiguous notion but a highly structured and proven social science. One of the reasons for Islam’s popularity in this day and age is how simple, effective, and universal its moral principles are. In spite of this, moral decay continues in our world so what hope is there for a return of Islamic spirituality to the natural/ empirical sciences? We do not lose hope, however. Only temper our expectations in accordance with reality.

intuition are actually the structure derived from the noumena. From one in particular: the mind-in-itself. He was half right. They are indeed not derived from any other thing-in-itself perceived through the five "external" senses. But he's left having to acknowledge, however inadvertently, at least one thing-in-itself which is treated differently from the rest of the world of noumena: the mind.

Furthermore, at some point one has to acknowledge the natural sciences, including biology. A philosophy of rationalism which can only justify itself by denying science is not what anyone wants. And as soon as we do this, Kant's argument falls apart. If the forms of intuition lie in the constitution of the mind, they certainly don't lie in the sensory organs. If they are to be found anywhere, the forms of intuition lie in the brain having spatio-temporal dimensionality... meaning it exists in space and time. It has spatial structure and temporal function (it changes states).

Does this rescue causality? Not the natural causality that Kant was trying to redefine. Let's apply it to Kant's understanding of causality.

Kant makes the following assertions,

Actions (effect considered without cause) imply permanence (permanent existence) as the ultimate substratum of all change (otherwise an infinite regress).

So actions cannot be a property of something that changes (only something unchanging can determine the change/action).

Change is simply defined as a mode of existence (which Kant said correspond to accidents). All that changes is permanent, only the condition thereof changes. The determinations of change (made by something unchanging, the substance, thus called the "determinations of a substance" or accidents) have a beginning and end. They are alternating (when some end, others begin) but not changing.

This is why time must be continuous. Because a permanent substance would not be permanent if it were interrupted (as would happen if there were indivisible moments or "atoms" of time). That's also why changing determinations are "smooth" and continuous transitions.

Things must be permanent because the content of our experiences does not change, it is permanent. If the content of our experiences could begin and end we would have time passing within our perceptions as it passes between them (in transition). It seems like a strange case of presupposing the worldview one intends to prove. But Kant is not proving, just rationalizing.

From the above it is obvious that he's pretty much channeling Parmenides. He mixed it with some atomist metaphysics inspired by Leibniz, but only in appearance (to refute

subjective idealism as if one was refuting pantheism). Underneath, it is still similar to the rationalist pantheism of Parmenides (in other words an undercurrent of subjective idealism runs throughout Kant's philosophy).

So, if we take the "constitution of the mind" from which the forms of intuition are developed to mean the brain's spatio-temporal existence, then we'd have to reinterpret all of Kant's conclusions in light of a realist metaphysics. There is no unchanging substance observable in nature but something unchanging in existence (permanent) is still necessary, and which would retain the necessary properties of unity and being the source of determinations of change. These changes would not be various modes of existence of this source itself, but in the creation of a distinct reality. Things would not be seen in this subjective, continuous sense but considered in an objective, atomic fashion. As real as the world is treated, it is still no more than a fleeting arrangement of changing substances and accidents ever and always dependent on its creator, in whom all the logically necessary attributes are centered. It's no surprise that Kant studied Leibniz early in his life as he too was a German philosopher and Kant was born not long after him.

Kant mentions that this path of deduction would be the logical consequence of realism when he discusses causality,

For that the primary subject of the causality of all arising and passing away, all origin and extinction, cannot itself (in the sphere of phenomena) arise and pass away, is a sound and safe conclusion, a conclusion which leads us to the conception of empirical necessity and permanence in existence, and consequently to the conception of a substance as phenomenon.

[...]

If, however, I regard all things not as phenomena, but as things in themselves and objects of understanding alone, they, although substances, may be considered as dependent, in respect of their existence, on a foreign cause.

Why was Kant so reluctant to go down the path of realism? Even when not doing so only hurt the standing of his justifications? I don't think Kant was as concerned with skepticism as people might say but rather inspired by it. He wanted to retain the skeptical tone towards metaphysics but within reason, thus his "critical" philosophy. If Kant had wanted, he could have better articulated his arguments and made a potent attack against the skepticism of Hume.

From the history of Islamic theology we find skepticism can generally be either subjective and "light", where we focus on the limits of our own reason, or objective and "heavy", where we focus on the limits of our experience. The skepticism of Islamic theologians like Imam al-Ghazali extended very briefly from the subjective to the

objective, mostly by challenging accepted doctrines which could almost certainly be proven wrong through skeptical argument. But this kind of “heavy” skepticism was left there because to go any further would itself be erroneous. To question our understanding of causality is one thing, to question reality itself is totally another. And that kind of extreme skepticism the Muslim theologians had much experience debating against (the pantheism of Western tradition was positively amateurish compared to Persian and Indian traditions). In light of their successes against such arguments, they found them wanting.

Anti-realism’s foundation is in our subjective viewpoint. But even this has to contend with the recognition of our internal sense and that the content of the data from our external senses can give us new knowledge of the workings of our own internal sense. As Kant argued, activity or action implies substantiality. We can distinguish between those operations of the internal sense which are subject to our will, which we can consequently second guess the reality thereof, and those which are not. The latter referring to the operation, in time, of the internal sense which Kant used as a proof for its phenomenal nature (that the subject is object). We certainly experience that in our subjective viewpoints so to deny that *something* is happening *somewhere* would take one out of the bounds of accepted philosophy and logicity.

We can then go beyond Kant and point out how the subject is indeed an object (a thing-in-itself) but still remains, with respect to us, the subject (meaning it is a thing-in-itself which we can know through experience, in contradiction to his overall view).

His demarcation is that our intuition of ourselves is subject to time so this intuiting is sensible or a type of sensory activity (in other words it is not really intuition at all, it is the “internal sense” not internal intuition) and the focus of it is phenomenon (implying at least the existence of noumenon).

He distinguishes this from formless, purely spontaneous, immediate, intellectual intuition by which we can know things deductively or subjectively. This is characterized by immediately grasping all the various aspects or representations of the subject.

The “forms of intuition” are from the latter (and therefore *a priori*) and applied to the former as “categories of understanding”. The forms of intuition (space and time) are applied to the external senses but the categories of understanding (including causality) are their corollary for the internal sense. They are both *a priori*. But Kant himself acknowledges first of all that the object of our internal sense, the subject, is phenomenal (and hence suggesting substantial or noumenal existence somewhere), but secondly that the forms of intuition are derived from the constitution or structure of the mind. Is this the structure of the mind as phenomena? No, because it is not directly perceived in our conception of the mind. We do not see the structure, only its effect. Which implies it is the structure of the noumenon, the thing-in-itself, behind the mind: the mind-in-itself. We grasp the many representations in the subject not immediately but according to *the*

structure of the subject-in-itself (it is known both as subject and as object). Since the structure is temporal the representations are perceived chronologically. So by knowing the forms of intuition we know something significant about a thing-in-itself, something objective about the subject.

A possible response to this in the line of Kant's reasoning could be to assert that there is only object, not subject. But to do so is to throw out the very notion of *a priori* understanding which Kant sought from the outset. The seat of our *a priori* understanding, of our intuition, is the subject. It seems Kant has no adequate response for this. All his trouble in trying to come up with synthetic *a priori* judgments is for naught in the face of the skeptical empiricism he was trying to engage to begin with. Either he comes to our conclusion or he goes to the empiricists.

Before moving on, we should discuss his conception of will. He says will has an empirical character, which is the cause of all man's actions. In accordance with his understanding of causality, the causal chain must end in something of permanence, not subject to time. For Kant, "reason is the permanent condition of all actions of the human will",

For reason is not a phenomenon, and therefore not subject to sensuous conditions; and, consequently, even in relation to its causality, the sequence or conditions of time do not influence reason, nor can the dynamical law of nature, which determines the sequence of time according to certain rules, be applied to it.

He distinguishes the empirical character of will from the intelligible character of it. This latter corresponds to reason.

The intelligible character, of which the former is but the sensuous schema, knows no before or after; and every action, irrespective of the time-relation in which it stands with other phenomena, is the immediate effect of the intelligible character of pure reason, which, consequently, enjoys freedom of action, and is not dynamically determined either by internal or external preceding conditions. This freedom must not be described, in a merely negative manner, as independence of empirical conditions, for in this case the faculty of reason would cease to be a cause of phenomena; but it must be regarded, positively, as a faculty which can spontaneously originate a series of events. At the same time, it must not be supposed that any beginning can take place in reason; on the contrary, reason, as the unconditioned condition of all action of the will, admits of no time-conditions, although its effect does really begin in a series of phenomena- a beginning which is not, however, absolutely primal.

I won't explore that further although, like the rest of his philosophy, it can be simplified

and reduced into others.

Returning to the issue above, Kant has left himself no means by which to justify his understanding of the Self as a subject and not mere object (in the context of his convoluted justification of causality *a priori* through “forms of intuition”). Either he must go the route of the skeptics and assert that there is no free will or he has to go our route.

Speaking of our route, how do we defend the idea of the Self as subject? Firstly, we redefine what we call “Self”.⁵⁷ Our “Self” might as well not be the subject, but an object (our psychology). In the Western discourse this debate has reduced to a matter of whether our wills are free or not. If our wills are free, our Self is subject, not mere object. If the will is not free, we are objects like any other. In the Islamic tradition, in the manner of the orthodox interpretation used here (not the only one), we do not pin the Self (which corresponds to Kant’s “empirical character” and “empirical ego”) as the seat of our will.

But our will is actually something. We experience it and perceive it, we know it. Furthermore our will is not disconnected, floating in some subjective existence cut off from objective reality. Going by the above we can see how our will interacts with, affects, and is in turn effected upon by the Self, the object. This knowledge of its nature, like the knowledge of its existence, is intuitive. Even along Kant’s reasoning, if our internal sense is object, then our internal intuition is more a part of the subject, and implies necessary permanence and causal responsibility (which he did attribute to will).

Kant’s work implies the metaphysics of Leibniz when it comes to substance. Causality can neatly go and end in the permanent substance of anything (ignoring the pantheistic nature of the structure of this substance). So, like Leibniz, it seems he’s implying will is inherent in this substance. For he describes reason by very much the same language he reserved for permanent substance. For the most part, however, this is guessing on our part. Kant doesn’t deal with the issue raised.

Moreover, simply extrapolating his view to Leibniz’s is problematic because nobody really accepts Leibniz’s monadology, especially with regards to its more theologically natured metaphysical aspects, like the pre-established harmony or the perceptive faculty (passive or active/willful) inherent in all monads. What Leibniz was essentially doing, though, was formulating his own metaphysics of the “soul”.

So if one cannot really argue against the skeptical empiricists’ view with the idea that the Self is the subject, the seat of will and our innermost intuition, the only recourse left for the one who wishes to preserve the subject-object distinction (for some will say everything is subject and others that everything is object, but these positions in essence are the same) is to talk of the “soul”. Identifying it as Leibniz did, and as Kant implied, would not be satisfactory for naturalism.

⁵⁷ In Arabic: *Nafs*

In Islamic theology too, the soul (*Ruh*) is the seat of our true free will. It is of a “permanent” nature and it is the lightning rod for causality of our willful, intentional, action.

It is not permanent or eternal in the same sense of God, whose permanent eternal essence was distributed among the pantheistic substance of Parmenides and Kant. It is eternal with respect to causal necessity in the sense that it is created by the eternal God as His command (*Amr*).⁵⁸ It acts as a lightning rod for causality in that it dissipates causal responsibility for the *creation* of our actions to Allah, which is the primary problem of causality, but leaves us with causal responsibility for willfully and intentionally choosing to *acquire* those actions.

It is also called “inspiration” and it does serve literally as that for our Self, the medium by which it connects to and governs our behavior. From a naturalistic perspective, all we can speak of is this governing of behavior, and thus speak of it as a “law”, like the other laws of nature, but one for each subject. While I spoke earlier of this “law” as not consistent or uniform like the typical laws of nature, reasoning along Kant’s lines can actually be used to relate it to those (for a more non-Islamic naturalistic perspective of the Islamic soul). We can treat it as a different but consistent law for each subject. So the difference arises from one person to another, but in itself it can be seen somewhat consistent like “the permanent condition of all actions of the human will” which Kant described. This can then be used in the sense of humanity as a collective, governed by one law (as we would describe the governance of the behavior of other biological life), but an inconsistent and non-uniform law. Nonetheless, we prefer to think of it as not uniform even in the individual sense because from any rational perspective, we can see the state of our Self and the Unseen influences on it (and vice-versa) change over time. Islamic speaking, the soul is effected upon by feedback from that which it governs, so it is not consistent or uniform as it changes over time (though it is often spoken of from God’s eternal “perspective” in that manner, as He can “see” all of its actions outside of time).

This idea of differing perspectives offering different descriptions of reality is obvious and was mentioned earlier under the section covering Islamic epistemology as akin to a sort of “landscape of knowledge”. Kant had a similar idea,

It is because he takes into account the role of our cognitive faculties in structuring the known and knowable world that in the second preface to the *Critique of Pure Reason* Kant compares his critical philosophy to Copernicus’ revolution in astronomy. Kant writes: “Hitherto it has been assumed that all our knowledge must conform to objects. But all attempts to extend our knowledge of objects by establishing something in regard to them *a priori*, by means of concepts, have, on this assumption, ended in failure. We must therefore make trial whether we may not have more success in

⁵⁸ Also in the sense that it will exist, after its creation, eternally thereafter (will not be destroyed).

the tasks of metaphysics, if we suppose that objects must conform to our knowledge" (Bxvi). Just as Copernicus revolutionized astronomy by taking the position of the observer into account, Kant's critical philosophy takes into account the position of the knower of the world in general and reveals its impact on the structure of his/her known world. Kant's view is that in explaining the movement of celestial bodies Copernicus rejected the idea that the movement is in the stars and accepted it as a part of the spectator. Knowledge does not depend so much on the object of knowledge as on the capacity of the knower.⁵⁹

Kant saw that treating the permanent substance timelessly in the supratemporal (Godly) sense would alleviate much of his convoluted rationalizations regarding the essence of change, determination, and permanence. He could not say the substances, existing eternally outside of time (like God), change in time, because this could only happen through creation (the difference between substance and Leibniz's "radical substance", and Kant only used the latter), although this creation would not be described as "change" on the part of the "radical substance". I suppose it is the word "change" he was after, in his rationalizing up to "determinations of change", though this would be a very simplistic and irrational motivation not up to Leibniz's standard and not befitting a philosopher of Kant's reputation. On the other hand the difference between Leibniz and Kant here is the same difference between panentheism and pantheism.

So even though we see naturalist arguments can do a fairly good job in our day of demolishing anti-realist arguments, naturalism still cannot avoid the logic pointing towards pantheism. It turns out, however, that one needs to go no further than panentheism to answer the various logical questions and paradoxes. It's also firmly compatible with naturalism in a way that pantheism is not.⁶⁰ Naturalistic pantheism, while effective in ancient history for the purposes of the Stoics and others, has some significant pitfalls when implemented today, most notably that there still must be an appeal to metaphysics to explain causality which, due to the naturalism, contradicts its own worldview. After all, we can not identify the source of causation in nature anymore today than we could in the past. The connection between one billiard ball moving towards another and a subsequent movement of the second ball is still not necessary. Without an appeal to metaphysics, the uniformity of nature (its laws) is still not necessary. That leaves only "naturalistic panentheism"⁶¹ of Islamic occasionalism's type to uphold both realism and rationality. Even on Kant's "critical" philosophy's landscape of knowledge it seems Islamic theology has the best vantage point.

Kant spends the closing portions of the *Critique of Pure Reason* by confirming what had

⁵⁹ http://en.wikipedia.org/wiki/Critique_of_Pure_Reason - Retrieved 05/21/12

⁶⁰ So it was pointing to panentheism, not pantheism, all along.

⁶¹ Islamic occasionalism cannot actually be described as this since panentheism of its sort is inherently contradictory to naturalism. The union is only a functional or effective one. It behaves enough like both.

been suggested all along,

Consequently, the hypothesis of a wise author of the universe is necessary for my guidance in the investigation of nature—is the condition under which alone I can fulfil an end which is contingent indeed, but by no means unimportant. Moreover, since the result of my attempts so frequently confirms the utility of this assumption, and since nothing decisive can be adduced against it, it follows that it would be saying far too little to term my judgement, in this case, a mere opinion, and that, even in this theoretical connection, I may assert that I firmly believe in God. Still, if we use words strictly, this must not be called a practical, but a doctrinal belief, which the theology of nature (physico-theology) must also produce in my mind. In the wisdom of a Supreme Being, and in the shortness of life, so inadequate to the development of the glorious powers of human nature, we may find equally sufficient grounds for a doctrinal belief in the future life of the human soul.

From the Islamic perspective it is mystifying why Kant spent all that time running around in circles to nit pick over the fine details of where God's influence ends when in the end he must rely entirely on God anyway. In this sense Kant foreshadowed the later direction of Western culture and philosophy. There was a growing trend to simply remove God from human affairs. This was more pronounced in the British philosophical tradition and later the Anglo-American scientific tradition.⁶² As mentioned earlier this shift from pantheism to atheism came naturally at the dictation of popular culture. God was not removed rationally from philosophy or on any scientific grounds, only axiomatically as a point of culture. Ironically this was the most irrational and emotional move in Western philosophy.

Kant's rationalism would provide fertile ground for the development of "critical rationalism" as a more focused philosophy of science that, in accordance with Kant's aims but completely in contradiction to his own philosophy, avoided metaphysical speculation in favor of focusing on the immediate philosophical questions posed by scientific endeavor. Questions surrounding exactly the sort of issues discussed in the earlier sections on science regarding the limits of our experience and knowledge.⁶³

The Evolution of Empiricism and Naturalism

Having just discussed rationalist metaphysics which often utilized philosophy that

⁶² Mysticism abounded in physics during the beginning of the 20th century which was dominated by scientists of German roots.

⁶³ As quoted earlier,

"Important schools of modern philosophy of science, a field from which Kant drew much, speak in terms of "models" or "convenient fictions" rather than asserting actual knowledge of reality."

appeared suspiciously like theology, we now move to the more overt anti-metaphysical philosophies.⁶⁴ Empiricism and naturalism.

Empiricism, once at home in theology, eventually developed into its own complete anti-metaphysical philosophy in the hands of later European philosophers like David Hume. Then this eventually gave way to what became known as the schools of *positivism* and *logical positivism*.

Empiricism (with a full emphasis on the *-ism*) eventually became known as,

...a theory of knowledge that asserts that knowledge comes only or primarily from sensory experience. [...] ...empiricism emphasizes the role of experience and evidence, especially sensory perception, in the formation of ideas, over the notion of innate ideas or traditions.

Empiricism in the philosophy of science emphasizes evidence, especially as discovered in experiments. It is a fundamental part of the scientific method that all hypotheses and theories must be tested against observations of the natural world rather than resting solely on *a priori* reasoning, intuition, or revelation.

Philosophers associated with empiricism include Aristotle, Alhazen, Avicenna, Ibn Tufail, Robert Grosseteste, William of Ockham, Francis Bacon, Thomas Hobbes, Robert Boyle, John Locke, George Berkeley, David Hume, Leopold von Ranke and John Stuart Mill.

[...]

Philosophical empiricists hold no knowledge to be properly inferred or deduced unless it is derived from one's sense-based experience. This view is commonly contrasted with rationalism, which asserts that knowledge may be derived from reason independently of the senses.

For example John Locke held that some knowledge (e.g. knowledge of God's existence) could be arrived at through intuition and reasoning alone. Similarly Robert Boyle, a prominent advocate of the experimental method, held that we have innate ideas. The main continental rationalists (Descartes, Spinoza, and Leibniz) were also advocates of the empirical "scientific method".⁶⁵

So, as we can see, the early philosophers furthering empiricism would not be called empiricists but were actually rationalists emphasizing empiricism. If one allows both,

⁶⁴ The former associated with the "intellectual atheism" of our time and the latter with the "populist, materialist atheism".

⁶⁵ <http://en.wikipedia.org/wiki/Empiricism> - Retrieved 05/22/12

then rationalist becomes the default description and this itself is telling because it illustrates the dichotomy in modern Western philosophy between empiricism and rationalism is at heart a false one.

From a Western perspective Islamic empiricism would fit in with that but in actuality Islamic epistemology leans towards empiricism more than rationalism and places theology above both. For the non-Muslim, theology is considered rational philosophy (since they do not believe in God and believe it was derived as rational philosophy, like the Greeks' conception of God). For the Muslim, theology is treated more empirical in nature because it centers around a physical source of information (the divine revelation, the speech of God, delivered by the prophet Muhammad (saw)). Yet theology does involve its translation directly into human reason (being itself a product of divine "reason" or rather, wisdom, and delivered in human language). Still, Islamic epistemology allowed for human reason to be a source of knowledge so it was obviously traditionally rationalist too. As I said, there isn't really a dichotomy here. These were both seen as obvious sources of knowledge used by all people. The only difference is between the pre-Islamic era when, aside from a few philosophers like Aristotle, knowledge derived from reason was given superiority over knowledge derived from the senses. With the advocacy of empiricism that came with Islamic theology, empirical knowledge (sensory experience) was treated with the same necessity as the most solid deductive reasoning.

Empiricism in its modern proper sense (with the emphasis on the *-ism*) came to be known by the idea that only empirical knowledge (from the senses) was admissible. It was always associated with skepticism (the skepticism of reason) and Hume is the most popular example of that in European philosophy.

Positivism was the next shift in its evolution.

From the *Encyclopedia Britannica*,

Positivism: in philosophy, generally, any system that confines itself to the data of experience and excludes *a priori* or metaphysical speculations. More narrowly, the term designates the thought of the French philosopher Auguste Comte (1798–1857).

As a philosophical ideology and movement, positivism first assumed its distinctive features in the work of Comte, who also named and systematized the science of sociology. It then developed through several stages known by various names, such as empiriocriticism, logical positivism, and logical empiricism, and finally, in the mid-20th century, flowed into the already existing tradition known as analytic philosophy (also called linguistic philosophy).

From Wikipedia,

Etymology: Re-imported in the 19th century from the French word *positivisme*, derived from *positif* in its philosophical sense of 'imposed on the mind by experience'. The adjective, however, as applied to law (natural law, positive law) occurs in this, its fundamental sense (lat. *positivus* 'arbitrarily imposed', from *pono* 'put in place'), as early as Chaucer. The classical Latin usage goes back to the Greek distinction between φύσις from φύω 'grow' and 'put in place' (cf. *thesis*, *synthetic*), very broadly speaking 'heredity' and 'environment'.

[...]

Positivism is a philosophy of science based on the view that in the social as well as natural sciences, data derived from sensory experience, and logical and mathematical treatments of such data, are together the exclusive source of all authentic knowledge.

[...]

Positivism asserts that the only authentic knowledge is that which allows positive verification. As an approach to the philosophy of science deriving from Enlightenment thinkers such as Henri de Saint-Simon and Pierre-Simon Laplace, Auguste Comte saw the scientific method as replacing metaphysics in the history of thought, observing the circular dependence of theory and observation in science.

[...]

Introspective and intuitional attempts to gain knowledge are rejected. Though the positivist approach has been a recurrent theme in the history of Western thought, the concept was developed in the modern sense in the early 19th century by the philosopher and founding sociologist, Auguste Comte. Comte argued that society operates according to its own laws, much as the physical world operates according to gravity and other laws of nature.

This introduction provides an extremely important bit of context. Positivism originated in the context of the social sciences (specifically sociology). In fact, it is because of Comte's philosophy (carried on by others) that we even call them (in the West) "social sciences" at all. These developments in European philosophy did not occur until the 19th century even though they had access to the works of Ibn Sina (Avicenna), Ibn Rushd (Averroes), and their like for quite some time.

At this juncture I would like to ask the reader to recall what has been written already about Islamic epistemology, the unity and hierarchy of knowledge, the idea of *'ilm* as it

relates to knowledge and science,⁶⁶ the work of Ibn Khaldun, and so on.

As we'll see, Europeans mostly applied science in the context of "natural science" to other fields of knowledge. In essence, "naturalizing" them. This, from our point of view, is a parochial treatment which lacks understanding of the essence behind the scientific method.

The scientific method as it was treated in Islamic theology and philosophy is a methodology for gaining knowledge through experience. In fact the words "experience" and "experiment" are both derived from the same Latin roots⁶⁷ and even in the English language were once used interchangeably in some situations. The term "experimental method" is therefore very apt but can also be understood in the sense of "a method for experience". Now, the idea in Islam (and expressed in the Qur'an) is that there are types of knowledge. True knowledge (or simply just "knowledge") and false knowledge (or which would be considered not knowledge in the first place). Distinguishing between the two is an obvious notion at the center of Islam because of the conflict between truth and falsehood. It is extended to include honesty in all affairs, including in communicating reports between people. Another goal is also to build or generate true knowledge in the first place. This judgment upon knowledge, which is itself composed partly of judgments, is establishing knowledge about knowledge in order to regulate or govern it. The idea of "knowledge" refers to perceiving, understanding, or apprehending clearly and with some degree of certainty. When you know something, you know its properties, qualities, for example in the sense of its possible structure. What we know about knowledge itself (that knowledge gained from experience) is that it is constructed in the human mind. So to have knowledge of knowledge would mean we understand the details of this construction. Now, the idea of "in order to regulate or govern it" basically means applying rules to it and is synonymous with methodology. So what we're left with is a set of rules by which to methodically construct knowledge, derived from knowledge of knowledge itself and its construction. Lest this sound tautological, what I'm referring to is the construction of knowledge from information gained through sensory exercise or activity, whether external or internal. And by construction here I mean, as one example, through the use of inductive reasoning, generalizing from our experience (of particulars) into rational knowledge (universal principles). This is an error-prone process thus it needs to be regulated.

What kinds of experience can we derive knowledge from in a regulatable process?

There is the less obvious, our experience of our own reasoning. This is experience in

⁶⁶ How Muslims have historically referred to not only the social sciences but the religious sciences, and you even see scholars (*ulema*, derived from *'ilm*) of these religious fields referred to as "scientists" (or in some terminologies, "doctors"). We're talking about works older than Descartes.

⁶⁷ Combining *ex*, out of, and *perior*, to go through (i.e, test)... together implying "from (or out of) testing".

the technical sense or one could say analogous to experience going by the etymological root ideas. The “going through” (the Latin verb, *perior*) can be applied to going through the steps of a logical process (reasoning) applied to some propositions or premises and the result of having gone through this would correlate to experience (*experientia* in the sense of “proof”). We can test this for correctness by logical analysis. This is especially necessary for inductive reasoning. And obviously we can make mistakes in deductive reasoning too so that is also held to scrutiny by rigorous use of logic. The “steps” in the logical process are gone through in a flash, spontaneously and instantly, yet they can be corrected or modified. This is experience in the literal sense if we consider that our ability to use logic is itself a literal experiencing of space and time (Kant’s forms of intuition), or to put it another way: an experiencing of *existence* in space and time.⁶⁸

This is further considered experience in the literal sense with regards to our experiencing of our Selves, in time, as per Kant’s “empirical ego” and “internal sense” (our ego, Self, or *nafs*), though Kant would have distinguished this from the reason. Our ability to regulate this of course is simply morality or the moral reform thereof (inherently a more subjective endeavor because it isn’t an experience so easily communicated or shared with others).

From *experientia* we get experiment, trial, proof, experience.

By the actions implied in the terms *experience*, *experiment*, *trial*, and *proof*, we endeavour to arrive at a certainty, respecting some unknown particular; the *experience* is that which has been tried, the *experiment* is the thing to be tried. *Experiment* is only employed in matters of an intellectual nature, *trial* in matters of a personal nature, *proof* in moral subjects: *experiments* confirm our opinions; *trials* direct our conduct, our taste, or choice; *proofs* determine the judgment.⁶⁹

Then there is the obvious: sensory experience. Knowledge is eventually “constructed” through inductive reasoning as described above. But before the inductive reasoning is employed, we have to account for the fact that experience in time is inherently variable and changing, far more so than our reasoning or logical processes. The laws of nature as received by our senses are unruly when compared with the laws of logic (as received by our “intuition”, which can be considered distilled from the laws of nature). We want to add a logical structure to nature to hold together the natural process occurring in time so that it is consistent and replicable. This is of course applying methodology to experiment. An experiment is a “controlled”, observable environment for a natural process whereas natural processes are inherently uncontrolled. The regulatory methodology here focuses on establishing an experimental method that can reveal something about the hypothesis

⁶⁸ Here is where Kant invoked his idea of “synthetic *a priori*” though I would just prefer to say that the distinction between *a priori* and *a posteriori* blurs here.

⁶⁹ Black, Richard Harrison, *An Etymological and Explanatory Dictionary of Words Derived from the Latin*

which we are testing and which is controlled, consistent, and replicable.

With regard to experience in the sense of “proof” as derived from the Latin *experientia* (and correlating to “experiment”), then this determines our judgments in the same way experiment confirms or rejects our opinions. This extends to moral judgments. The result of either process, experience, informs our behavior in the manner of “trial”, the result of which is yet more experience. We can call this our moral behavior and our moral experience (as opposed to the experience resulting from experiments and proofs). This activity with our Self, ego, or *Nafs*.

Now with regards to moral reform, that too can be accomplished by methodology which is similar in nature as that applied to logical reasoning or experiment. In fact, that has been the essence of the Islamic science of *tasawwuf*, a branch of Islamic spirituality (Sufism, the “spiritual sciences”). We see in the modern Western context the same principle only in a naturalized sense. The *nafs* (Self or ego) is treated in psychological terms only. There is some overlap in what we would call therapy, but Western psychology is an extension of medicine (in the form of psychiatry) which is an altogether different field in Islam, a branch of the natural sciences.⁷⁰ It is the same in the West. So “morality” is still only treated tangentially in Western philosophy, and not as an entire science unto itself. The efforts of Comte and the subsequent positivists (more specifically, their failure) may have had something to do with that. Even the serious treatment it does receive routinely comes under rightful criticism from the rest of the sciences and philosophy. As a philosophy it is not held to logical rigor and as a science it is often little more than pseudo-science (particularly the field of evolutionary psychology where it seems people literally make up whatever they feel like, alluded to earlier in the discussion on Ibn Khaldun). There is nothing “tried and tested” about it at all. Yet it is somehow depended upon by an entire global civilization to inform their ethical development. The current state of humanity’s ethical development should then come as no surprise.

Now let’s get to Auguste Comte.

Auguste Comte (1798–1857) first described the epistemological perspective of positivism in *The Course in Positive Philosophy*, a series of texts published between 1830 and 1842. These texts were followed by the 1844 work, *A General View of Positivism* (published in French 1848, English in 1865). The first three volumes of the *Course* dealt chiefly with the physical sciences

⁷⁰ Medicine is actually more like an entire branch of its own in Islam, it has a hugely important place going back directly to hadith of prophet Muhammad (saw). The natural sciences are immediately split between study of human bodies and all other bodies. As much as Islam advanced knowledge in physics and the other sciences, which informed its considerable progress in physical medicine, its progress in *humanistic* medicine (the manner in which patients and illness were treated) was also unrivaled and this is due to the prioritized moral attention from being classified in such a manner.

already in existence (mathematics, astronomy, physics, chemistry, biology), whereas the latter two emphasized the inevitable coming of social science. Observing the circular dependence of theory and observation in science, and classifying the sciences in this way, Comte may be regarded as the first philosopher of science in the modern sense of the term. For him, the physical sciences had necessarily to arrive first, before humanity could adequately channel its efforts into the most challenging and complex "Queen science" of human society itself. His *View of Positivism* therefore set-out to define the empirical goals of sociological method.⁷¹

"The most important thing to determine was the natural order in which the sciences stand — not how they can be made to stand, but how they must stand, irrespective of the wishes of any one.... This Comte accomplished by taking as the criterion of the position of each the degree of what he called "positivity," which is simply the degree to which the phenomena can be exactly determined. This, as may be readily seen, is also a measure of their relative complexity, since the exactness of a science is in inverse proportion to its complexity. The degree of exactness or positivity is, moreover, that to which it can be subjected to mathematical demonstration, and therefore mathematics, which is not itself a concrete science, is the general gauge by which the position of every science is to be determined. Generalizing thus, Comte found that there were five great groups of phenomena of equal classificatory value but of successively decreasing positivity. To these he gave the names astronomy, physics, chemistry, biology, and sociology."

— Lester F. Ward, *The Outlines of Sociology* (1898)

The goal was to develop a unity and hierarchy of knowledge, hitherto a relatively unknown concept in Western philosophy. Of course, to call him the "first" philosopher of science in the modern *sense* of the term is cultural hubris (since it is plainly obvious philosophers living a thousand years before him did no less than he),⁷² but he could be called the first European philosopher of science.

Comte offered an account of social evolution, proposing that society undergoes three phases in its quest for the truth according to a general 'law of three stages'. The idea bears some similarity to Marx's view that human society would progress toward a communist peak. This is perhaps unsurprising as both were profoundly influenced by the early Utopian

⁷¹ <http://en.wikipedia.org/wiki/Positivism> - Retrieved 05/23/12

⁷² According to this general viewpoint the human beings who walked the Earth before the European Enlightenment (even in Europe) are to be treated as like a separate species forever lost in time.

socialist, Henri de Saint-Simon, who was at one time Comte's mentor. Both Comte and Marx intended to develop secular-scientific ideologies in the wake of European secularisation.⁷³

Compare this with Ibn Khaldun's work. One point to note here is the line,

Both Comte and Marx *intended* to develop secular-scientific ideologies in the wake of European secularisation.

The primary characteristic of empiricism and positivism is an emphasis on teleology that ought to be absent from more naturalistic worldviews. Even though these philosophies have generally given way to naturalism in today's scientific and philosophical climate, this attribute of theirs nonetheless remains.

Whereas Ibn Khaldun sought to study bias itself (sociology of knowledge) in an effort to describe nature, human nature, *as it truly was*, Comte and the others sought to apply bias to reality. Or rather, since the jury was out on whether reality was even real, to make human nature conform to their views. It is thus not so much a work of logical reasoning or proof (proper philosophy) as it is a rationalization of predetermined intentions and aims. There is a clear agenda. This is basically how one treats theology.⁷⁴ The other difference here is that the terminology of theology and philosophy is being abandoned for the terminology of "science". It is intentionally misleading, pretending to be based in naturalism (which is how the non-scientist population saw science).

Comte's stages were (1) the *theological*, (2) the *metaphysical*, and (3) the *positive*. The theological phase of man was based on whole-hearted belief in all things with reference to God. God, Comte says, had reigned supreme over human existence pre-Enlightenment. Humanity's place in society was governed by its association with the divine presences and with the church. The theological phase deals with humankind's accepting the doctrines of the church (or place of worship) rather than relying on its rational powers to explore basic questions about existence. It dealt with the restrictions put in place by the religious organization at the time and the total acceptance of any "fact" adduced for society to believe. Comte describes the metaphysical phase of humanity as the time since the Enlightenment, a time steeped in logical rationalism, to the time right after the French Revolution. This second phase states that the universal rights of humanity are most important. The central idea is that humanity is invested with certain rights that must be respected. In this phase, democracies and dictators rose and fell in attempts

⁷³ <http://en.wikipedia.org/wiki/Positivism> - Retrieved 05/23/12

⁷⁴ Contrast Ibn al-Nafis' *Theologus Autodidactus* to Ibn Tufail's *Philosophus Autodidactus*, the former a case of rationalization of theology and the latter derivation of philosophy. Both works, however, tried to produce effective proofs and there the rationalization did wind up winning out, employing a more empirical approach where possible to put its case over the top.

to maintain the innate rights of humanity.

The final stage of the trilogy of Comte's universal law is the scientific, or positive, stage. The central idea of this phase is that individual rights are more important than the rule of any one person. Comte stated that the idea of humanity's ability to govern itself makes this stage innately different from the rest. There is no higher power governing the masses and the intrigue of any one person can achieve anything based on that individual's free will and authority. The third principle is most important in the positive stage. Comte calls these three phases the universal rule in relation to society and its development. Neither the second nor the third phase can be reached without the completion and understanding of the preceding stage. All stages must be completed in progress.⁷⁵

This provides some insight. The theological and metaphysical phases were his observations of the past (in Europe) and for the most part, they fit (in Europe). In the history of Islam the theological and metaphysical stages were much more closely connected but with one an outgrowth of the other, not superseding it. In fact Europe's metaphysical phase pretty much came from foreign ideologies like Islam. Also in Europe there was a disconnect between theology and metaphysics. Whereas the Arabs were under no pretense to improve themselves or change the world when Islam came to them and transformed their civilization virtually overnight, Europeans had thrown off the domination of the Catholic Church and had embraced rationalism and empiricism, philosophies from different times and different places. They eagerly consumed what they could of metaphysics because the aim all along was material or physical and metaphysics was the gateway to that, an inevitable result of employing rationalism alongside empiricism and a study of the physical world.

This is an important bit of insight. Because the manner in which it happens on the society-wide level can be described in the above terminology where we speak of "*the Europeans*". But how it actually happens is manifested in man's individual nature. The cultural forces pushing Europe towards materialism after turning away from theology subsisted in the people and these people used other people who studied metaphysics. The latter often, if not always, had complete theologies mapped out with their metaphysics. Leibniz, for example, very likely believed in the God of his monadology. But the people who benefited from his work in physics did not need to in order to benefit from his work. The same can be said for Newton, Berkeley, and the others. Hume, as has been pointed out so many times here, lifted the skeptical arguments of the occasionalists without their theological context. There is some truth behind the European or Western argument behind humanism in that this accelerated pace of philosophical development occurred because there was less restriction and philosophers were free to adopt whatever theologies they needed to do the work the rest of society benefited from. This is not a proof for the moral correctness or rightness of humanism, only in its

⁷⁵ <http://en.wikipedia.org/wiki/Positivism> - Retrieved 05/23/12

efficiency or utility as a means for achieving the ends. To some degree this existed in Islamic civilization too where society, feeling relatively secure theologically, saw no real threat from philosophers of varying persuasions and benefited from their work. If anyone had a problem with them, they were free to engage with them in the philosophical arena, as the theologians did (and wind up only benefiting society further). The populace were upon Islam and the esoteric views of philosophers were not going to sway any significant amount of people.

Parallels are drawn between the situation today and those. It is argued that by abandoning theology, the Muslim world could tolerate the differing views of people it stands to benefit from. Or at least it was argued. The appeal of Islam for the masses is underestimated. The Muslim world's most parochial and conservative sectors are modernizing the fastest by simply being able to afford to pay those whose work they need. The popularity of Islam has been resurgent at the grass roots level. The idea is that the people the Muslim world need for development would inevitably be from the West and incapable of working with Muslims (due to both an incompatibility with conservative Muslim culture and the intolerance of Muslim culture). It's turning out to be wrong on both counts. Apparently those who make such arguments (these days limited to Islamophobes or people with anti-theistic agendas in general to whatever degree) forgot that, wars aside, the cultures of the Muslim world have long had the reputation of being some of the most hospitable. For better or worse, the Muslim world, in the spirit of globalism, seems perfectly fine with just hiring Westerners rather than being completely self-sufficient. This will have to be addressed at some point but with the main crux of the argument, time and efficiency, being thrown out, there's no reason to not let it happen slowly on Islam's own terms.

Now with Comte's "positive" phase that was purely his own wishful thinking for the future.

Comte believed that the appreciation of the past and the ability to build on it towards the future was key in transitioning from the theological and metaphysical phases. The idea of progress was central to Comte's new science, sociology. Sociology would "lead to the historical consideration of every science" because "the history of one science, including pure political history, would make no sense unless it was attached to the study of the general progress of all of humanity". As Comte would say: "from science comes prediction; from prediction comes action." It is a philosophy of human intellectual development that culminated in science. The irony of this series of phases is that though Comte attempted to prove that human development has to go through these three stages, it seems that the positivist stage is far from becoming a realization. This is due to two truths. The positivist phase requires having a complete understanding of the universe and world around us and requires that society should never know if it is in this positivist phase. Anthony Giddens argues that since humanity constantly uses science

to discover and research new things, humanity never progresses beyond the second metaphysical phase. In this view, Comte's positivism appears circular.⁷⁶

There is a bit of dark foreshadowing in the next few sentences which consider the rise of its popularity and the application of such a teleological philosophy to history,

As an approach to the philosophy of history, positivism was appropriated by historians such as Hippolyte Taine. Many of Comte's writings were translated into English by the Whig writer, Harriet Martineau, regarded by some as the first female sociologist. Debates continue to rage as to how much Comte appropriated from the work of his mentor, Saint-Simon. He was nevertheless influential: Brazilian thinkers turned to Comte's ideas about training a scientific elite in order to flourish in the industrialization process. Brazil's national motto, *Ordem e Progresso* ("Order and Progress") was taken from the positivism motto, "Love as principle, order as the basis, progress as the goal", which was also influential in Poland.⁷⁷

And in the following we see the logical course of this kind of thinking on popular culture, the development of an alternative theology,

In later life, Comte developed a 'religion of humanity' for positivist societies in order to fulfil the cohesive function once held by traditional worship. In 1849, he proposed a calendar reform called the 'positivist calendar'. For close associate John Stuart Mill, it was possible to distinguish between a "good Comte" (the author of the *Course in Positive Philosophy*) and a "bad Comte" (the author of the secular-religious *system*). The *system* was unsuccessful but met with the publication of Darwin's *On the Origin of Species* to influence the proliferation of various Secular Humanist organizations in the 19th century, especially through the work of secularists such as George Holyoake and Richard Congreve. Although Comte's English followers, including George Eliot and Harriet Martineau, for the most part rejected the full gloomy panoply of his system, they liked the idea of a religion of humanity and his injunction to "*vivre pour autrui*" ("live for others", from which comes the word "altruism").⁷⁸

It wasn't all doom and gloom for the social sciences, however. Émile Durkheim rescued sociology from Comte by establishing a more flexible methodology and by staying on topic by doing scientific work, not wild philosophical speculation.

⁷⁶ *Ibid.*

⁷⁷ *Ibid.*

⁷⁸ *Ibid.*

While Durkheim rejected much of the details of Comte's philosophy, he retained and refined its method, maintaining that the social sciences are a logical continuation of the natural ones into the realm of human activity, and insisting that they may retain the same objectivity, rationalism, and approach to causality. Durkheim set up the first European department of sociology at the University of Bordeaux in 1895, publishing his *Rules of the Sociological Method* (1895). In this text he argued: "[o]ur main goal is to extend scientific rationalism to human conduct... What has been called our positivism is but a consequence of this rationalism."

Durkheim's seminal monograph, *Suicide* (1897), a case study of suicide rates amongst Catholic and Protestant populations, distinguished sociological analysis from psychology or philosophy. By carefully examining suicide statistics in different police districts, he attempted to demonstrate that Catholic communities have a lower suicide rate than Protestants, something he attributed to social (as opposed to individual or psychological) causes. He developed the notion of objective *sui generis* "social facts" to delineate a unique empirical object for the science of sociology to study. Through such studies, he posited, sociology would be able to determine whether a given society is 'healthy' or 'pathological', and seek social reform to negate organic breakdown or "social anomie". Durkheim described sociology as the "science of institutions, their genesis and their functioning".

Accounts of Durkheim's positivism are vulnerable to exaggeration and oversimplification: Comte was the only major sociological thinker to postulate that the social realm may be subject to scientific analysis in exactly the same way as natural science, whereas Durkheim saw a far greater need for a distinctly sociological scientific methodology. His lifework was fundamental in the establishment of practical social research as we know it today - techniques which continue beyond sociology and form the methodological basis of other social sciences, such as political science, as well of market research and other fields.⁷⁹

As such, Durkheim is the true founder of modern Western sociology. His approach has had plenty of successes but key flaws have emerged over time (especially in the past decade) in precisely how to interpret results, what knowledge to gain, and how best to react. One very interesting work on the fallibility of prevailing thought in market research and economics is *The Black Swan: The Impact of the Highly Improbable* by epistemologist Nassim Nicholas Taleb.

In the original Comtean usage, the term "positivism" roughly meant the use of scientific methods to uncover the laws according to which both physical and human events occur, while "sociology" was the overarching

⁷⁹ *Ibid.*

science that would synthesize all such knowledge for the betterment of society. "Positivism is a way of understanding based on science"; people don't rely on the faith of god but instead of the science behind humanity. "Antipositivism" formally dates back to the start of the twentieth century, and is based on the belief that natural and human sciences are ontologically and epistemologically distinct. Neither of these terms is any longer used in this meaning. There are no fewer than twelve distinct epistemologies that are referred to as positivism. Many of these approaches do not self-identify as "positivist", some because they themselves arose in opposition to older forms of positivism, and some because the label has over time become a term of abuse by being mistakenly linked with a theoretical empiricism. The extent of antipositivist criticism has also become broad, with many philosophies broadly rejecting the scientifically based social epistemology and other ones only seeking to amend it to reflect 20th century developments in the philosophy of science. However, positivism (understood as the use of scientific methods for studying society) remains the dominant approach to both the research and the theory construction in contemporary sociology, especially in the United States.

The majority of articles published in leading American sociology and political science journals today are positivist (at least to the extent of being quantitative rather than qualitative). This popularity may be because research utilizing positivist quantitative methodologies holds a greater prestige in the social sciences than qualitative work. Such research is generally perceived as being more scientific and more trustworthy, and thus has a greater impact on policy and public opinion (though such judgments are frequently contested by scholars doing non-positivist work).⁸⁰

Positivism never lost that teleological edge of Comte, however. Even the choice of the word "positivism" suggest an opposition to the philosophy of Hegel which emphasized "negativity" in the context of the dialectic.

Dialectic is basically a means of resolving two opposing positions by transcending to a higher level of understanding which encompasses the two positions, thus setting the stage for even further dialectic. It is most commonly understood in the classic "thesis-antithesis-synthesis" format. For Hegel, by means of "the negation of the negation", something becomes other than itself (and, as Hegel emphasized, something more).

With regards to science, this can seem abhorrent, as it was to Comte, who emphasized "positivism", or positive verification (through empiricism) as the path to resolve difference. Hegel's dialectic arose more out of the social sciences than the natural sciences since dialectic figured prominently in the history of philosophy (Hegel constantly talked up Heraclitus who first emphasized this in the Greek tradition).

⁸⁰ *Ibid.*

The concept of *dialectic* existed in the philosophy of Heraclitus of Ephesus, who proposed that everything is in constant change, as a result of inner strife and opposition.⁸¹

A similar debate once occurred within Islamic philosophy with early pioneers favoring the dialectic method but eventually fracturing into a positivist method for distinguishing truths from outright falsehoods (for the purposes of theology and any other religious science which by definition had to appeal to authority since an actual objective authority existed, which is the typical empiricist path), and a dialectic method specifically suited to the social and spiritual sciences, including philosophy (where relativity and subjectivity was rampant).

The issue with Hegel that the positivists and others took was the application of the dialectic method to the scientific. Positivists wanted a strong, *positive*, outcome as exemplified by the empirical scientific method.

Hegel's method was also very mystical and a strong form of anti-realist Idealism. He inspired others to follow in his lead by actually disagreeing with him and taking the idea into other realms of philosophy (notably, Marx and Engels' dialectical materialism).

A good description of the dialectical method follows,

Another way to understand dialectics is to view it as a method of thinking to overcome formal dualism and monistic reductionism. For example, formal dualism regards the opposites as mutually exclusive entities, whilst monism finds each to be an epiphenomenon of the other. Dialectical thinking rejects both views. The dialectical method requires focus on both at the same time. It looks for a transcendence of the opposites entailing a leap of the imagination to a higher level, which (1) provides justification for rejecting both alternatives as false and/or (2) helps elucidate a real but previously veiled integral relationship between apparent opposites that have been kept apart and regarded as distinct. [...] The dialectic method also examines false alternatives presented by formal dualism (materialism vs idealism; rationalism vs empiricism; mind vs body, etc.) and looks for ways to transcend the opposites and form synthesis. In the dialectical method, both have something in common, and understanding of the parts requires understanding their relationship with the whole system. The dialectical method thus views the whole of reality as an evolving process.⁸²

The substantial role of dialectic in Islamic philosophy should be clear. It even played a large role in Islamic theology with regards to where philosophy was involved (such as

⁸¹ <http://en.wikipedia.org/wiki/Dialectic> - Retrieved 05/24/12

⁸² *Ibid.*

the development of epistemology, metaphysics, and so on). The reader will notice that throughout this work even I emphasize how the Islamic view of two opposing positions is often the consequence of a dialectical reconciliation between the two, and how we view a lot of the dualisms presented by Western philosophical tradition as false dichotomies. Basically, dialectic is a pretty great way of discussion and communication. It makes use of what was hinted at earlier regarding a “landscape of knowledge” and uses humanity’s inherent subjective nature in a constructive manner. The essence of the idea is “let’s compare notes, perhaps we’re just observing two different facets of the same objective truth”.

Yet Islamic theology and philosophy must also be characterized as heavily positivist (there we go again, another dialectic!).

The difference comes down to having a *known* objective truth as a goal, a teleological endeavor *usually* requiring a positivist position, or striving to find the *unknown*, for which dialectic is often necessary in some manner as a means of reconciling differing human subjective viewpoints. Dialectic can even be employed as a means within positivism and vice-versa (when, for instance, the goal is known but not how to reach it).

Dialectic is different from debate. Debate is a more positivist endeavor. Debate also characterizes much of Western philosophy and also characterized later Islamic theology although dialectic was the preferred method of Islamic philosophy all the while.⁸³ With regards to Islamic theology, the reason for the shift to a more positivist position is clear, to either uphold a known truth or refute a known falsehood. Of course, with the benefit of having texts, the revelation or divine scripture, considered a source of objective truth, there is a reason to do such a thing. Dialectic often occurred with the aim of transcendence of understanding and the scripture were used as a guide in this. Thus the transcendence of Islamic epistemology above the rationalism-empiricism distinction, or the development of the metaphysics behind occasionalism. Occasionalism itself can be seen as a reconciliation between viewpoints, in the same way that Imam Ash’ari’s theology was seen as a reconciliation of the Mu’tazilah on the one hand and the anthropomorphists on the other (and Imam Maturidi’s as between the Ash’aris on the one hand and the Mu’tazilah on the other).⁸⁴ Yet the origin of much of this wasn’t a dialectical method at all. Imam Abu Hanifah (ra), whose theological work inspired the others, was more of a positivist/teleological derivation or rationalization, a positive verified outcome from the source texts, like a position a person takes in a debate. So dialectic was often employed as the means by which to arrive at a workable philosophy, even if that dialectic could be “aimed” at a certain specific outcome (teleologically). One of the reasons Islamic theological discussion shifted away from speculation was because dialectic could get out of control, quite literally. The Mu’tazilah initially acted on behalf of the orthodoxy using principles like dialectic and others within debate but wound

⁸³ Which suggests that Western philosophy often behaves like a theology.

⁸⁴ Mentioned in the work *A Flash Through the Formation of the Sects* by Imam Zahid al-Kawthari discussed earlier.

up adopting some of the heretical positions of their opponents in due time (possible due to their inherently rationalist outlook). The orthodoxy's response was not to halt dialectic but to put limits on it by putting limits on rationalism (or what resulted from it), rendering dialectic subservient to the teleological aims of theology (in other words, rationalization rather than rationalism).

This was seen in the spirit of the works of Ibn Tufail and Ibn al-Nafis. Which also provides some insight into positivist viewpoints since the philosophers, as represented by Ibn Tufail, took more outright positivist positions, favoring the outcomes of their reasoning as the "positive", "verified" outcomes. So teleology is not always tied up with positivism. Teleology does, however, represent one of the distinctions between philosophy and theology (according to the traditional understanding of theology which Islamic theology did not always follow). The theologians, on the other hand, used dialectic reasoning along the lines of the Socratic method to attack the opposition's claims and the premises for those claims. They thus forced a shift to a more empirical outlook in theology (both in terms of appealing to the objective source texts and in general favoring empiricism over rationalism), which in true dialectic fashion, could be seen as an example of the transcendence into a new debate altogether where now the theologians were the positivists. This was the use of philosophical skepticism against reason (rationalism), shutting down wild theological speculation and keeping metaphysical speculation in check for relevant purposes. This reconciliation was a real one in the true spirit of the dialectic as envisioned by Socrates. The rationalists all but disappeared. They were not chased out, hunted down, or eliminated. The debate itself just stopped and usually either the philosophers themselves or the next generation among their students all hopped on board the empiricism-mysticism train of Imam al-Ghazali.

The effects of this were not widely observable on the Muslim world because it had moved away from religiosity to materialism and excess. Scholarship was less prioritized in any field. Business, politics, and military endeavors were emphasized and the central role of science to these endeavors was not yet as obvious (plus the fact that most of those engaged in such fields were themselves often religious and/or spiritual so people put less weight on what they said). Imagine if in Europe's move away from Comte's "theology" phase, Europe had to deal with the fact that all their scientists were theologians and science was seen as a branch of religion. Unlike Europe, the Muslim world already had material wealth at that point and did not need to obtain it (and hence find the best means of doing so).

With regards to mysticism and metaphysics, we can see some of what Hegel later did too. The world was seen as evolving up from base levels of interactions between inherently opposing forces to higher levels of existence, culminating in rational consciousness. Of course this was not seen as "God" (i.e, the pantheistic God) trying to become "aware" of Himself but of creation's struggle in attaining nearness to God. This was mentioned briefly a little earlier in the context of Ibn Arabi's metaphysics. Nature

was seen in a dialectical manner but our knowledge of it was not. So our knowledge of nature (our search for objective truth, as per Ibn al-Haytham) required sticking to the treatment of hypotheses as per the scientific method. But the *experience* of nature was a dialectical affair and this included the human experience, including especially the human social experience. Even in the discovery of objective truth about nature through science we had to employ dialectic to deepen our conceptions or conceptualizations and hold them accountable to each other (owing to science being a social tradition as much as an empirical or rational one).⁸⁵ But what guided this dialectical experience of nature (including the discovering of truth about nature as itself a kind of experience of nature) was our knowledge of truth, whether existing verified empirical knowledge or the knowledge of objective truth contained in theology (from the Qur'an).

This goes to the heart of the Islamic view of existence. There is God, the One, unchanging and indivisible, the active willful Creator, the source of existence (the necessarily existent, whose essence is itself Existence). Then there is the world of creation, the existent created things. The nature of these is finite and even Hegel's logic confirms that the finite is constantly in a state of coming-to-be and ceasing-to-be (and thus "becoming").⁸⁶ Which is clearly manifested in the atomist metaphysics of Islamic occasionalism. But without God in the picture it is hard to justify either reality or objective truth.

Where Marx took Hegel's philosophy was not too far from the positivists. In Hegel's philosophy we witness a much less emphasized presence of the teleological nature of Comte's (though Popper would harshly accuse it otherwise). Marx brought that back. He applied Hegel's philosophy to a materialist interpretation of history and came up with his ideas about class struggle and the inevitable evolution to a transcendent state. In a way Marx, and later Lenin, almost celebrated the dialectic as itself the goal (more so than the result of it). That would correspond to the violent class warfare which would break out as a self-fulfilling prophecy in Russia.

With positivism tinged by teleology and applied to the social sciences, we also saw that in the absence of any objective guiding principle, or even the acknowledgement that objective truth could exist (which would require explaining *how* it could exist), existentialism filled the void. A positive claim is a *posited* claim which is empirically

⁸⁵ And here we have a clear example of the dialectical nature of the scientific method. The part which requires replication and verification by other scientists. It's also involved in the general idea of the hypothetico-deductive model in how we frame and formulate our hypotheses.

⁸⁶ There are, however, numerous criticisms of Hegel's dialectical logic that can be made from the Islamic perspective but to go into this would just add even more exorbitant length to this work. I will say that the most notable objection is probably that dialectic doesn't always have to manifest as constructive interference (like two waves in phase) yet Hegel's metaphysics requires it to. From this principle various proofs for God had been developed in Islamic theology long ago (in both Ash'ari and Maturidi schools). Hegel's "becoming" must in reality correspond to "creating" which requires a creator, whatever one believes it to be.

verifiable. "Might makes right" emerged both out of the post-Hegelian dialectical mood of continental Europe and legal/ethical positivism which, in a very existentialist manner, only upheld the objective correctness of that which was already objective, i.e. that which was simply posited or existed (which conveniently happened to be the actions of whoever was in charge). This mood served as the context for the rise of fascism in Italy (in an outright Hegelian context) and in Germany in the run-up to World War 2. Positivism, by its very nature (dependent on observation), meant that there would be plenty of conflicting ideologies (since observations in all of the social sciences tend to be far more inconsistent than in the natural sciences) all perceiving themselves as absolutely right.

A description of legal or ethical positivism,

"The ethical version, which I will call "ethical positivism," is concerned with the validity of prescriptive norms. It insists on a distinction between the existence of a norm and its moral correctness, and maintains that validity is largely a judgment about the existence of a norm, not its moral correctness. Legal positivism is but one variant of ethical positivism and represents the view that there is no necessary or logical relationship between what the law is and what the law ought to be. Law can be unjust or evil and yet be law, in the sense that citizens have the duty to obey the law and that officials are entitled to punish those who disobey it."⁸⁷

Society managed to evolve and create theologies which circumvented secularism. This is what I meant by comparing the teleological nature of some philosophy with theology. Secularism emerged as a way to marginalize the political influence of any one religion over another on the basis of plurality and co-existence.⁸⁸ But when a theology is not advertised as a theology? Even by its own founders? Even by the rest of the European philosophical community, proponents and critics alike because all the language used is couched in the terminology of philosophy of science? Then you have an unchecked religion ready to run amok. Unchecked by morality (because as opposed to traditional theology, morality is covered by ambiguous hand-waving philosophy which could justify just about anything), and uncheckable by secular institutions (who only focus on traditional established "moral" theologies). It seems people cannot escape religion, they'll make religions up out of whatever they have or keep behaving according to and following "phantom" religions, like phantom limbs. And unlike Hegel's romanticized dialectical method, there was no transcendence to a higher state. It was a regression to a level humanity had hardly known in its history (the 20th century having been the most violent and brutal as a direct consequence of many of these ideologies). All this, however, is the subject of the next section, not this one.

So, moving on from that sour note, and shifting gears back to philosophy of science,

⁸⁷ Fiss, Owen M., *The Varieties of Positivism*

⁸⁸ Either that or on the basis of just marginalizing certain religions.

positivism eventually birthed an offshoot that is known as “logical positivism” (also called “logical empiricism”).

Logical positivism (also known as logical empiricism, scientific philosophy, and neo-positivism) is a philosophy that combines empiricism—the idea that observational evidence is indispensable for knowledge—with a version of rationalism incorporating mathematical and logico-linguistic constructs and deductions of epistemology. It may be considered as a type of [analytic philosophy](#).

Logical positivism, in the formal sense, began from discussions of a group known as the First Vienna Circle which gathered during the earliest years of the 20th century in Vienna... [...] A 1929 pamphlet written by Neurath, Hahn, and Rudolf Carnap summarized the doctrines of the Vienna Circle at that time. The doctrines included the opposition to all metaphysics, especially ontology and synthetic a priori propositions; the rejection of metaphysics not as wrong but as having no meaning; a criterion of meaning based on Ludwig Wittgenstein's early work; the idea that all knowledge should be codifiable by a single standard language of science; and above all the project of rational reconstruction, in which ordinary-language concepts were gradually to be replaced by more precise equivalents in that standard language.

During the early 1930s, the Vienna Circle dispersed, mainly because of political upheaval and the untimely deaths of Hahn and Schlick. The most prominent proponents of logical positivism emigrated to the United Kingdom and the United States, where they influenced American philosophy considerably. Until the 1950s, logical positivism was the leading school in the philosophy of science.

[...]

Logical positivists typically considered philosophy as having a very limited function. For them, philosophy is concerned with the organization of thoughts, rather than having distinct topics of its own. The positivists adopted the principle of verificationism, according to which every meaningful statement is either analytic or is capable of being verified by experience. This caused the logical positivists to reject many traditional problems of philosophy, especially those of metaphysics or ontology, as meaningless.

[...]

Immanuel Kant also had an important influence on the positivists, both positive and negative. Negatively, Kant was often scorned by the positivists in their early debates, and Kant's doctrine of synthetic a priori truths was

the doctrine they most wished to discredit. However, Kant's opinions about the nature of physical objects pervaded the protocol sentence debate, and Kantian opinions of the relationship between philosophy and science were shared by the positivists to some degree.

[...]

Positivism in Germany is thought to have developed in response to Hegelian and neo-Hegelian metaphysics, which was a famous philosophy in Germany. Hegelian successors such as F.H. Bradley attempted to explain reality by postulating metaphysical entities that did not have any empirical basis. Logical positivists in response wanted to stop such metaphysical entities from being used as an explanation.

[...]

Although the logical positivists held a wide range of views on many matters, they were all interested in science and skeptical of theology and metaphysics. Early, most logical positivists proposed that all knowledge is based on logical inference from simple "protocol sentences" grounded in observable facts. Many logical positivists endorsed forms of materialism, metaphysical naturalism, and empiricism. (See James Ladyman, *Understanding Philosophy of Science*, p. 147)

Perhaps the view for which the logical positivists are best known is the verifiability criterion of meaning, or verificationism. In one of its earlier and stronger formulations, this is the doctrine that a proposition is "cognitively meaningful" only if there is a finite procedure for conclusively determining its truth. An intended consequence of this opinion, for most logical positivists, is that metaphysical, theological, and ethical statements fail this criterion, and so are not cognitively meaningful. They distinguished cognitive from other varieties of meaningfulness (e.g. emotive, expressive, figurative), and most authors concede that the non-cognitive statements of the history of philosophy possess some other kind of meaningfulness. The positive characterization of cognitive meaningfulness varies from author to author. It has been described as the property of having a truth value, corresponding to a possible state of affairs, naming a proposition, or being intelligible or understandable in the sense in which scientific statements are intelligible or understandable.

Another characteristic feature of logical positivism is the commitment to "Unified Science"; that is, the development of a common language or, in Neurath's phrase, a "universal slang" in which all scientific propositions can be expressed. The adequacy of proposals or fragments of proposals

for such a language was often asserted on the basis of various "reductions" or "explications" of the terms of one special science to the terms of another, putatively more fundamental one.

[...]

Logical positivism spread throughout almost the entire western world. It was disseminated throughout the European continent. It was spread to Britain by the influence of A. J. Ayer. And later, it was brought to American universities by members of the Vienna Circle after they fled Europe and settled in the United States during and after WWII. Logical positivism was essential to the development of early analytic philosophy. The term subsequently came to be almost interchangeable with "analytic philosophy" during the first half of the twentieth century. Logical positivism was immensely influential in the philosophy of language and represented the dominant philosophy of science between World War I and the Cold War.⁸⁹

So this was, unlike positivism in general, a very focused application of the ideas behind it to the philosophy of science. It didn't even last as long as positivism (which is still kicking today),

Early critics of logical positivism said that its fundamental tenets could not themselves be formulated consistently. The verifiability criterion of meaning did not seem verifiable; but neither was it simply a logical tautology, since it had implications for the practice of science and the empirical truth of other statements. This presented severe problems for the logical consistency of the theory. Another problem was that, while positive existential claims ("there is at least one human being") and negated universal claims ("not all ravens are black") allow for obvious methods of verification (find a human or a non-black raven), negative existential claims and positive universal claims do not allow for verification.

Universal claims could apparently never be verified: How can you tell that all ravens are black, unless you've hunted down every raven, including those of the past and future? This resulted in a great deal of work on induction, probability, and "confirmation," which combined verification and falsification.

[...]

A well-known critic of logical positivism was Karl Popper, who published the book *Logik der Forschung* in 1934 (translated by himself as *The Logic of Scientific Discovery*, published 1959). In it he argued that the positivists' criterion of verifiability was too strong a criterion for science, and should be

⁸⁹ http://en.wikipedia.org/wiki/Logical_positivism - Retrieved 05/24/12

replaced by a criterion of falsifiability. Popper thought that falsifiability was a better criterion because it did not invite the philosophical problems inherent in verifying an inductive inference, and it allowed statements from the physical sciences which seemed scientific but which did not satisfy the verification criterion.

Popper's concern was not with distinguishing meaningful from meaningless statements, but distinguishing scientific from metaphysical statements. Unlike the positivists, he did not claim that metaphysical statements must be meaningless; he also claimed that a statement which was "metaphysical" and unfalsifiable in one century (like the ancient Greek philosophy about atoms) could, in another century, be developed into falsifiable theories that have the metaphysical views as a consequence, and thus become scientific.

Popper denied that science need rely on inductive reasoning, or that inductive reasoning actually exists, although most philosophers think it obvious that science does rely on it.

[...]

According to Hilary Putnam, a former student of Hans Reichenbach and Rudolf Carnap, making an observational/theoretical distinction is meaningless.

[...]

Willard Van Orman Quine criticized the distinction between analytic and synthetic statements and the reduction of meaningful statements to immediate experience.

[...]

Work by Thomas Kuhn has claimed that it is not possible to provide truth conditions for science independent of its historical paradigm.

[...]

Key tenets of logical positivism, including its atomistic⁹⁰ philosophy of science, the verifiability principle, and the fact-value distinction, came under attack after the Second World War by philosophers such as Nelson Goodman, Quine, J. L. Austin, and Peter Strawson. Nicholas G. Fotion comments that, "By the late 1960s it became obvious that the movement had pretty much run its course." Most philosophers consider logical

⁹⁰ This isn't referring to atomistic metaphysics or physics.

positivism to be, as John Passmore expressed it, "dead, or as dead as a philosophical movement ever becomes." By the late 1970s, its ideas were so generally recognized to be seriously defective that one of its own main proponents, A. J. Ayer, could say in an interview: "I suppose the most important [defect]...was that nearly all of it was false." It retains an important place in the history of Analytic philosophy as the antecedent of contemporary philosophies, such as [Constructive empiricism](#), Positivism and [Postpositivism](#).⁹¹

The articles on constructive empiricism and postpositivism are worth reading, especially since their formulations are quite a bit more (but obviously not entirely) palatable to the view of science of Islamic theology. The associations between these philosophies and the different fields of science are telling.

If you haven't already, I recommend reading the Wiki article on [analytic philosophy](#). Logical positivism can be seen as taking analytic philosophy and turning it into an "end" instead of a means to an end. In the sense that philosophers can use analytic philosophy but disagree with aspects of logical positivism or empiricism.

We can shift into the discussion on naturalism by starting with the criticisms of empiricism or logical empiricism made by one of the most prominent philosophers in the tradition of analytic philosophy and naturalism, Willard Van Orman Quine.

We'll start with his seminal work, *Two Dogmas of Empiricism*, published in 1951.

...it is one of the most celebrated papers of twentieth century philosophy in the analytic tradition. According to Harvard professor of philosophy Peter Godfrey-Smith, this "paper [is] sometimes regarded as the most important in all of twentieth-century philosophy". The paper is an attack on two central aspects of the logical positivists' philosophy. One is the analytic-synthetic distinction between analytic truths and synthetic truths, explained by Quine as truths grounded only in meanings and independent of facts, and truths grounded in facts. The other is reductionism, the theory that each meaningful statement gets its meaning from some logical construction of terms that refers exclusively to immediate experience.⁹²

As the *Stanford Encyclopedia of Philosophy* puts it,

He is perhaps best known for his arguments against Logical Empiricism (in particular, its use of the analytic-synthetic distinction). This argument, however, should be seen as part of a comprehensive world-view which makes no sharp distinction between philosophy and empirical science and

⁹¹ http://en.wikipedia.org/wiki/Logical_positivism - Retrieved 05/24/12

⁹² http://en.wikipedia.org/wiki/Two_Dogmas_of_Empiricism - Retrieved 05/25/12

thus requires a wholesale reorientation of the subject.⁹³

First let's keep in mind the analytic-synthetic distinction was introduced by Kant in the beginning of his *Critique of Pure Reason*, and Kant was an advocate of "critical philosophy" (i.e., "critical rationalism").

Kant picked up on themes that already occurred in the works of Locke and Hume. We have already discussed the influences on Locke, which included the thought-experiment-as-fictional-story of Ibn Tufail. This, the works of the two Bacons (Roger Bacon d.1294 and Francis Bacon d.1626), and others like Robert Grosseteste, were heavily influenced by the empiricism of the tradition of Islamic philosophy (particularly physics: Ibn al-Haytham, Al-Kindi, etc). There was also the philosophical and metaphysical doctrines of occasionalism and empiricism among the Cartesian philosophers who Hume directly drew from. The manner in which a lot of the philosophy came down though was "second hand" in that these were observers outside the tradition of philosophy reading translated works or works based on those (or works based, in turn, even on those). It's akin to getting the essence of an argument by an example or through a story (which is why Ibn Tufail's story was so popular everywhere, instead of difficult philosophical arguments it demonstrated it via a fictionalized empirical account by a protagonist whose thought processes were explained, allowing one to put themselves in his shoes and "think like them", but using their own reasoning). In a way this is generally the nature of empirical narratives. The information regarding how to set up and conduct an experiment or what principles of nature to derive are given but not the reasoning behind these so different people will bring their own reasoning to the table (which implies a universal accessibility for humans implying a shared common experience of the world). Suffice it to say these European philosophers were not getting the full blown texts of the theologians, aside from perhaps Imam al-Ghazali's work. In fact, his work, *Maqasid al-Falasifah* or *Aims of the Philosophers*, which was written separately prior to the later *Incoherence* was set up to introduce a reader to that work by first laying out the entire mode of thought of the philosophers (specifically the Greek-influenced). To some Western observers it appeared that Al-Ghazali was actually endorsing this philosophy himself, not that he was intending it to be a setup for his later deconstruction of it, and they thought it a great text of the Peripatetic tradition.

The reason Al-Ghazali even felt the need to write such a work was to fill a need. Meaning that in spite of the prevalence of Greek-influenced philosophy, even a sufficient basic and introductory text was not available. This goes back to why Muslims even went after the works of the Greeks to begin with. Empiricism in the Islamic tradition did not start with any foreign philosophy but with the Qur'an itself which laid particular emphasis on empirical knowledge. Within the prophet Muhammad's (saw) lifetime the precedent had been set for acquiring practical knowledge through empirical means, not the least of which was related to the Arabs' particular disposition for careers in trade but which

⁹³ Hylton, Peter, "[Willard van Orman Quine](#)", The Stanford Encyclopedia of Philosophy (Fall 2010 Edition), Edward N. Zalta (ed.)

expanded to include all applications, from healing⁹⁴ to warfare. On top of this the Qur'an emphasized seeking knowledge for its own sake as a way of attaining nearness to God. Out of these practical and spiritual necessities which drove the evolution of knowledge eventually came a need to discuss knowledge itself (i.e, philosophical matters). It was in this context that Greek philosophy was sought after. Islamic beliefs about ontology and epistemology had heretofore already been essentially set down in a very naturalistic theology which emphasized realism, experience, and social order. But the need came to expand on it, in language, in detail and for this purpose Greek philosophy, particularly Aristotle's, was adopted (so much so that Aristotelian terminology is used throughout all Islamic works of philosophy). It was the language that was sought after. The language of reason (philosophy), not the literal language of Greece. Initially it was accessed on a need-to-know basis. Islamic philosophers, often natural philosophers, went to these works when they had something to write about knowledge itself (and not just their practical experiences). It so happened that in the course of their studies about astronomy, mathematics, optics, chemistry, medicine, language and eventually in their studies of (and debates with) foreign theologies, they came upon knowledge about knowledge itself, or philosophy, and needed a language to express this.

Reason did not come from the Greeks or philosophy. It is something everyone has and everyone uses. It already had its place in Islamic epistemology which can be reduced to the verses of the Qur'an placing the use of "the heart" alongside uses of the other sensory faculties (so reason is treated as a faculty by which knowledge is gained). The terminology of Aristotle, who was for the Arabs a symbolic representation of the entire Greek tradition, was found to be the language necessary to hold reason to account (a process requiring explication, analysis, and comparison).

Of course philosophy did develop into an Islamic rationalist tradition. The Aristotelian language of reason gave form to every developing field of *'ilm*. Every single one, from *'aqeedah*, to *fiqh*, to *tasawwuf* and mysticism (Sufism). All of these were written in this language and it is no wonder that later Western commentators ascribe the Islamic tradition of knowledge as either a continuation of the Greek (if they're being generous) or a copy of the Greek (from the Islamophobic revisionists of history who deny a "golden age" ever occurred in Islamic civilization). What is meant here by "Islamic rationalism" is the emphasis of the reason as a source of knowledge above all others.

This actually never caught on beyond a few philosophers. For the most part the Islamic natural philosophers used Aristotelian terminology because they picked it up second hand from Galen, Ptolemy, or other Greek natural philosophers. Those who became true rationalists, along the lines of Al-Farabi, Ibn Sina, and Ibn Rushd were quite rare and even these cannot be said to entirely have been rationalist either (as their philosophy had a strong teleological/theological tinge to it) in the tradition of the Greeks. "Realistic Naturalism" (the belief in the existence of a real world which could be accessed and

⁹⁴ Such as the prophetic saying: "*Allah has not sent down a disease except that He has sent down a cure for it.*" [Sahih Muslim]

studied⁹⁵) was the context for empiricism and rationalism. So the fledgling rationalist tradition met immediate resistance from the theologians and ambivalence from the natural philosophers and this eventually came to a head with Al-Ghazali whose *Incoherence of the Philosophers* served as a critique of rationalism (forcing it into line without compromise). And Al-Ghazali's attack came in the context of the orthodox theology expounded upon by Imams like Abu Hasan al-Ash'ari in the very same language of reason. The specific version of Islamic epistemology elaborated upon in this work wasn't even Ash'arite, it was from the Maturidi tradition (Imam an-Nasafi), considered more rationalist, yet it was chosen for its simple and clear demarcation of epistemology.

All of this is to illustrate the basic distinction between Reason and the language of reason. Reason, in orthodox Islamic epistemology, is treated in a naturalistic manner. It is treated like a "black box"⁹⁶ sensory faculty.

That isn't to say there hasn't been speculation on how it works. From Aristotle to the Neoplatonists to the Islamic Peripatetics, there has been an incredible amount of speculation about how exactly the faculty of reason functions and perhaps the best example of this is in the philosophy of Al-Farabi who wrote an extensive metaphysics adapting Neoplatonism to Islamic theology, and posited a mechanism describing the impressing upon the human soul (*ruh*) by a divine intellect (which he described in the example of the Archangel Gabriel (as) teaching the prophet Muhammad (saw)). Of course the orthodox theologians wanted no part of this metaphysical speculation that wasn't grounded in either authentic theology or empirical accountability.

We do know a little about Reason in the way of the distinction between different forms of "reasoning", and these are described linguistically as deductive (syllogistic) and inductive (*istiqra'*). These various terms were expounded upon earlier in the discussion on the Nasafi creed. These essentially describe different relationships drawn between the "input" and "output" of reason.

From this terminology of Greek origin we find the original inspiration for Kant's use of the terms analytic and synthetic. The fact that they are used as a distinction of epistemological significance is due purely to the European endeavor to reconcile empiricism and rationalism without a proper naturalistic (holistic at least) context for dialectic (all they had was Idealism), which instead forced endless debates until people

⁹⁵ Whenever "Islamic naturalism" is spoken of, it refers to how the *supernatural* is considered an extension of the natural and studied according to the same principles and methodology of the natural (i.e. it is all acknowledged as one cohesive holistic reality which is treated in the way naturalists treat nature).

⁹⁶ From Wikipedia: Black box - *In science and engineering, a black box is a device, system or object which can be viewed solely in terms of its input, output and transfer characteristics without any knowledge of its internal workings, that is, its implementation is "opaque" (black). Almost anything might be referred to as a black box: a transistor, an algorithm, or the human mind.*

like Kant who suddenly picked up enormous influence because his philosophy attempted to be what the rest of society actually wanted from philosophy. People used Kant's language for the same reason everyone used Aristotle's early on. It was a language of reason and Kant's was a "critical" version of it, better suited for empirical aims.

Kant's various terminology can be reduced into the black box example with no more than the terms deductive and inductive. And yet we can also abandon both these terms and adopt different language to describe the function of reason, even the convoluted system of Kant. None of this terminology, for a naturalist, necessarily has epistemological significance. It is the sources of knowledge themselves which have that. But for the idealists and the fundamentalist empiricists, they must have epistemological significance because that is all there is (ideas).

These distinctions can be treated as only having linguistic significance in the sense that these different terms convey different meanings or naming references. Keep in mind that we have already rejected Kant's definitions, we are keeping Kant's terminology and his use of that terminology, but not how he defined either. So it should be obvious that the notion of analyticity discussed here is no longer that of Kant or the logical positivists who followed, but it is used in generally the same fashion.

One notion which it can be seen as referencing is in the instance of indicating varying levels of trust (or faith or belief, depending on the terminology you prefer) in knowledge from virtue of experience. Knowledge can thus even be described in the simple terminology of the Greeks (in terms of belief) for our purposes here, if one felt so inclined. So, truth is truth. Knowledge, on the other hand, can have varying degrees of confidence or certainty. True knowledge (that has certainty, necessity) is indeed special but we cannot go around haphazardly giving the label "true" to just any knowledge.

But here the fundamental issue with the different nature of analytic statements and synthetic statements remains since it would seem that analytic statements do not require experience. However, analyticity must be considered within the context of epistemology. We know it is a product of reason. Judging by the analytic relationships themselves (logic, mathematics) we can see it hints at an experience: the experience of existence; the experience of spatio-temporal existence being necessary for what Kant called the forms of intuition. Whereas Kant refused to overtly acknowledge this (preferring to stick to his idealist roots), he had to implicitly acknowledge it by using the term "synthetic" in the context of "synthetic *a priori*". The fact of existence itself leads us to some fundamental principles, such as the notion of unity and the notion of subject. Without space, meaning without significant spatial existence or with just some minimum amount of spatial existence / form or if dimensionless existence were possible and linked to our consciousness, some things could still be known. Were it not for the fact that our knowledge of consciousness and perception is purely derived from biology, we might not even need to posit time as a prerequisite for just those two (if we believed in a passive perception like Leibniz, which Muslims do believe is possible in some manner) or even

three if we include object. If we add, at minimum, spatial dimensionality and configuration (or something equivalent), then we can expand those principles to unity, subject, object, and from there multiplicity. All this without needing sensory experience for anything other than data with which to form language (“sign system”, to borrow the term from semiotics). The derivation of the understanding of multiplicity is also necessary yet seems as if it would be a deduced understanding from the concepts of subject and object. The concept of multiplicity contains inherent within it the foundation of our understanding of mathematics. If it is deduced in some reflexive innate manner, it would support the notion that time is perhaps not necessary for this fundamental perception/understanding (going by the nature of the “knowing” whereby things come into our knowledge immediately, unveiled all at once, or with spontaneity as Kant said). It is deduced from the experience of existence, an instantaneous unveiling that would suggest the phrase “the *fact* of experience” as a better description. No one can deny this nature of knowing or that it suggests a timeless relation (occurring at the fastest possible speed of our spatial existence).⁹⁷ This probably sounds confusing but will be elaborated upon in the upcoming pages.

Kant’s terminology of “forms” is a misrepresentation. He only uses it to push his idealist, Platonic agenda (whether a conscious or subconscious effort on his part). The term “forms” indicates that they might be arbitrary and there could be some other forms. They (space and time) are the dimensions of existence and consequently of some of our intuition and thought but it is pure dimensionality itself which is the form of our intuition since *knowing* in a purely metaphysical sense as described just above does not seem to *essentially*⁹⁸ require either space or time. Space and time are required for experience but *knowing* is fundamentally different from experience (as any human can attest to). It would seem to only depend on existence to be possible and on experience to be actualized (for the means of input and storage). So if we consider the possibility of existence without spatial/temporal dimensionality, then *knowing* would also seem to be possible.

Before we continue it would be prudent to explore some of these basic concepts. We can call knowledge an attribute of a knowing subject. Where there is information and where there is a knowing subject, there is knowledge. There are two requirements of knowledge: a knowing subject, and information. Our instinct might tell us that only humans are knowing subjects but returning to Kant’s critical philosophy, how do we know that? Kant only acknowledged ourselves as objects in the true sense, we could not justify calling ourselves subjects by his account. What does it mean to be a subject? We could say it is experiencing existence. We have an object, a human brain, by

⁹⁷ By “timeless” here I only mean “seemingly” or “almost” timeless since any created thing would undergo experience of at least one instant of time, regardless of how long that instant was in relation to other things. It would come into being then cease to be without having changed. The “length” of its instant would be measured relative to the change of other things (how many instants, or creation and annihilation events, they undergo for the same duration of existence).

⁹⁸ “Essentially” here in the context of true ontological essence, not its colloquial usage.

experiencing its existence we are subjectively experiencing its objective existence. We are knowing subjects. But this mode of thought would inevitably lead us to wondering what if we could experience the existence of an inanimate object? It must also be a subject by this logic. But then would it be a knowing subject? There is knowledge to be known if the subject was capable of knowing: information about at least its own existence must be present as long as it exists. If we say to be a subject is to experience existence, then what exactly *is* a subject? What is experiencing existence? We can define experiencing as a sort of internal change of state by the subject to reflect the state (order or information derived from dimensional configuration) of something other (object or itself treated as object). So it would require the possibility to change or possess multiple internal states. That would be experiencing the object or itself as object. Experiencing existence, however, would simply mean possessing the default or original internal state, *unchanged*, for the duration of its existence. The latter (experiencing existence) implies subject. The former (experiencing other things) implies knowledge (a more detailed definition of knowledge will be discussed soon). Together they form a knowing subject, that which has an internal portion capable of changes of state to reflect the states of other objects (i.e, representations), thereby experiencing them, and an internal portion which does not change and therefore implies an experience of existence (its existence in meaningful spatio-temporal dimensionality acts as a representation) and confers upon it a stable identity of its own. For if the entire subject changed it would no longer be the same subject, it would cease to exist as soon as its complete dimensional configuration disappeared (or became something else, with even the slightest change). Some part of it has to remain. The specific dimensional configuration of that part which remains unchanged would contain the information for its *a priori* knowledge (i.e, knowledge of its own dimensional configuration, in the case of our brain this is regarding its spatio-temporal existence... space and time). But what if there were no spatio-temporal dimensional configuration, only existence in the "dimension of existence."⁹⁹ Then what information or knowledge could such an experience of existence represent?

Now, continuing with the prior train of thought: compare this with notions of the universe tunneling into existence from nothing or being spontaneously created from nothing. This would require the laws of nature to exist before spatial/temporal meaningfulness. Laws dictating order would seem to imply information somehow existed separately (before, prior, or independently of) from space and time. *Knowing*, then, would be like a "timeless", "spaceless", "experiencing" of information. If we say experiencing requires some kind of dimensional meaningfulness or means of expression, then this would lead us to conclude that existence itself must be dimensionally meaningful yet in some other way than spatio-temporal dimensionality. At the very least it could mean the necessity of a dimension just for existence. If someone would object that even if we were to accept a spaceless/timeless existence for information then that necessarily precludes experience,

⁹⁹ Recall this is simply the alternative to saying that dimensionality isn't required for existence and things can exist outside of any dimensional configuration, like space and time, which is harder to deal with conceptually and rationally (if not impossible).

then we point to the idea that these laws could somehow *create* the universe which is an act or *action*. So treating existence as dimensional is nowhere near as audacious an assertion as that creation out of the blue. Not only would treating existence in this way make more sense of such creation claims, it would also allow for the “existential experiencing” of knowledge (knowledge experienced by virtue of the fact of existence, usually concerning the information regarding the essence of the thing in question, which in the case of spatio-temporal dimensionality is also manifested as physical information in the natural order). This view is very much compatible with most atheistic-“naturalistic” metaphysical conceptions of a non-eternal universe. I put “naturalistic” in quotes because that should preclude metaphysical speculation but it has not stopped many prominent scientists or atheist writers. This is also the essence of the holographic universe theories though those would say that only the information contained in this “dimension of existence” is meaningful and the spatio-temporal existence is merely a representation and therefore an illusion.

For those who adhere to more responsible (i.e., “critical”) philosophies which rigorously avoid metaphysical speculation, we appeal to the basic sensibilities of a person’s experience of life in order to build confidence in such a treatment of existence:

1. Existence is posited by action. Our experience is an action so it implies something is happening somewhere. It also tells us some things are in our control and some things are not. Notably, time is not in our control and hints that some part of ourselves is subject to and dependent on this external factor.

2. There are two experiences of Self. One is what Kant called the transcendental apperception which is the empirical ego or our sensible experience, in time, of our Self. This is what we would call our psychological Self, or our *Nafs* (i.e., our conscious experience). We can learn much about this through the content of our sensory experiences which tells us that there is some connection between the existence of our mind, in which this experience of Self resides, and that which is being described by our sensory experiences (for one thing, both require space and time). When our sensory experiences can deliver to us information which allows us to understand our own psychological natures, then there is little need of convincing that there is something we can call “reality” which we are experiencing both through the construction or configuration of our minds’ existence in that reality and through our sensory organs’ perceptions of that same reality. The fact it happens in a social order (other minds who can figure us out and vice-versa and communication with whom gives us more incentive to believe in their real existence in some manner) is just the icing on the cake. We can, with confidence, posit a belief in a reality, of whatever nature, external to our subjective experience. Positing a belief with a level of confidence is in accordance with any rational skepticism, it is the logical choice, therefore, of any self-professed skeptic (i.e., the agnostic). With regards to the gnostic denier of objective reality, we may take a page from Imam Maturidi and ask them, in jest, “Do you know what you deny?”, and if the answer is “No”, their denial stands cancelled. If they answer in the affirmative, they

admit the reality of their denial (that this knowledge of theirs, and their denial, has a real essence at least) and thereby contradict themselves.

3. The second experience of Self is not a *sensible* experience. It is not really occurring in time in the same way as our psychological experience is. Kant called this “intellectual” and characterized it by spontaneity. It is also called “intuition” and is the root of *a priori* knowledge. Kant refused to accept Descartes’ “I think, therefore I am” on the grounds that it was insufficient with sensible experience of Self (which, since it was experienced in time, he considered more objective, like the way we would look at another object, rather than subjective perception of identity (“I”)) but it can be admissible here since this is true subjective experience not essentially reliant on either space or time in the acquisition of knowledge, only as means by which to deliver this knowledge to the psychological Self. Not that subjectivity was entirely ruled out for apperception in the first place either. The knowledge we gain here by intuition is described as *necessary* because we do not have a choice in the matter. It resembles the necessity of the knowledge acquired by the sensory faculty as there, once choice has been made to utilize the faculty and acquire knowledge, choice cannot be made with regards to its contents. The prime example of this kind of intuitive necessary knowledge is the knowledge that the whole of a thing is greater than its part. The basic ideas of unity (usually first applied to the Self), subject (association with Self, non-sensibly), object, multiplicity, etc. Kant’s “forms of intuition” are from this. So Descartes’ would have been more accurate in saying “I know, therefore I am” or perhaps “I know I”, although “I think, therefore I am”, even with regards to the active consciousness of the psychological Self, is still not a bad justification. Kant tries at length to refute it but then later acknowledges that activity or action implies substantiality, and thinking is without a doubt an activity like experiencing in Kant’s view of the transcendental apperception (our psychological experience of the Self, and thinking or cognition here being a psychological activity), because it is subject to time. So he implicitly agrees with the reasoning of Descartes behind this famous statement in the rest of his *Critique*. Kant’s denial also had the side effect of preserving the “I” as distinct from our psychological Self or ego, reserving it for this more subjective and intuitive experience of the existence of the Self.

Similarly, when one acquires knowledge by deduction, once that choice is made, it is like a spontaneous unveiling by means of which any object referred to becomes clear and evident, and capable of being described (assuming satisfactory grasp of language). So though it is not necessary but acquired (by choice), the actual act of *knowing* retains the quality of intuition. In fact both deductive and inductive reasoning, any kind of reasoning at all really, happen in this manner (although only with deductive reasoning does the knowledge resemble necessary knowledge in certainty and fixity), because it is a characteristic of knowledge, not of reason (hence it’s also the same for when we acquire knowledge from the senses by immediate perception without thinking). With our reason, it’s like putting the pieces of a puzzle together in a rough and disconnected manner where the joining happens automatically. We might rearrange the pieces several times for the automatic joining to trigger. We consciously choose to undergo this process by

the act of choosing to provide the pieces up for this “automatic assembly” and choosing their configuration, thus influencing the outcome (with regards to pieces that could assemble into a variable shape). When the pieces are from experience, it is *a posteriori* knowledge and when they are constructed from previous knowledge, it is *a priori* knowledge. Kant would call the manner in which the pieces are joined his categories of understanding, but the form in which the pieces are arranged is actually dependent to some degree on conscious effort (with regards to reasoning) as well as to the manner of their acquisition (since our faculties of experience operate in space and time). It is not a “form”, it is itself an experience of spatio-temporal existence. Furthermore, for Islamic epistemology, knowledge does not have to be true to be considered knowledge which makes the concept of *a priori* a bit less troublesome:

Knowledge is an attribute of the knowing subject by means of which any object referred to becomes revealed (*yatajalla*) to him; that is to say, it becomes clear and evident and capable of being described by words, and this regardless of whether that object is something existing (*mawjud*) or something non-existing (*ma'dum*). Knowledge includes both the comprehension (*al-idrak*) by the senses and the comprehension by Reason (*al-aql*), and this again both of things conceived (*al-tasawwurat*) and of things asserted (*al-tasdiqat*), the latter of which may be both certainties (*al-yaqiniya*) and non-certainties (*ghayr al-yaqiniya*).

This is in opposition to the view of the Sophists that knowledge is an attribute [of the knowing subject by means of] which [he] makes an affirmative judgment of which the contradictory (*al-naqid*) cannot be admitted. This definition of theirs, although it includes the comprehension of the senses, provided only that the thing to be perceived is not inaccessible to the senses; and although it also includes the things conceived [by Reason] provided only, as they claim, that the things to be conceived do not have contradictories; yet it does not include the non-certainties of things asserted. So much for their view. Accordingly the revelation of an object to the knower must be taken to mean a complete unveiling (*al-inkishaf al-tamm*) [which has been identified with knowledge] and therefore precludes opinion (*al-zann*) so that knowledge with them is to be contrasted with opinion.¹⁰⁰

This is because, obviously enough, people deduce all manner of thoughts, ideas, and opinions wrongly, this knowledge catches on and is even spread by others. Knowledge for us, therefore, does not have to be a *true* belief (in the sense of Plato’s “justified true belief”).¹⁰¹ So saying *a priori* knowledge is just constructed from previous knowledge

¹⁰⁰ Commentary on the Creed of Imam Nasafi by Al-Taftazani

¹⁰¹ “Justification” is also a slippery slope, we say instead there is a level of trust or certainty in the “belief”. Technically we don’t call it a belief either, the belief qualifies the degree of certainty and trust in the knowledge. The word used in the text quoted here is comprehension (that attribute of a knowing subject by which comprehension of an object is possible).

works both for us and more or less for Western philosophy as well. You can form a causal chain of *a priori* knowledge going back to necessary knowledge from intuition (like that regarding unity and multiplicity, subject and object, etc). This is a holistic treatment, however, and does not work well with reductionism where a statement is analyzed on its own without any context. In that case we could take recourse to the ambiguous notion of “ideas”, which, though not defined clearly in Western philosophy, has a pretty clear colloquial or common usage that is somewhat closer to the Islamic definition of knowledge.

Now, the assembled “structure” composed of these automatically assembled pieces is then considered and if as a result of this consideration a comprehension results, it is knowledge (or an opinion, or an assertion, according to other epistemologies). This comprehension is the spontaneous and immediate unveiling, distinct from any act of reasoning. This is what’s referred to by knowledge. It reduces, in effect, to an immediate perception or understanding. What’s being perceived here are ontological relationships (essential and existential). This perception can also be called an understanding. This is fundamentally related to man’s ability to know the identities of things as related in Islamic theology (which will be discussed in a little more detail soon).

We can combine this with our earlier conception of knowledge as an internal change of state in a subject representing the state of an object (or the subject itself treated as an object). The nature of knowledge as this sudden and immediate unveiling corresponds to how understanding in the human brain tends to “click”, interspersed with bouts of reasoning. We can consider this as the internal change of state (representing whatever object we are perceiving or conceiving) coming into existence. The comprehension or understanding often does not happen until the “shape” of the assembled pieces in the above example is just right. And as soon as it does, things “click” (like running through the numbers of a combination lock until the right combination of numbers is entered). This can directly translate into the example of neuronal activity in the brain. In fact, the formation of memories of experiences also happens in a similar manner but this “click” is like the click of a camera (albeit with multiple sources of sensory input to be bundled together) and happens with rapid frequency since reasoning isn’t involved.

This leads us to the foundation of the metaphysical differences between pantheism, Idealism, and occasionalism.

In occasionalism the creation and annihilation of internal states of the mind (representations of objects) parallel or reflect the function of the outside world and the creation and annihilation of the states of all things (in fact, it is necessary since they are both undergoing the same process of change). This view emphasizes the reality of the external world and the distinction between subject and object (including the view that we subjectively experience an objective reality so knowledge is inherently uncertain but some measure of certainty is possible). Objects are identified or distinguished by their real essences (an essence is like an ontological “STOP” command in our reductionism,

without it reductionism can run unchecked until there's nothing left but energy or the laws of nature or just anti-realist worlds of information or math).

According to Subjective Idealism, these internal states or representations correspond to ideas and they are all that is. There is only subject (and perhaps God since we still can't explain the source of the power behind change).

According to the Transcendental Idealism of Kant, these internal states or representations correspond to ideas and they are all we can know. There is only object. This places heavy limitations on knowledge since all knowledge consists of representations the accuracy of which are impossible to gauge, thus extreme uncertainty. At least in Kant's original conception. Other philosophers polished it up a bit after him into a more focused epistemology (and less of a metaphysical philosophy) which is called "critical" philosophy (like Critical Rationalism) rather than Idealism.¹⁰²

According to naturalistic pantheism, the entire universe (which is real) undergoes internal changes of state which results in the semblance of different things (but everything reduces to the universe in its elementary constitution and governed by the laws of nature). The human mind is a way for the universe to know itself.¹⁰³ This overlaps a bit with atheistic naturalism since you might see some espousing such views. The "pantheism" results from an ontological error (or what we would call an error) in not recognizing ontological relationships of essence (the existentialism is apparent) and engaging in runaway reductionism, effectively treating the entire universe as one thing. Atheism in this context is a natural consequence of this behavior because to even posit a Being-like essence for the universe (i.e, pantheism) leaves room for more reductionism.

According to "Idealistic" pantheism, the entire universe is a mind and all things are no more than ideas in it. This is similar to traditional pantheism, especially from the East, and some new age holographic universe or computer-simulated-universe.

To summarize some of the points made here about ontology/metaphysics: If we take into account the Platonic influence on Western philosophy then the use of the term "forms" implies that Kant's "forms of intuition" are taking this form from the "other world", which for Kant is the world of noumena or things-in-themselves. Space, time, and

¹⁰² So critical rationalist epistemology based on Kant is probably the "best" flavor of rationalist philosophy to come out of the West from our point of view, especially when it has ditched his Idealist metaphysics.

¹⁰³ "We are a way for the cosmos to know itself" - Famous scientist, Carl Sagan. An inspiration to many atheists though he was in actuality an Agnostic (and considered by many a pantheist in the vein of Spinoza): *"The idea that God is an oversized white male with a flowing beard who sits in the sky and tallies the fall of every sparrow is ludicrous. But if by God one means the set of physical laws that govern the universe, then clearly there is such a God. This God is emotionally unsatisfying... it does not make much sense to pray to the law of gravity."*

dimensionality are necessary facets of existence in our world (or you could say world of experience) but from a metaphysical position then only dimensionality is necessary for existence. Dimensionality implies *existence*, spatial dimensionality implies existence in our world of experience (including order and information) and temporal dimensionality implies *creation* (power, change). All three imply *finitude* and in fact it would make more sense to consider them together holistically as spatio-temporal dimensionality since their implications overlap (we could consider spatial dimensionality to imply something which exists and *can* change and temporal dimensionality to imply something which *is changing*, so the two can make abstract sense independently but shouldn't be considered independently in any reference to reality). Dimensionless existence in this context wouldn't actually be dimensionless since the term "dimensionless" in common use simply means lacking the dimensions of space and time. It would mean existence without spatio-temporal dimensionality. We don't need to consider a "hidden dimension" of existence for all intents and purposes related to our daily experience here of the natural world, but one would be implied by the fact of existence. If something is posited to exist, it has some kind of meaningful existence beyond space and time, whether we know the nature of this or not. Anyone who believes the universe was created spontaneously from nothing by the laws of nature believes the same principle.

[Theology] This "ontological dimension" could correspond to pure essence and/or perhaps existence as the command (*amr*) of God for all we know (part of the *Al-Ghayb* or Unseen). That which is given only the most bare minimum form of existence (assuming there is such a dimension) cannot express itself unless it is also given other dimensions by which to do so (so spatial dimensions add spatial meaningfulness and so on). God, on the other hand, expresses Himself through creation and His very essence is described in terms of Existence. Going into speculation in this regard was what philosophers like Al-Farabi and others did and it distinguished them from the orthodox theologians. One thing to keep in mind is that the world is treated holistically. The Unseen (at least the part of it which is the *Amr*, as the Unseen is an umbrella term which encompasses more than just this) is *not* a separate world, it is just the unseen or invisible (i.e, veiled from our physical experience) part of this one. If we were to speak of it as a distinct world, informally, we could call it the world or dimension of the *laws of nature* (the world of laws, the world of command). This world is not a projection of that, though we could treat it as an extension of it (that is not to say it *is* an extension, just that we could treat it as such). If we consider "reality" to mean physical material reality, then the world we experience (the creation, *khalq*) is more real! If by reality we mean the objective, then they would be the same (and both belong to God). We really cannot say much about the *amr* separate from *khalq* as we do not know what modes of existence

characterize God's command (as Unseen light or *nur* for example is one popular conception).¹⁰⁴ So it is not a Platonic realm in the slightest though the distinction between "command"/"law" and "form" should have made that obvious enough and indicates the same distinction that occurs between occasionalism and pantheism, one an active and willful concept, the other a passive emanation. The same goes for treating it as a dimension in which case it becomes even easier (similar to how we treat space and time as one thing, spacetime). It (*amr*) is not a part of our world of sensory experience, but it is a part of the real world of creation *and* command (*khalq and amr*) that our sensory experience describes. Though *khalq* and *amr* are essentially two different things we, aside from abstract discussion like in theology or philosophy, generally do not consider one apart from the other. So the real world is not only *khalq* or only *amr* nor do we reduce one into the other but simply treat it holistically as "*khalq-amr*" retaining the individual nature of each while emphasizing the interaction with each other. This holism is the advantage of the dimensionality terminology over Platonic or other antiquated terminology of "worlds" or "realms". We must necessarily go into the abstract when discussing metaphysics in order to avoid confusion and remain coherent. While it may seem treating *khalq* and *amr* in the way of dimensions is not as "real" as treating them as worlds, it is in the interaction of the two where a greater application to reality is achieved in the end by such terminology. And while the basic concepts do not require additional terminology (we can simply say "the creation and the command" without couching it in terms of "worlds" or "dimensions" because the wording itself is so intuitive and this is likely always going to be the default orthodox position) it is in the purposes of philosophy where such terminology might be useful. For example, all those adherents of scientism who believe the laws of nature can exist independently of or prior to physical existence (the universe) when engaging in such unrestricted metaphysical speculation will suddenly find themselves on the road to our theology, building the argument for an immaterial human soul. [/Theology]

In the above I tagged certain sections as "Theology" just to emphasize that the rest is the most basic of metaphysical deductions. The entire preceding paragraph and the terminology of dimensionality used there (with theology) is pretty much completely arbitrary just to illustrate that terminology exists which is more meaningful and relatable than arcane Platonic ideals. It is not something thought out or intended for serious use as-is. I also mention a "world of experience" and by this I mean centering our view of the world around the act of experience. Not around the impressions of experience as the Idealists (and the empiricists among them) do but neither around the objective

¹⁰⁴ What hammers this home is the Islamic concept of *Barzakh* or the world after death, loosely correlated to purgatory in Christian tradition except it could feature both reward or punishment and is not a permanent destination (more like a stop until the the Day of Judgment). Is it *khalq* or *amr*? We would assume it is a world of *khalq* which is also part of the Unseen. Is it connected with ours? We do not know, but every world of *khalq* must be connected (as perhaps a dimensional extension of) the world of *amr*, so that particular part of the Unseen is treated holistically with our world of *khalq* (as exemplified in the Sufi treatment of the human soul (i.e., mineral soul, vegetable soul, animal soul, etc)).

reality (the *khalq* and the *amr*) as the mystics do. Simply the border between them where we believe there is our subjective experience of an objective reality. From the Western philosophers before the contemporary period Kant came the closest to this with his particular treatment of phenomena-noumena though he treaded too close to phenomenism (even if only functionally, that was enough to color his philosophy).

Returning to the issue at hand, these distinctions (analytic-synthetic) can therefore also be treated as having ontological reference,¹⁰⁵ in terms of the essence-existence relationship. That is, if one particularly desired to use such terminology for some reason in the first place. The only reason I went into such detail on interpreting it in our terms is, like most cases in this work, to offer up a possible workable translation scheme so it is easier to make sense of philosophy which utilizes the distinction (as opposed to axiomatically rejecting all philosophy using this distinction as far too incoherent to consider which no doubt some would try to do). An analytic statement can be seen as having a different ontological meaning or reference than a synthetic one. The former can be seen as describing relationships of essence or proceeding from essential properties to existential ones. The latter can be seen as describing relationships of existence or proceeding from existential properties to essential ones.

Though I won't mention it again until much later (in the discussion on the philosophy of Saul Kripke) we see there is the potential to draw a connection between ontology and metaphysics with regards to the notion of "the laws of nature".

In Islamic theology there is a particular emphasis on our "essential knowledge" or our ability to have knowledge of essences and the relationship of this to language itself. This theological significance of language, though it shall remain unexplored here, could be seen as ontological.¹⁰⁶ This is related in the tradition of Allah's creation of the first "man" (as we see ourselves categorically), or Adam (as). Allah taught Adam the "names" of things, something which the angels had no knowledge of.

The commentary from the *Ma'ariful Qur'an* on that verse (2:31),

In replying to them, Allah first adopted the mode of authority, and told the angels that they knew nothing about the nature and the needs of deputation on the earth, and that Allah alone was the one to know it fully. The second answer was in the mode of wisdom - Adam had been given preference over the angels on account of his superiority in the station of knowledge, because in order to function properly as a deputy on the earth one must know the

¹⁰⁵ Though I shy away from it here, we can say they have *ontological significance*. The difference is the word epistemology carries connotations of the acquisition or generation of knowledge in addition to its categorization but the word ontology does not carry connotations of the acquisition of existence, only its categorization.

¹⁰⁶ As we will see, Quine's objection to the analytic-synthetic distinction is partly on the grounds that it messed up the relationship between language and ontology.

names, the properties and the characteristics of the things to be found there, and the angels had no aptitude for this kind of knowledge.

[...]

Then, Allah demonstrated the truth to them in a vivid form. He gave to Adam a kind of knowledge for which he alone had been endowed with the proper aptitude, and not the angels. That is to say, He taught him the names, the properties and qualities of all the existents, animate or inanimate. Angelic nature is not capable of such awareness - for example, an angel cannot really experience the pain of hunger and thirst, the tumult of passions, the torment from the bite of a scorpion or a snake, or the exhilaration from an intoxicant. Only Adam had the capacity to learn such things, and he was taught to know them. Then, there is no indication in the Holy Qur'an to show that he was taught in privacy, apart from the angels. It may well be that the teaching in itself was open to the angels as well as to him; his nature allowed him to receive it, and he learnt the lesson, while, they were impeded by their own proper nature, and could not. Or, it may be that the teaching did not take an external form at all, but that the Adamic nature was made to carry this particular kind of knowledge within itself without the need of a formal education, just as an infant does not have to be taught how to suck the mother's milk, or a duckling how to swim. As to the question why Allah, being omnipotent, did not change the nature of the angels and make them learn these things, we shall say that the question, in fact, boils down to this: Why did not Allah change the angels into men? For, if their nature had been altered, they would no longer have remained angels, but become men.

[...]

Since they failed to name the things which Adam could, they came to see that purity and innocence is not the criterion in choosing a deputy or viceregent but the knowledge of the things which are to be found on the earth, of the ways of using them, and of the consequences which would follow from such a use.

Plus a footnote to the above by Mufti Taqi (the *tafsir* itself was written by his father),

Some Modernists have zealously taken to the habit of interpreting these verses as implying that man as a viceregent of Allah is required to make a 'progress' in 'Science' - that is, in the empirical study of physical phenomena; a so-called 'Muslim' translator of the Holy Qur'an has even had the temerity to translate the name 'Adam' by the English word 'Man', thus denying the existence and prophethood of Adam. In order to dispel such grave errors and distortions of word and meaning, let us point out that

the 'names' which Allah taught to Adam do not refer merely to the chemical or biological or psychological properties of things and men, but to their essential qualities and aptitudes - we are using the word 'essential' in the technical and metaphysical sense of the word in which it was originally used in the West too.

Which makes the Islamic stance clear. Essential properties obviously do encompass the physical, hence the different modes of reasoning. This is a flat repudiation of the denial of analyticity in our sense of referencing *essential* ontological relationships, within an overall holistic context (i.e, naturalistic) as part of [the actions of] man's faculty of reason (whatever it is, wherever it is, and however it functions).¹⁰⁷ This is aimed at naturalism or rather the specific flavor of it upheld by the "scientific naturalism/positivism" crowd who deny philosophy. Some people of this persuasion emerged from within the Muslim community and advocated treating everything not reducible to the basic five senses as metaphor. This statement by Mufti Taqi is *not* a rejection of naturalism in its sense of treating the world holistically according to how we treat nature. For even the essence of man, which can be described for example as "rational animal", can have *physical* essential properties since man is, in essence, a *physical* life form with DNA and the like, including physical essential properties corresponding to our "rational" nature which allow us to know the identities of things, as the *Ma'ariful Qur'an's* commentary above allowed when mentioning carrying knowledge without a formal education (i.e, the capacity to know is innate, perhaps encoded in our biological form), though we have not understood it yet. They are still, however, *essential* properties, so when manifested physically they are *al-haqiqah* (real essences). We do not say existence necessarily precedes essence since the real essences of things exist within the things themselves, that is things which are possessed of external reality, and with respect to those things which are not we use the terms *huwiya* ("itness") and *al-mahiya* (quiddity or "whatness"). Adam was taught the identities (the real essences *and* the quiddities) of things which existed. What perhaps distinguished him from the angels was his ability to know the *haqiqah*, the real essence, of a thing whereas angels might have only been able to know quiddity (or it could be that angels could know neither, this is purely speculative on my part but since they already attempted to classify man as a free-willed being by existing knowledge, it's not unreasonable to presume). And you cannot know the identity of thing with only its quiddity. In other words, perhaps angels could only know deductively, they could not know in the sense of experiential knowing (owing to their constitution not being a physical one like ours) and therefore could not know the full identities of things. They were perhaps not able to derive new knowledge apart from that given to them. Whereas with humans we have a capacity to know which allows us to deduce and induce from experience and build knowledge, giving us the potential to encompass a vast amount of

¹⁰⁷ Obviously not many use this definition of analyticity. In terms of the usage of Kant and the logical positivists, analyticity would likely be rejected.

knowledge (collectively).¹⁰⁸ This is one allowable orthodox interpretation of Adam (as) being given knowledge of the names of things. I prefer both, that he was given the capacity and to some extent this was actualized with specific knowledge, which perhaps he was not allowed to hold on to.

The key point to notice here is the emphasis on *experiential knowledge of real essences* as characterizing man's nature. What of the analytic-synthetic distinction? Is there any room for Kant's definition of analyticity here? Knowledge completely independent of experience? From the perspective of Islamic theology the obvious answer is no, that there is no knowledge which is not, in some way, dependent on experience. As we say, God's essence is Existence itself (He must necessarily exist). Our essence on the other hand, the essence of man as a created thing, is rooted in experience. We must "necessarily" experience.¹⁰⁹ Another essential property is our rational nature, so we must also necessarily know from experience.

So, now that we've discussed some of the background for our perspective, let's return to the Western debate. Along comes a philosopher of a naturalist persuasion, W.V. Quine, who points out what he sees as the *Two Dogmas of Empiricism*:

Modern empiricism has been conditioned in large part by two dogmas. One is a belief in some fundamental cleavage between truths which are *analytic*, or grounded in meanings independently of matters of fact and truths which are *synthetic*, or grounded in fact. The other dogma is *reductionism*: the belief that each meaningful statement is equivalent to some logical construct upon terms which refer to immediate experience. Both dogmas, I shall argue, are ill founded. One effect of abandoning them is, as we shall see, a blurring of the supposed boundary between speculative metaphysics and natural science. Another effect is a shift toward pragmatism.¹¹⁰

From his statements we can observe that the effect of abandoning them is the inverse of the effect of taking them on to begin with, which goes back to the heart of the debate in Islamic theology and philosophy: demarcating metaphysics. There the goal was to demarcate metaphysics from theology (not eradicate metaphysics). However some overlap was seen as allowable, even necessary, for the relationship of metaphysics and natural science. As it was pointed out earlier the insistence of some Western schools of philosophy upon separating the latter (really, to eradicate metaphysics)

¹⁰⁸ There are also more deterministic views of knowledge within Islamic tradition which view all instances of true knowledge among humans, including regarding the basics of civilization, as originally having been inherited from divine revelation in some way.

¹⁰⁹ I am drawing a conceptualization parallel, I don't mean to say whether man's prime essential property is experience or not, but it is an important one nonetheless related to physical existence. This idea is alluded to later in Leibniz's varying notions of perception with man's rational and active perception the highest form among creation.

¹¹⁰ Quine, W.V., "Two Dogmas of Empiricism", *Philosophical Review*, 60: 20-43, 1951

seemed counterintuitive for natural science. According to Quine such an act (separating metaphysics from natural science) could not be justified.

Quine summarizes his understanding of analyticity as follows,

But Kant's intent, evident more from the use he makes of the notion of analyticity than from his definition of it, can be restated thus: a statement is analytic when it is true by virtue of meanings and independently of fact.

He objects to the use of the term "meaning" on the following grounds,

1. Meaning is not naming or reference.

With regards to singular terms,

Consider Frege's example of 'Evening Star' and 'Morning Star.' Understood not merely as a recurrent evening apparition but as a body, the Evening Star is the planet Venus, and the Morning Star is the same. The two singular terms name the same thing. But the meanings must be treated as distinct, since the identity 'Evening Star = Morning Star' is a statement of fact established by astronomical observation. If 'Evening Star' and 'Morning Star' were alike in meaning, the identity 'Evening Star = Morning Star' would be analytic. [...] The distinction between meaning and naming is no less important at the level of abstract terms. The terms '9' and 'the number of planets' name one and the same abstract entity but presumably must be regarded as unlike in meaning; for astronomical observation was needed, and not mere reflection on meanings, to determine the sameness of the entity in question.

2. Meaning is not extension.

With regards to general terms, or predicates,

Whereas a singular term purports to name an entity, abstract or concrete, a general term does not; but a general term is *true* of an entity, or of each of many, or of none. [See: *On What There Is*] The class of all entities of which a general term is true is called the *extension* of the term. Now paralleling the contrast between the meaning of a singular term and the entity named, we must distinguish equally between the meaning of a general term and its extension. The general terms 'creature with a heart' and 'creature with a kidney,' e.g., are perhaps alike in extension but unlike in meaning.

Confusing meaning with extension, he says, is typically less common. This is because meaning is often identified with *intention* as the opposite of extension (similar to the

relationship between “connotation” and “denotation”).

3. Meaning is not essence.

The Aristotelian notion of essence was the forerunner, no doubt, of the modern notion of intension or meaning. For Aristotle it was essential in men to be rational, accidental to be two-legged. But there is an important difference between this attitude and the doctrine of meaning. From the latter point of view it may indeed be conceded (if only for the sake of argument) that rationality is involved in the meaning of the word 'man' while two-leggedness is not; but two-leggedness may at the same time be viewed as involved in the meaning of 'biped' while rationality is not. Thus from the point of view of the doctrine of meaning it makes no sense to say of the actual individual, who is at once a man and a biped, that his rationality is essential and his two-leggedness accidental or vice versa. Things had essences, for Aristotle, but only linguistic forms have meanings. Meaning is what essence becomes when it is divorced from the object of reference and wedded to the word.

Emphasis mine.

4. Meanings are not entities.

In other words, they aren't anything. He asks “what sort of things are meanings?”,

They are evidently intended to be ideas, somehow -- mental ideas for some semanticists, Platonic ideas for others. Objects of either sort are so elusive, not to say debatable, that there seems little hope of erecting a fruitful science about them. It is not even clear, granted meanings, when we have two and when we have one; it is not clear when linguistic forms should be regarded as *synonymous*, or alike in meaning, and when they should not. If a standard of synonymy should be arrived at, we may reasonably expect that the appeal to meanings as entities will not have played a very useful part in the enterprise.

So now he's rejected the notion of any kind of special entity called a “meaning”.

A felt need for meant entities may derive from an earlier failure to appreciate that meaning and reference are distinct. Once the theory of meaning is sharply separated from the theory of reference, it is a short step to recognizing as the business of the theory of meaning simply the synonymy of linguistic forms and the analyticity of statements; meanings themselves, as obscure intermediary entities, may well be abandoned

After having tackled “meaning” itself, Quine goes on to criticize the application

of “definition” or “synonymy” (i.e, sameness of meaning) to analyticity. Then he criticizes the “semantic” defense of analyticity which asserts that it makes sense in a more semantically strict artificial language. Moving on from that,

In the course of these somber reflections we have taken a dim view first of the notion of meaning, then of the notion of cognitive synonymy: and finally of the notion of analyticity. But what, it may be asked, of the verification theory of meaning? This phrase has established itself so firmly as a catchword of empiricism that we should be very unscientific indeed not to look beneath it for a possible key to the problem of meaning and the associated problems.

The verification theory of meaning, which has been conspicuous in the literature from Peirce onward, is that the meaning of a statement is the method of empirically confirming or infirming it. An analytic statement is that limiting case which is confirmed no matter what.

Quine goes out on a limb to say that meaning can be “reduced” to synonymy and if synonymy itself is adequately accounted for then analyticity can be saved. The verification theory of meaning is taken to be a posited explanation for synonymy. Quine goes on to investigate the “nature of the relationship between a statement and the experiences which contribute to or detract from its confirmation”,

The most naive view of the relationship is that it is one of direct report. This is *radical reductionism*. Every meaningful statement is held to be translatable into a statement (true or false) about immediate experience. Radical reductionism, in one form or another, well antedates the verification theory of meaning explicitly so called. Thus Locke and Hume held that every idea must either originate directly in sense experience or else be compounded of ideas thus originating; and taking a hint from Tooke we might rephrase this doctrine in semantical jargon by saying that a term, to be significant at all, must be either a name of a sense datum or a compound of such names or an abbreviation of such a compound. So stated, the doctrine remains ambiguous as between sense data as sensory events and sense data as sensory qualities; and it remains vague as to the admissible ways of compounding. Moreover, the doctrine is unnecessarily and intolerably restrictive in the term-by-term critique which it imposes. More reasonably, and without yet exceeding the limits of what I have called radical reductionism, we may take full statements as our significant units -- thus demanding that our statements as wholes be translatable into sense-datum language, but not that they be translatable term by term.

He briefly covers one such (failed) attempt to form a sense-datum language by Carnap then continues,

Carnap seems to have appreciated this point afterward; for in his later writings he abandoned all notion of the translatability of statements about the physical world into statements about immediate experience. Reductionism in its radical form has long since ceased to figure in Carnap's philosophy.

But the dogma of reductionism has, in a subtler and more tenuous form, continued to influence the thought of empiricists. The notion lingers that to each statement, or each synthetic statement, there is associated a unique range of possible sensory events such that the occurrence of any of them would add to the likelihood of truth of the statement, and that there is associated also another unique range of possible sensory events whose occurrence would detract from that likelihood. This notion is of course implicit in the verification theory of meaning.

The dogma of reductionism survives in the supposition that each statement, taken in isolation from its fellows, can admit of confirmation or infirmation at all. My countersuggestion, issuing essentially from Carnap's doctrine of the physical world in the *Aufbau*, is that our statements about the external world face the tribunal of sense experience not individually but only as a corporate body.

The dogma of reductionism, even in its attenuated form, is intimately connected with the other dogma: that there is a cleavage between the analytic and the synthetic. We have found ourselves led, indeed, from the latter problem to the former through the verification theory of meaning. More directly, the one dogma clearly supports the other in this way: as long as it is taken to be significant in general to speak of the confirmation and infirmation of a statement, it seems significant to speak also of a limiting kind of statement which is vacuously confirmed, *ipso facto*, come what may; and such a statement is analytic.

The two dogmas are, indeed, at root identical. We lately reflected that in general the truth of statements does obviously depend both upon extra-linguistic fact; and we noted that this obvious circumstance carries in its train, not logically but all too naturally, a feeling that the truth of a statement is somehow analyzable into a linguistic component and a factual component. The factual component must, if we are empiricists, boil down to a range of confirmatory experiences. In the extreme case where the linguistic component is all that matters, a true statement is analytic. But I hope we are now impressed with how stubbornly the distinction between analytic and synthetic has resisted any straightforward drawing. I am impressed also, apart from prefabricated examples of black and white balls in an urn, with how baffling the problem has always been of arriving at any explicit theory of the empirical confirmation of a synthetic statement. My present suggestion

is that it is nonsense, and the root of much nonsense, to speak of a linguistic component and a factual component in the truth of any individual statement. Taken collectively, science has its double dependence upon language and experience; but this duality is not significantly traceable into the statements of science taken one by one.

Russell's concept of definition in use was, as remarked, an advance over the impossible term-by-term empiricism of Locke and Hume. The statement, rather than the term, came with Russell to be recognized as the unit accountable to an empiricist critique.

But what I am now urging is that even in taking the statement as unit we have drawn our grid too finely. The unit of empirical significance is the whole of science.

It should now hopefully be evident why such a lengthy discussion on Islamic epistemology was undertaken before finally getting around to Quine.¹¹¹

The next section is labelled "Empiricism Without Dogmas" and it begins with Quine's conclusion,

The totality of our so-called knowledge or beliefs, from the most casual matters of geography and history to the profoundest laws of atomic physics or even of pure mathematics and logic, is a man-made fabric which impinges on experience only along the edges. Or, to change the figure, total science is like a field of force whose boundary conditions are experience. A conflict with experience at the periphery occasions readjustments in the interior of the field. Truth values have to be redistributed over some of our statements. Re-evaluation of some statements entails re-evaluation of others, because of their logical interconnections -- the logical laws being in turn simply certain further statements of the system, certain further elements of the field. Having re-evaluated one statement we must re-evaluate some others, whether they be statements logically connected with the first or whether they be the statements of logical connections themselves. But the total field is so undetermined by its boundary conditions, experience, that there is much latitude of choice as to what statements to re-evaluate in the light of any single contrary experience. No particular experiences are linked with any particular statements in the interior of the field, except indirectly through considerations of equilibrium affecting the field as a whole.

If this view is right, it is misleading to speak of the empirical content of an individual statement -- especially if it be a statement at all remote from

¹¹¹ I also apologize for the possible confusion resulting from simultaneously tackling metaphysics and ontology.

the experiential periphery of the field. Furthermore it becomes folly to seek a boundary between synthetic statements, which hold contingently on experience, and analytic statements which hold come what may. Any statement can be held true come what may, if we make drastic enough adjustments elsewhere in the system. Even a statement very close to the periphery can be held true in the face of recalcitrant experience by pleading hallucination or by amending certain statements of the kind called logical laws. Conversely, by the same token, no statement is immune to revision. Revision even of the logical law of the excluded middle has been proposed as a means of simplifying quantum mechanics; and what difference is there in principle between such a shift and the shift whereby Kepler superseded Ptolemy, or Einstein Newton, or Darwin Aristotle?

For vividness I have been speaking in terms of varying distances from a sensory periphery. Let me try now to clarify this notion without metaphor. Certain statements, though about physical objects and not sense experience, seem peculiarly germane to sense experience -- and in a selective way: some statements to some experiences, others to others. Such statements, especially germane to particular experiences, I picture as near the periphery. But in this relation of "germaneness" I envisage nothing more than a loose association reflecting the relative likelihood, in practice, of our choosing one statement rather than another for revision in the event of recalcitrant experience. For example, we can imagine recalcitrant experiences to which we would surely be inclined to accommodate our system by re-evaluating just the statement that there are brick houses on Elm Street, together with related statements on the same topic. We can imagine other recalcitrant experiences to which we would be inclined to accommodate our system by re-evaluating just the statement that there are no centaurs, along with kindred statements. A recalcitrant experience can, I have already urged, be accommodated by any of various alternative re-evaluations in various alternative quarters of the total system; but, in the cases which we are now imagining, our natural tendency to disturb the total system as little as possible would lead us to focus our revisions upon these specific statements concerning brick houses or centaurs. These statements are felt, therefore, to have a sharper empirical reference than highly theoretical statements of physics or logic or ontology. The latter statements may be thought of as relatively centrally located within the total network, meaning merely that little preferential connection with any particular sense data obtrudes itself.

Compare this with the talk earlier in the original main section covering epistemology where a metaphorical "landscape of knowledge" was posited for conceptualization along with treating epistemology like "vectors", with each vector representing an epistemological source of experience for an individual (acting as the body for the vectors) and the arrangement of individuals attached or "bonded" by epistemological

narratives representing paradigms of thought. That was all derived purely from Islamic epistemology.¹¹²

He goes on to describe the implications of his conclusion, which I'll quote completely until the end,

As an empiricist I continue to think of the conceptual scheme of science as a tool, ultimately, for predicting future experience in the light of past experience. Physical objects are conceptually imported into the situation as convenient intermediaries -- not by definition in terms of experience, but simply as irreducible posits comparable, epistemologically, to the gods of Homer. Let me interject that for my part I do, qua lay physicist, believe in physical objects and not in Homer's gods; and I consider it a scientific error to believe otherwise. But in point of epistemological footing the physical objects and the gods differ only in degree and not in kind. Both sorts of entities enter our conception only as cultural posits. The myth of physical objects is epistemologically superior to most in that it has proved more efficacious than other myths as a device for working a manageable structure into the flux of experience.

Imagine, for the sake of analogy, that we are given the rational numbers. We develop an algebraic theory for reasoning about them, but we find it inconveniently complex, because certain functions such as square root lack values for some arguments. Then it is discovered that the rules of our algebra can be much simplified by conceptually augmenting our ontology with some mythical entities, to be called irrational numbers. All we continue to be really interested in, first and last, are rational numbers; but we find that we can commonly get from one law about rational numbers to another much more quickly and simply by pretending that the irrational numbers are there too.

[...]

Now I suggest that experience is analogous to the rational numbers and that the physical objects, in analogy to the irrational numbers, are posits which serve merely to simplify our treatment of experience. The physical objects are no more reducible to experience than the irrational numbers to rational numbers, but their incorporation into the theory enables us to get more easily from one statement about experience to another.

The salient differences between the positing of physical objects and the positing of irrational numbers are, I think, just two. First, the factor of simplification is more overwhelming in the case of physical objects than in the numerical case. Second, the positing of physical objects is far more archaic,

¹¹² I had not read anything by Quine at the time.

being indeed coeval, I expect, with language itself. For language is social and so depends for its development upon intersubjective reference.

Positing does not stop with macroscopic physical objects. Objects at the atomic level and beyond are posited to make the laws of macroscopic objects, and ultimately the laws of experience, simpler and more manageable; and we need not expect or demand full definition of atomic and subatomic entities in terms of macroscopic ones, any more than definition of macroscopic things in terms of sense data. Science is a continuation of common sense, and it continues the common-sense expedient of swelling ontology to simplify theory.

Physical objects, small and large, are not the only posits. Forces are another example; and indeed we are told nowadays that the boundary between energy and matter is obsolete. Moreover, the abstract entities which are the substance of mathematics -- ultimately classes and classes of classes and so on up -- are another posit in the same spirit. Epistemologically these are myths on the same footing with physical objects and gods, neither better nor worse except for differences in the degree to which they expedite our dealings with sense experiences.

The over-all algebra of rational and irrational numbers is underdetermined by the algebra of rational numbers, but is smoother and more convenient; and it includes the algebra of rational numbers as a jagged or gerrymandered part. Total science, mathematical and natural and human, is similarly but more extremely underdetermined by experience. The edge of the system must be kept squared with experience; the rest, with all its elaborate myths or fictions, has as its objective the simplicity of laws.

Ontological questions, under this view, are on a par with questions of natural science. Consider the question whether to countenance classes as entities. This, as I have argued elsewhere, is the question whether to quantify with respect to variables which take classes as values. Now Carnap has maintained that this is a question not of matters of fact but of choosing a convenient language form, a convenient conceptual scheme or framework for science. With this I agree, but only on the proviso that the same be conceded regarding scientific hypotheses generally. Carnap has recognized that he is able to preserve a double standard for ontological questions and scientific hypotheses only by assuming an absolute distinction between the analytic and the synthetic; and I need not say again that this is a distinction which I reject.

The issue over there being classes seems more a question of convenient conceptual scheme; the issue over there being centaurs, or brick houses on

Elm Street, seems more a question of fact. But I have been urging that this difference is only one of degree, and that it turns upon our vaguely pragmatic inclination to adjust one strand of the fabric of science rather than another in accommodating some particular recalcitrant experience. Conservatism figures in such choices, and so does the quest for simplicity.

Carnap, Lewis, and others take a pragmatic stand on the question of choosing between language forms, scientific frameworks; but their pragmatism leaves off at the imagined boundary between the analytic and the synthetic. In repudiating such a boundary I espouse a more thorough pragmatism. Each man is given a scientific heritage plus a continuing barrage of sensory stimulation; and the considerations which guide him in warping his scientific heritage to fit his continuing sensory promptings are, where rational, pragmatic.

Besides the obvious (Quine's anti-realist tendencies in ontology), what we can see from this is that the debate in Western philosophy, from the perspective of Islamic theology, comes down to a few issues like the definition of knowledge, ontology, and holism vs. reductionism, among other things. But these all reduce to the differences in prevailing metaphysical attitudes. Here again are the usual suspects, realism vs. anti-realism, materialism, existentialism, panentheism vs. pantheism, and so on.

Let's begin with Quine's opposition to meaning. It makes sense. But we can easily rescue "meaning" if we take it to mean something like: *an attribute of language by which knowledge is conveyed* (or conveyable). If any linguistic form or statement is said to have meaning, then this would mean it conveys knowledge. While Quine would acknowledge the "meaningfulness" of statements (that they convey knowledge), he declines to accept the term "meaning" since it implies an entity of some sort. But meaning can simply be defined as an attribute then. A linguistic form which "has meaning" simply bears this attribute. When we "give" the meaning of something, or treat meaning as a word which references an object/entity called "meaning", we actually give a synonymous linguistic form which has the same exact attribute (conveys the same specific knowledge, not just shares the attribute of conveying any knowledge at all). So when meaning is treated as an entity (which, whether we like it or not, is commonly done and so must be made sense of), it becomes synonymous for a specific knowledge (in a vague sense almost being treated as a "unit of knowledge"). So the word "meaning" itself has two meanings (or as Quine would say, two usages), the first referring to an attribute of language, and the second referring to synonymy. Quine already accepts the latter usage (synonymy). That in and of itself is just a colloquial evolution of language. Were it not for it having become part of modern vernacular we could have just abandoned it. The main definition of meaning would be as an attribute of language by which [knowledge: an

attribute of the knowing subject by which occurs the comprehension of an object¹¹³] is conveyed.

So knowledge here refers to our definition of it as discussed in greater detail earlier, *not* the vague and ambiguous concept of “belief” (which suffices for common or informal usage but not for philosophy dealing with epistemology and ontology). That informal usage is seen even in more advanced philosophical works of the Western tradition—even Quine calls knowledge “beliefs”.

But this makes no sense when even the Western tradition acknowledges a concept of knowledge very much like our own. Simply refer to the Wikipedia page on [knowledge](#),

Knowledge is a familiarity with someone or something, which can include facts, information, descriptions, or skills acquired through experience or education. It can refer to the theoretical or practical understanding of a subject. [...] However no single agreed upon definition of knowledge exists, and there are numerous theories to explain it. [...] Knowledge acquisition involves complex cognitive processes: perception, communication, association and reasoning; *while knowledge is also said to be related to the capacity of acknowledgment in human beings.*

Of course these edits reflect recent sources and discussion and Quine is somewhat dated even if only by a few decades. But the fact that this is not brought up in any meaningful way and allowed to turn into a centuries-long philosophical debate is mystifying.

It was said earlier that the analytic-synthetic distinction could be translated into Islamic epistemology by treating it as a reference to ontological relationships. This is essentially the same as defining meaning in terms of the conveyance of knowledge and knowledge as a kind of “comprehension” of an object, a comprehension which can be uncertain in some contexts. The insistence on defining it in opposition to opinion (even when such a view can be formulated in terms of “belief” as mentioned earlier) reflects quite a bit on the prevailing cognitive dissonance in that culture of thought which seems afraid to acknowledge openly the arbitrary nature of their view of the world. The refusal to openly acknowledge the possibility of ontological non-arbitrariness (seen even with Quine), which is a necessary consequence of any belief in an objective reality accessible by our experiences, also gives away their hesitance to to acknowledge something which might potentially be used “against” them by making the arbitrariness of their view all

¹¹³ “Object” in the ontological sense though it may be existing or non-existing and the comprehension thereof refers to comprehending the result of 1) the conceiving of it (thus the object is the thing conceived and the act of conceiving results in a conception in the mind) and 2) the assertions (value judgments) made of it which may include both certainties and/or uncertainties. Conceiving implies comprehension by the reason but includes comprehending by the senses (perceiving).

the more apparent. I suppose the fear is that if the inherent uncertainty of knowledge is openly acknowledged, then to hold on to a belief in an accessible objective reality might cause a reversal of the evolution of contemporary Western philosophy back to its panentheistic roots around the time of the Enlightenment. And the last thing many want to do is surrender control of anything to a higher power (for one thing it makes it harder to justify materialistic-hedonistic lifestyles), much less (almost) everything.

There have been some developments in Western realism, for example [object-oriented ontology](#). Ironically the biggest protests to this view are that it reduces human “meaningfulness”, further reinforcing our assertion that occasionalism is the only logical and meaningful path to realism.

One thing I’d like to briefly mention again is the “object” (epistemological or ontological) is often talked about in terms of “the object of an act of knowledge” but with us knowledge is not an action, it is an attribute (or like a state of being to put it in more metaphysical language). It is defined similarly in most traditional theologies, from Roman Catholicism to Hinduism.¹¹⁴

What is an “object of knowledge” in the context of language which conveys knowledge (thus having meaning)? Well it could be any number of things but we want to focus in on the analytic direction. So analyticity in this context would refer to knowledge of linguistic forms (which refers to a “meaningful” unit of language, like a word, phrase, or sentence), which is akin to learning the definition of something. Treating a linguistic form as an “object” opens the doors to several other philosophies.

In a realist worldview linguistic forms are indeed objects. They are signs in the [semiotic](#) sense.

Semiotics, also called semiotic studies or (in the Saussurean tradition) semiology, is the study of signs and sign processes (semiosis), indication, designation, likeness, analogy, metaphor, symbolism, signification, and communication. Semiotics is closely related to the field of linguistics, which, for its part, studies the structure and meaning of language more specifically.

Semiotics is often divided into three branches:

- Semantics: Relation between signs and the things to which they refer; their denotata, or meaning
- Syntactics: Relations among signs in formal structures
- Pragmatics: Relation between signs and the effects they have on the

¹¹⁴ Which, for reasons I’ll get into, I feel should be considered here according to their respective languages, not civilization. Both theologies are rooted in ancient and well developed languages. Contemporary Western philosophy, its English subset in particular, has little to do with Latin (or the older Greek tradition).

people who use them

Semiotics is frequently seen as having important anthropological dimensions; for example, Umberto Eco proposes that every cultural phenomenon can be studied as communication. However, some semioticians focus on the logical dimensions of the science. They examine areas belonging also to the natural sciences – such as how organisms make predictions about, and adapt to, their semiotic niche in the world (see semiosis). In general, semiotic theories take signs or sign systems as their object of study: the communication of information in living organisms is covered in biosemiotics or zoosemiosis.

Syntactics is the branch of semiotics that deals with the formal properties of signs and symbols. More precisely, syntactics deals with the "rules that govern how words are combined to form phrases and sentences." Charles Morris adds that semantics deals with the relation of signs to their designata and the objects which they may or do denote; and, pragmatics deals with the biotic aspects of semiosis, that is, with all the psychological, biological, and sociological phenomena which occur in the functioning of signs.¹¹⁵

Also,

[Semiosis](#) (from the Greek: σημείωσις, sēmeiōsis, a derivation of the verb σημειῶ, sēmeiō, "to mark") is any form of activity, conduct, or process that involves signs, including the production of meaning. Briefly – semiosis is sign process. The term was introduced by Charles Sanders Peirce (1839–1914) to describe a process that interprets signs as referring to their objects, as described in his theory of sign relations, or semiotics. Semiosis is triadic and cyclic. Other theories of sign processes are sometimes carried out under the heading of semiology, following on the work of Ferdinand de Saussure (1857–1913).¹¹⁶

In traditional philosophy, including classical and medieval Western philosophy, semiotics is a subject that is characterized by an abundance of investigation and also diversity (pretty much everyone wrote their own theory of signs, which complicates study of the field from a historical perspective). That it later declined with the shift in Western philosophy towards anti-realism is perhaps expected, since it is quite relevant for theologies.¹¹⁷ It is also very relevant for philosophies of language, communication,

¹¹⁵ <http://en.wikipedia.org/wiki/Semiotics> - Retrieved 05/30/12

¹¹⁶ <http://en.wikipedia.org/wiki/Semiosis> - Retrieved 05/30/12

¹¹⁷ Here we can consider as theology any ideology or complete philosophy encompassing any kind of notion of a Supreme Being which necessitates belief in an objective real existence, regardless of whether or not that reality conforms to our experienced one, and which emphasizes communication between humans and said non-human entity (or entities in the case of polytheistic or animist traditions).

logic, computer science, neuroscience, and so on. The advent of these fields in contemporary times has accompanied the shift towards naturalism and away from positivism based on the work of philosophers like Quine. It is also significant for various aspects or applications of information theory (and we should consider information's physical nature and that it obeys natural laws). It's appropriate then that real science has come to dominate significant philosophical discourse in these areas.¹¹⁸ Unfortunately philosophical discourse in general has also waned which makes much of the work done in these areas not easily accessible to those outside these fields. Philosophy can be seen, ideally, as facilitating meaningful communication and exchange of ideas between fields of study. Without it every field of study becomes isolated and compartmentalized, forming its own paradigm of tradition. This has resulted in the paradoxical situation where separate fields of science treat each other with as much alienation and disdain as different religions once did (and in theology, especially Western theology, this was by design since philosophy was seen as opening the door to the threat of takeover by competing ideas... but it serves no useful function when it is inadvertently applied to science).

Returning to semiotics, it is basically the study of [sign systems](#), defined as,

A sign system is a key concept in semiotics and is used to refer to any system of signs and relations between signs. The term language is frequently used as a synonym for a sign-system. However, the term sign-system is preferable to the term language for a number of reasons. First, the use of the term language tends to carry with it connotations of human language, particularly human spoken language. Human spoken language is only one example of a sign-system; albeit probably one of the most complex sign-systems known. For example, in traditional forms of face-to-face communication, humans communicate through non-verbal as well as verbal sign-systems; colloquially referred to as 'body language'. Hence, humans communicate a great deal by way of facial movements and other forms of bodily expression. Such expressions are also signs and an organised collection of such signs would be considered a sign system. Second, the same concept of a sign-system can be used in considering a vast range of communication forms such as animal communication and man-machine communication. Examination of simpler forms of such systems of signs within non-human communication can help to illuminate some of the essence of communication and in particular can help to provide tentative answers to the question of the nature and function of communication.¹¹⁹

The definition of sign at Wikipedia,

¹¹⁸ Aside from the pseudo-positivistic anti-philosophical doctrine of *scientism* (wearing the mask of "scientific naturalism") used by the "New Atheist" movement in some intellectual circles.

¹¹⁹ http://en.wikipedia.org/wiki/Sign_systems - Retrieved 05/30/12

A sign is a representation of an object that implies a connection between itself and its object. A natural sign bears a causal relation to its object—for instance, thunder is a sign of storm. A conventional sign signifies by agreement, as a full stop signifies the end of a sentence. (This is in contrast to a symbol which stands for another thing, as a flag may be a symbol of a nation).

The way a sign signifies is called semiosis which is a topic of semiotics and philosophy of language.

How a sign is perceived depends upon what is intended or expressed in the semiotic relationship of:

Signification
Significance (i.e. meaning)
Importance

Thus, for example, people may speak of the significance of events, the signification of characters, the meaning of sentences, or the import of a communication. Different ways of relating signs to their objects are called modes of signification.

Uses of conventional signs are varied. Usually the goal is to elicit a response or simply inform. That can be achieved by marking something, displaying a message (i.e. a notice), drawing attention or presenting evidence of an underlying cause (for instance, medical symptoms signify a disease), performing a bodily gesture, etc.¹²⁰

This sort of sheds some more light on why, as Quine argued, holism was necessary (as opposed to “atomizing” statements of meaning). How can you understand a sign without also taking into account what the sign is referencing? Which also suggests that within a proper holistic context, the analytic-synthetic distinction could still be used with modification, if so desired. Quine’s point was moreso about ditching reductionism rather than ditching analyticity which is simply a means to an end.

This bears significant relevance to Islamic theology. In fact, the Qur’an’s term for its own verses is “*ayah*” (pl. *ayaat*) which is the Arabic word for evidence or sign. It is from the Alif-Ya-Waw root. The entire entry in Lane’s Arabic-English Lexicon on the root is too long to include here so here’s just the specific derivation in question,

A sign, token, or mark, by which a person or thing is known;

It properly signifies any apparent thing inseparable from a thing not

¹²⁰ <http://en.wikipedia.org/wiki/Sign> - Retrieved 05/30/12

equally apparent so that when one perceives the former, he perceives the other which he cannot perceive by itself, when the two things are of one predicament; and this is apparent in the object of sense and in that of the intellect.

Which relates to the definition of knowledge used earlier (as that attribute of a knowing subject by means of which an object referred to becomes revealed to them, or comprehended). Some more,

...it is one of the nouns that are prefixed to verbs because of the nearness of its meaning to the meaning of time as in the saying [of a poet],
[*At the sign of your urging forward the horses, unsmoothed in their coats, or not curried*; which means nearly the same as "at the time of your urging"]

A sign as meaning an indication, an evidence, or a proof.

A sign as meaning a miracle; [and a wonder; for] *ayatullah* means the wonders of God.

An example, or a warning.

A message, or communication sent from one person or party to another (syn. *risalat*¹²¹).

The body, or corporeal form or figure or substance, of a man, which one sees from a distance; [as being a kind of sign;] or a person, or an individual.

A whole company of people: as in the saying, *The people, or party, went forth with their whole company, not leaving behind them anything*. Hence, according to some, A verse of the Qur'an; as being a collection of words of the Book of God; or a connected form of words of the Qur'an continued to its breaking off; so called because it is a sign of the breaking off; or a portion of the Qur'an after which a suspension of speech is approvable; or a portion of the Qur'an denoting any statute, or ordinance, of God, whether it be [what is generally termed] an *ayah* [i.e. a verse,] or a chapter (*surah*), or an aggregate [and distinct] portion of the latter.

So within the context of one word, sign, we have connotations of time, physical reality, and an inherent opposition to reductionism in emphasizing the grouping of words and the "breaking off" point for any string of words being variable according to use. So an *ayah* can encompass more than a single numbered verse of the Qur'an and in one of its Qur'anic usages acts as a sign of the very point of breaking off (to say nothing of its

¹²¹ I.e., "Message" from which comes *rasul* or Messenger as in the title or name of Muhammad (*saw*), *Rasulullah* (*saw*).

theological connotations as an actual sign of God, which is also there obviously). In this sense even the meaning of a verse can act as the sign of the breaking off of connected words. Rather than sign itself being only a measure of meaning (as is the connotation in the general English understanding of sign in the semiotic sense as a “unit of meaning”), meaning itself can be a unit of signs (as in, the unit of a sign system or language). Meaning can then be understood, linguistically, as the breaking off point in a string of linguistic forms marking knowledge conveyed about one or more desired or intended objects from others. Which comes right back to the nature of the Qur’an with regards to meaning as it’s well known for being the subject of many attempts at interpretation, some verses containing (even in the traditional/conservative orthodox reading) layers upon layers of meaning (the literal (bare linguistic) meaning, metaphorical meaning, moral meaning, legal meaning, theological meaning, esoteric/spiritual meaning, physical or natural meaning, and so on). And of course the “hidden” meanings. This is reflected in how Qur’anic verses are often not quoted as such but instead marked by the subject’s desired choice of meaning that they intend to convey (such as picking up in the middle of one verse and ending in the middle of another and containing complete verses within the excerpt or a quotation which contains different verses). Which necessitates that any subjective treatment of the Qur’an, to discuss specific subjects in it, requires such selective quotation from disparate verses as the format of the Qur’an is not in the traditional manner of Book, Chapter, Topic, Subject, or Heading. The entire thing is like one cohesive conversation between God and man. And in a similar manner to a conversation one subject is mentioned in passing in one verse but then mentioned again later as the primary subject of focus in another verse several chapters later, and then brought up yet again secondarily in another verse much later in a chapter whose name might indicate a completely different subject (because the names of chapters are themselves signs, not simply topic or subject headings, the name of a chapter might characterize a theme throughout a chapter or it might only be mentioned in one verse out of many in that chapter). This has often posed as an obstacle to people from other languages, especially English, who have tried to understand the Arab obsession with its form and have only come away with a sense of a disjointed and disorganized discussion. This is because the Qur’an must be treated holistically by its nature (for “objective” interpretation of it) and subjective interpretations require some legwork in finding verses for one subject or another though most of that work was done long ago by Qur’anic commentators and these days one can take quick recourse to an internet search engine. One consequence of this is that the same subject when encountered in different parts of the Qur’an might be elucidated upon in different ways, like literally taking different approaches to one destination (thereby packing a lot of meaning into a small number of verses). The Qur’an’s relatively short length and the tradition of committing it to memory reflect on how this nature (the need to be taken holistically) was not seen in a negative manner by the Arabs who were used to committing even longer narrations to memory.

Here are some verses on the Qur’an about *ayaat* or signs,

But it (the Qur'an in itself) is (a package of) evident signs in the hearts of those who are given knowledge. And no one rejects our verses except the wrongdoers. And they say, "Why is it that no signs (miracles) have been sent down to him from his Lord?" Say, "Signs are only with Allah, and I am only a plain warner" Is it not sufficient for them that We have sent down to you the Book that is being recited (conveyed) to them? Surely in it there is mercy and advice for a people who believe.

29:49-51

The first sentence says it all.

Would any of you wish to have a garden of dates and grapes, with rivers flowing beneath it, in which there are all kinds of fruit for him, and old age befalls him, and he has children who are (too) weak (to earn livelihood), then a whirlwind comes upon it with fire in it, and it is all burnt? This is how Allah makes the signs clear to you, so that you may ponder.

2:266

This is a parable for giving charity with hypocrisy (which nullifies the deed's moral value as is so manifestly made clear by the example). The last line there indicates that this sort of parable or allegory is used to convey knowledge about relationships between objects or events. In this case we get some knowledge of just how valuable morally virtuous deeds are and just how devastating robbing these acts of moral value is.

The Qur'an also refers in a great many instances to natural events and how they contain signs (*We will show them Our signs in the universe and within their own beings until it will become manifest to them that it is the truth* 41:53). Every event in nature is a sign, and the Qur'an itself (its physical form as a mode of transmission of the words of God) is considered an object of nature in that it is in recited/written human language (although the Speech of Allah in the Qur'an, distinct from its mode of transmission, is considered uncreated and eternal). So nature is not to be distinguished from the divine to the extent of how it is traditionally treated in Western philosophy, nor is it to be conflated with the divine as it often is in Eastern philosophy. Nature is the work of the divine, the divine command and creation. It is this very work which is a communication from God. Consider this in the context of previous discussion of the command of God, *amr*, as being the essential source of creation (*khalq*).

Another verse is 24:1,

- This is a *Surah* We have sent down and enjoined, and sent down in it clear signs (*ayaat*), so that you may receive the advice.¹²²
- This is a Chapter of the Quran that We caused to descend and We imposed

¹²² M. Taqi Usmani

laws in it. We caused to descend signs, clear portents, so that perhaps you will recollect.¹²³

- *Sooratun* anzalnaha wa*faradnaha* waanzalna feeha *ayatin bayyinat* la'allakum tathakkaroon(a)

Here the word *surah* is also used, which is usually translated as “chapter”. In it are *ayaat*, verses or signs, of a nature characterized by the word *bayyinah* which means “an evidence, demonstration, proof or argument that is clear or manifest”. The *surah* has been sent down and the next word is *faradnaha* which means “to impose law, ordain, enact, settle, enjoin, fix”.

15:75 says,

Surely, in that there are signs for those who read signs.

The last part of which is alternately translated as “examine”, “read marks”, “investigate”, “probe into reality”, and “who can read the signs (so as to understand the inner meaning of things and events).”¹²⁴ The word used is *mutawassimeen* which comes from the Waw-Siin-Meem root (W-S-M). From Lane’s Arabic-English Lexicon, the pure root itself denotes marking, branding, or stigmatizing (for identification) and carries connotations of impression,

He was beautiful in face: or bore the impress, or stamp, of beauty.

The derivation closer to the word used in the verse is described as,

[I discovered, or perceived, in him good, or goodness, by right opinion formed from its outward signs;] originally, I knew its real existence in him by its outward sign.

He examined deliberately in order to know the real state or character of a thing by the external sign thereof.

He perceived a thing by forming a correct opinion from its outward signs.

One thing which becomes easier to see here is a long held opinion of mine that the characteristics of a language of a person will reflect in the way that person thinks. Ideas we usually consider as culturally spread tend to take on particular manifestations in different cultures suggesting a link with language (which is the mode of transmission for them in the first place). Contrast the course and development of philosophy in England during the Enlightenment and afterwards with, say, Germany and compare the differences in language (which are more pronounced in languages with as many

¹²³ L. Bakhtiar

¹²⁴ Ali Unal

similarities and common origins as German and English). A common question for Muslims posed by agnostics or atheists is “Why Arabic?”. It should be manifestly clear by now that the basic doctrines of Islamic theology run to the very roots of the language, whose origin is older than is known in history (unlike modern English which did not emerge in its present form until the 16th or 17th century). Not surprisingly Islam is or ought to be treated as a “Semitic” faith, like Judaism. The God of Abraham, it would seem for those who believe in Him, guided the development of the language of the descendants of Abraham such that Arabic was in the state and form it was in the 7th century. It could be possible that the Qur’an as it stands now had no suitable language for it before then, though this is pure speculation. The revelations to earlier peoples and in other languages take on a different tone. The most easily accessible example of this is with Judaism, just consider the different meanings and ideas conveyed in the speech used by Jews in their prayer as compared with Muslims since they’re essentially describing the same God.¹²⁵ This is also possibly reflected in the differences among the *shari’ahs* (sets of divine laws) revealed to different peoples (for example, according to an anecdote in the *Ma’ariful Qur’an*, it was allowed in earlier *shari’ahs* to refer to God as “Father” but disallowed in the *shari’ah* of Muhammad (saw) for obvious reasons related to abuse of the term to unfairly anthropomorphize God).

English, in contrast to Arabic, Greek, or Latin, is as a newer and less developed language. Its strength lies in the development of it for law (under the British Empire) and scientific endeavor which emerged in the second half of the 20th century primarily in the United States. It’s also been a useful language for reductionist philosophy (applied to almost anything, including translating to and from other languages), but is noticeably light on conceptual power compared to the older languages associated with theological traditions (which meant they had to be capable of philosophical use). There is significant flexibility in that virtually any idea can eventually be expressed in the language (i.e, isn’t inherently difficult by nature for the language), even if with considerable difficulty and verbosity.¹²⁶ Considering this, the trend towards reductionist philosophy, materialist-atheist metaphysics, and empirical science as seen in the works of 17th-18th century English philosophers, as well as the general trends and developments in English culture at the time would seem par for the course. So too would the development of analytic philosophy as a predominantly English (British and American) tradition. Though therein lies the rub. Culture and language are strongly tied together. Is this then related to culture or language? Is language a means by which culture can affect the mindset of a person? I suppose though that it would just be simply too easy to blame some of the

¹²⁵ Here’s an example on YouTube: <http://www.youtube.com/watch?v=0aHWASyMjwg> Turn on captions and annotations for the English translation

¹²⁶ This is seen in the talks and works of scholars like Shaykh Hamza Yusuf of the United States who has considerable mastery over both English and Arabic. It’s apparent from any talk or lecture of his that he recognizes the importance of language in conveying knowledge and understanding.

mystifying approaches to philosophy of some English writers on their language.¹²⁷

In the last verse discussed there was mention of “impression”. Knowledge and understanding has traditionally often been likened to a faculty similar to the sensory faculties. While a three dimensional representation of an object is impressed upon the eyes, for example, an *essential* representation of an object is impressed upon “the soul” or “heart” (or whatever one wishes to reference) in the moment of understanding or knowing (i.e, comprehending). This shows how even the approach to empiricism of classical Islamic philosophy and theology had some basis in the Arabic language.

Most of these issues that Quine raised against the logical empiricists came down to the same thing. The definition of knowledge and how it relates to language, the issue of reductionism versus holism, and a neglect of ontology are all different symptoms of the same fatal flaw which is their metaphysics are just not objective enough. When you focus everything on experience and sense impressions and say that is all there is, such errors are the logical consequences. Quine was an empiricist (in the more general sense) and a naturalist. Naturalism has traditionally been associated with some form of realism but Quine shies away from that, favoring just the holistic treatment of nature without going into its reality. But rather than shifting to the pretty much full on anti-realism of his contemporaries he takes a sort of reductionist/anti-realist attitude to ontology instead. He prefers to keep metaphysical speculation within the bounds of clearly discernible and apparent (and accountable) ontology. This would be the mark of a careful philosopher, by Western standards at least. Though he does not in this work offer up a full scheme by which to do the accounting, he has written other works expanding on his view of ontology and language. Though it should be pointed out that rather than conflate experience with language, he is still conflating language with ontology, which might be why the issue of “meaning” was an issue to begin with even for him.

Some points from his closing comments,

As an empiricist I continue to think of the conceptual scheme of science as a tool, ultimately, for predicting future experience in the light of past experience.

The implications of this statement should be apparent by now. Everything for him still reduces to experience. His scheme of experience just has some depth.

Physical objects are conceptually imported into the situation as convenient

¹²⁷ There are likely going to be upheavals in this tradition (and the English language) during the course of the 21st century as some of the world’s most populous English-speaking countries (a relic of the British Empire) are neither in the Americas or Europe. India is the 2nd largest English speaking country in the world (followed by Philippines and Nigeria). Pakistan is 9th and has more English speakers than Australia. Germany has almost as many English speakers as England. Its prevalence is also increasing quickly across the Arabic-speaking world.

intermediaries -- not by definition in terms of experience, but simply as irreducible posits comparable, epistemologically, to the gods of Homer.

This highlights his approach to a sort of anti-realism from ontology. Rather than looking inward, his naturalist philosophy does a much better job addressing the rest of the philosophical world than logical positivism/empiricism. He says that, in effect, pretty much everything in our "world" is metaphysical speculation. He goes on to explicate that in terms of ontology. Make no mistake, it's not just that the fallacy of his opponents made him look good, he actually was a very intelligent philosopher. He grounded a view of the world which has been in our day so unamiable to philosophy (an empiricist naturalism focused on science) in a sophisticated analytic philosophy which does not ignore all the philosophical tradition which came before it (and hence, does not repeat many of the careless mistakes of his contemporaries). In the context of our times this is remarkable. It's unfortunate that it has not caught on enough but it's because his philosophy leans too closely to the truth: that our subjective experience of reality is really very subjective after all. People do not like that, they want objectivity, even the other naturalists. They want to be able to axiomatically deny positions and views they do not like, they don't want to engage in analytic philosophy or learn ontology or any of what they deem philosophical nonsense.

This reflects even in the views of Quine.

His reference to the gods of Homer is a meaningful one. The pantheons of polytheistic traditions usually represented gods, spirits, and other entities in place of what we would today consider natural laws or forces of nature (i.e, thunder and lightning). Quine identifies any notion of physicality just as ontologically arbitrary (so we see he's pushing the status quo, just in a more intelligent manner).

This would greatly upset the naturalists who vehemently oppose theology (so much so that they are willing to sack philosophy along with it). For one thing it lets God and gods back into the picture, something they feel was pushed out with a great deal of effort. Quine doesn't see it that way. His perspective is aimed at the scientific crowd, not the religious one. He no doubt must have seen the direction in which science was heading, positing its own "convenient fictions" (as the Critical Rationalists would put it) which were then being treated literally and used fallaciously. It's been taken to plenty of extremes today. It would seem those from the "scientism" crowd, who are the most vociferous in their opposition to religion, are actually guilty of behaving the most like a religion. No wonder they feel threatened. Philosophers like Quine, however, were "true" science-minded atheists in that they were secure enough in their own worldview to not fret over others'. He focused on actual philosophy and science (philosophers and scientists), he didn't seem to harbor much of a social or political agenda (which is where concern with traditional religion usually arises). He felt pragmatism was more than enough to address competing ontologies. Moreover the conceptions of God most typical in his "scene" were of the naturalistic-pantheistic variety. It's not as if people are about to start worshipping

Odin or Zeus again. That is the real implication of his comments, “gods” not God with a capital G. The naturalists who weren’t satisfied with this approach only obsess over the latter.

Unfortunately Quine doesn’t discuss God in his ontology. I say unfortunately because that would have been interesting to read. I suppose in his lifetime since the trend was away from religion of any kind in the United States he didn’t take God seriously, religion was a thing of the past. This is what I meant earlier by being able to axiomatically deny views that one simply does not wish to engage with. God was, after all, not really “eliminated” so much as “forgotten”. People tried to eliminate theology and they failed. The triumph was in forgetting it in favor of a worldview which justified the evolving materialistic modern lifestyle.

However, it would be unfair to Quine to count this as a criticism of his philosophy. He was involved in the philosophy of science. As such, his focus was science. And he did push the field further than anyone had in a long time.

He says in *Two Dogmas of Empiricism*,

Science is a continuation of common sense, and it continues the common-sense expedient of swelling ontology to simplify theory.

In his work on ontology, *On What There Is*, he says,

Our acceptance of an ontology is, I think, similar in principle to our acceptance of a scientific theory, say a system of physics: we adopt, at least insofar as we are reasonable, the simplest conceptual scheme into which the disordered fragments of raw experience can be fitted and arranged. Our ontology is determined once we have fixed upon the over-all conceptual scheme which is to accommodate science in the broadest sense; and the considerations which determine a reasonable construction of any part of that conceptual scheme, for example, the biological or the physical part, are not different in kind from the considerations which determine a reasonable construction of the whole. To whatever extent the adoption of any system of scientific theory may be said to be a matter of language, the same—but no more—may be said of the adoption of an ontology.

The issue here is that he wants his ontology to be fitted to science only. To explain the phenomenal nature, not the existential or essential nature. Since Quine’s ontology was concerned with the designation of physical objects and he was unconcerned with the physicality itself, Quine would have no reason to wonder about existence or what causes it since he, like the logical empiricists, distinguished experience from existence and only focused on the former. Which for us is a fallacious move because through naturalism itself, especially in light of modern science, any discussion of experience must at least

raise the question of existence, even if it leaves that discussion for a different field of philosophy. It is what we're fundamentally experiencing, after all.

Should naturalism established in analytic philosophy (i.e, Quinean naturalism) wish to deal with the idea of God, it would first have to confront what conception of God is being referred to. In Islamic theology, as in general monotheism, God's essence is synonymous with existence. God is, for all intents and purposes of the naturalist, the philosophy of existence. God explains every experience of existence and predicts every future experience of existence. The Islamic understanding of God actually says that this knowledge of the future stays with God (inherently unpredictable). Unlike philosophies with extravagant answers or complicated mathematical form, this philosophy of existence always reduces monistically¹²⁸ to one explanation. God. Existent things continue to exist, at least as far as it seems, and this suggests a non-arbitrary God.

Unlike traditional humanistic existentialism, which isn't very logically or rationally grounded (more so in subjective moral or ethical appeal), this existentialist philosophy cannot be countered by reductionism nor holism, nor any ontological argument (for the same reason ontological argument cannot be advanced in positing God's actual existence, it hits the limit of the language of ontology), nor really any linguistic angle. Nor any mathematical angle. For even Quine's ontology allows for such a concept of God because it has trouble explaining non-existence. If you cannot justify existence, how can you justify non-existence? How can you justify, for example, that pink unicorns do not exist? The normal "trick" has been to dismiss existence as something not worth discussing (not relevant to a discussion of experience). But when philosophy forces one towards ontology, there is no avoiding the "ontological problem" as some have come to call it, which is the problem of justifying the non-existence of things.

Quine tackled these questions in *On What There Is*. Before we go into that, let's go back to Kant and his *Critique of Pure Reason*. In his discussion of ontology he tackled the ontological argument for God (which essentially says God must exist by "definition"). He famously objected, or so it is popularly related, that "existence is not a predicate" (in the context of Kant's subject-predicate distinction).

What Kant actually said was the following,

Being is evidently not a real predicate, that is, a conception of something which is added to the conception of some other thing.

Let's back up for a moment. He first mentions that people confuse *logical* predicates with *real* predicates. A real predicate, he says, is "a predicate which aids in the determination of thing".

If we stop here then his statement is very agreeable to Islamic theology. Of course he

¹²⁸ "Reduces monistically to one explanation" meaning approaching one explanation.

can not do that.

So what he says next is,

Being is evidently not a real predicate, that is, a conception of something which is added to the conception of some other thing. *It is merely the positing of a thing*, or of certain determinations in it.

What he means is that the “positing of a thing” is not a concept in and of itself which, like the concept of color, size, or another attribute can be added to another concept (like say, a house). The positing of a thing is merely to put forth a concept, to simply say it. People say this means he says “existence is not a predicate”, which is untrue. Existence can certainly be a logical predicate (in other words you can predicate it of something and this statement can work logically and even make sense). But the reason existence can't be a *real* predicate is because, for all intents and purposes, existence isn't *real*. Though he does not come right out and say this and certainly does not himself believe that (he did believe in real existence at least), he inevitably must make this argument being an Idealist himself (or approaching his rationalism from an Idealist perspective).

Obviously we can talk about real existence. A flying dog with wings does not exist. When I say it does exist everyone who listens to me will assume I'm talking about an actual flying dog with wings, which I would hopefully show to them in reality to confirm my statement. They're going to expect to see a dog with wings presented in front of them which then flaps its wings and takes off. So we all understand what it means then to discuss the existence of a thing. It is most definitely not merely the positing of a thing. Kant's statement applies to general ontological discussion (so I don't think it even applies to the ontological argument, and there have been many critics of his argument both from theologians and just philosophers in general). In a general ontological sense when we say a statement like “The King of France is bald” and want to say this is false, we can be right or wrong in our judgment. The truth of the matter is that this statement is false. But *why* is it false? It is in this sense, where there is some confusion over what is being discussed, over whether the judgment is of the subject or the predicate, that Kant's statement makes sense. According to Kant's reasoning, when we analyze this statement logically, then we take the existence of the King of France to merely be a posit. The logical analysis is focused on whether or not this posited King is bald, not whether or not he exists.

This becomes problematic because he says a logical predicate can be anything, a subject can even be predicated of itself. But that contradicts with reducing existence as a logical predicate to mere “positing of a thing”. To say being is merely the positing of a thing is to say it is not a predicate at all (to deny it not only as a “real predicate” but also as a logical one). So, in effect, Kant really does say that existence is not a predicate *at all*, but he did not intend to do so and he certainly doesn't use that to argue against God or the ontological argument. It's a contradiction which undermines his philosophy.

In some statements existence is not synonymous with the positing of a thing. Existence *is* an actual predicate, even if only a logical one. In the ontological argument this is the case. Trying to talk about the existence of God in most contexts is not a discussion of semantics, it is a discussion of whether God *really* exists and even whether He *can* exist. Kant is right in seeing that there is a bit of misdirection involved in the ontological argument. He is just not right in pinpointing where that was. His statement on “being” is far too general, especially when taken in context. It smacks of anti-realism, of reducing existence to a mere positing of logical statements.

He does not mention these phantom “real predicates” again.

What he did say about it was that it was a predicate which “aids in the determination of a thing”. He also said,

But the determination of a conception is a predicate, which adds to and enlarges the conception. It must not, therefore, be contained in the conception.

Some background is required. From the beginning of his section entitled “Of The Transcendental Ideal”,

Every conception is, in relation to that which is not contained in it, undetermined and subject to the principle of determinability. This principle is that, of every two contradictorily opposed predicates, only one can belong to a conception. It is a purely logical principle, itself based upon the principle of contradiction;

So if the determination of a concept adds to and enlarges the conception, it should not be contained within the conception itself as a predicate. Why? Kant doesn't say. Yet he calls it a “real *predicate*” and says that it is a predicate which aids in the determination of a thing. How can he posit it then turn around and say the opposite? He just does.

So what he says is that there is a conception of a thing. And this conception can only contain logical predicates (more specifically, these predicates are obtained from determinations of one of two opposed predicates). Being is a real predicate, it aids in this determination, of picking between one of two opposed logical predicates. Once a logical predicate is so picked, it is added to the conception and our conception of that thing is thus enlarged. So being, as a real predicate, cannot be added to the conception which contains only logical predicates.

This forces us to focus on the term “conception”. It would seem that while a subject may contain a predicate, a conception of that subject may only contain a logical predicate (which Kant says are conceptions themselves). It seems he intended to rightly say that

existence is not a mere conception that can be added to another conception. So what contains the real predicates? The subject itself? Going by the rest of his philosophy, presumably so. He does not believe our knowledge of phenomena can be connected in any way to noumena (things-in-themselves). A concept or conception is phenomenal, a subject is therefore noumenal. Speaking of the real existence of anything is to talk about the thing-in-itself, something which Kant says we really cannot do, other than to say it really exists if there is a corresponding phenomenal representation of it in our experience. This is plain empiricism, to say that only by experiencing something can we determine its existence. In other words experiencing a subject allows us to determine its predicates, whether it is red or not red, bald or not bald, etc. In this sense existence is treated like any other predicate. If we experience something (as phenomena), then we determine its existence (phenomenal and noumenal) as opposed to its non-existence. This is more or less what Kant would have wanted to say. Why didn't he? Because we logically deduce the existence of things all the time, mostly through inductive reasoning ("deduce" here does not mean deductive, it simply means, in its common usage, to arrive at conclusive knowledge of something through reasoning). Like when we see a person we would "deduce" (say we have knowledge of) the existence of, at one time, their parents. The ontological argument takes things one step further and says we can deduce the existence of something through deductive reasoning (this is the truer definition of "deduce" in its original sense).

For Kant this is problematic because he has swept space and time into the *a priori* designation and we do actually deduce the existence of things (i.e, deductively) from our knowledge of space and time. If you awake to find yourself in a room with a door on your left, go through that door and emerge in a room with another door to your left, go through that one and emerge in yet another room with a door on your left, go through that one and emerge in finally another room with a door on your left, you will know that door is going to open into the room you originally started from (behind your starting position), assuming the rooms seemed equal sized enough. This knowledge, although being a deductive conclusion according to Kant, is an assumption that you're in a 3-dimensional structure, not a hypercube or tesseract (4 spatial dimensions). Of course the challenge that this conclusion is assumptive itself rests on the assumption that a fourth non-compactified spatial dimension exists despite not being experienced in any empirical sense ever, nor required for any theory of physics or metaphysics (so one can see Kant's rationale for treating space and time as he does).

So, since he can not rule out *a priori* knowledge of something that, while not experienced sensibly, is deductively reasoned to be required to exist in order for experienced things to exist (because he in fact argued for the opposite of that), he is forced to settle for this semantic opposition. Still, saying the subject is the noumenal corollary of his phenomenal conception is a bit of a reach. We do know there must be a noumenal corollary because he posited "real predicates". So for all intents and purposes we can call this phantom subject a "real conception" (or we can say logical subject, logical predicate vs. real subject, real predicate). "Real" for Kant refers to the world

of experience (phenomena). So a real predicate, our phenomenal experience of the subject, helps us determine between two contradictorily opposed logical predicates. This means all it takes to be a “real subject” or “real conception” is simple phenomenal existence (existence in the world of experience).

This allows us to make sense of the ontological argument even in its most audacious sense. It presupposes realism. If one is however an adherent of some form of Idealism, then the ontological argument will need to be translated into their metaphysical language. So the ontological argument thus modified would argue that God must necessarily *phenomenally* exist (not *really* exist) and this does not violate any ontological semantics of such a worldview. Kant’s Idealism, however, is stranger. In his metaphysics real (noumenal) existence is possible and can only proceed from phenomenal existence, not logic. But phenomenal existence can still proceed from *a priori* knowledge derived from logic. So there’s just one extra step for him, concluding God must phenomenally exist and then by virtue of *that*, really exist as well.

Of course the issue here is that how can God phenomenally exist? For that matter, why should God be necessary even phenomenally? The ontological argument does not say because it was not conceived for Idealist metaphysics. All it would mean is that we should expect God in the world of our phenomenal experience in the same way we would, with absolute certainty, expect that fourth room in the above example. Phenomenal necessity does not mean that God must become sensible to our eyes or ears, only that God’s existence is required to explain phenomenal existence itself. If there is any phenomenal existence (if there is any experience), then there must be God, even if He can’t be seen. It’s just a translation of the ontological argument. For Kant, space and time are necessary to explain the structure of phenomenal existence, but God would be necessary to explain the fact of phenomenal existence at all. God becomes an umbrella term for existential concepts, including the existence of experience. All issues regarding the source of existence, of change in existence, and so forth are swept under the label “God”. Kant’s philosophy kind of hints at the necessity of this monistic approach to existence.

When Kant says “Every conception is, in relation to that which is not contained in it, undetermined and subject to the principle of determinability”, and that this is a determination between one of two contradictorily opposed logical predicates, he gets into the territory of *possibility*. There are only two possible values for each predicate variable (this isn’t the terminology he uses but it should be more intuitive for us now).

He then raises a “principle of *complete* determination”,

But again, everything, as regards its possibility, is also subject to the principle of complete determination, according to which one of all the possible contradictory predicates of things must belong to it.

Which means that when there is “complete determination”, *all* the possible predicates are accounted for. One of the two opposed choices is determined for each and every possible predicate.

As we’ll see, Kant basically grounds everything in the “Transcendental Ideal”, which is the “ideal of pure reason”, the source of all possibility and synonymous for him with God.

I’ll quote at length from that section of his work here,

This principle is not based merely upon that of contradiction; for, in addition to the relation between two contradictory predicates, it regards everything as standing in a relation to the sum of possibilities, as the sum total of all predicates of things, and, while presupposing this sum as an a priori condition, presents to the mind everything as receiving the possibility of its individual existence from the relation it bears to, and the share it possesses in, the aforesaid sum of possibilities.

Thus this principle declares everything to possess a relation to a common correlate — the sum-total of possibility, which, if discovered to exist in the idea of one individual thing, would establish the affinity of all possible things, from the identity of the ground of their complete determination. The determinability of every conception is subordinate to the universality (Allgemeinheit, universalitas) of the principle of excluded middle; the determination of a thing to the totality (Allheit, universitas) of all possible predicates.

It is the principle of the synthesis of all the predicates which are required to constitute the complete conception of a thing [...] It contains, moreover, a transcendental presupposition- that, namely, of the material for all possibility, which must contain a priori the data for this or that particular possibility.

[...]

The proposition is equivalent to saying: “To attain to a complete knowledge of a thing, it is necessary to possess a knowledge of everything that is possible, and to determine it thereby in a positive or negative manner.” The conception of complete determination is consequently a conception which cannot be presented in its totality in concreto, and is therefore based upon an idea, which has its seat in the reason

[...]

...it is evolved as a conception completely determined a priori. Thus it becomes the conception of an individual object, which is completely

determined by and through the mere idea, and must consequently be termed an ideal of pure reason.

[...]

If, therefore, a transcendental substratum lies at the foundation of the complete determination of things — a substratum which is to form the fund from which all possible predicates of things are to be supplied, this substratum cannot be anything else than the idea of a sum-total of reality (omnitudo realitatis). In this view, negations are nothing but limitations — a term which could not, with propriety, be applied to them, if the unlimited (the all) did not form the true basis of our conception.

[...]

The transcendental principle of the complete determination of all things is therefore merely the representation of the sum-total of all reality; it is not a conception which is the genus of all predicates under itself, but one which comprehends them all within itself. The complete determination of a thing is consequently based upon the limitation of this total of reality...

[...]

The possibility of things must therefore be regarded as derived- except that of the thing which contains in itself all reality, which must be considered to be primitive and original.

[...]

The object of the ideal of reason — an object existing only in reason itself — is also termed the primal being (ens originarium); as having no existence superior to him, the supreme being (ens summum); and as being the condition of all other beings, which rank under it, the being of all beings (ens entium). But none of these terms indicate the objective relation of an actually existing object to other things, but merely that of an idea to conceptions; and all our investigations into this subject still leave us in perfect uncertainty with regard to the existence of this being.

A primal being cannot be said to consist of many other beings with an existence which is derivative, for the latter presuppose the former, and therefore cannot be constitutive parts of it. It follows that the ideal of the primal being must be cogitated as simple.

The deduction of the possibility of all other things from this primal being

cannot, strictly speaking, be considered as a limitation, or as a kind of division of its reality; for this would be regarding the primal being as a mere aggregate — which has been shown to be impossible, although it was so represented in our first rough sketch. The highest reality must be regarded rather as the ground than as the sum-total of the possibility of all things, and the manifold nature of things be based, not upon the limitation of the primal being itself, but upon the complete series of effects which flow from it. And thus all our powers of sense, as well as all phenomenal reality, phenomenal reality, may be with propriety regarded as belonging to this series of effects...

Pursuing this track, and hypostatizing this idea, we shall find ourselves authorized to determine our notion of the Supreme Being by means of the mere conception of a highest reality, as one, simple, all-sufficient, eternal, and so on — in one word, to determine it in its unconditioned completeness by the aid of every possible predicate. The conception of such a being is the conception of God in its transcendental sense, and thus the ideal of pure reason is the object-matter of a transcendental theology.

But, by such an employment of the transcendental idea, we should be overstepping the limits of its validity and purpose. For reason placed it, as the conception of all reality, at the basis of the complete determination of things, without requiring that this conception be regarded as the conception of an objective existence. Such an existence would be purely fictitious, and the hypostatizing of the content of the idea into an ideal, as an individual being, is a step perfectly unauthorized.

So God is for Kant the transcendental idea, “an object existing only in reason itself”, the highest idea in a world of ideas which transcends this world itself and serves as the source of all determinations of possibilities. Conceptions of things are derived from this ideal, which is given by *a priori* necessity to human reason, through negations, not affirmations, as affirmations are the default state of the transcendental ideal,¹²⁹ the monistic union of all possibilities (which are described as contained and *comprehended* (determined) within it, not merely a pantheistic union of things and predicates into one overarching umbrella genus). In Islamic theological language this basically refers to the knowledge of God which contains all possibilities and determinations of possibilities and so on.

For Kant, an Idealist, it would only be natural to treat God then as the greatest *necessary* idea which lurks in the back of all reasoning minds. He then objects to characterizing this transcendental ideal with objective existence although acknowledging it would have to be the case in a transcendental theology because this idea is synonymous with “the highest reality”, hence with all “object-matter” (the ever elusive *real* “reality” for Idealists).

¹²⁹ Acknowledging the question raised in ontology regarding how positing the non-existence of something is different from positing its existence.

But he says we have no justification for going that far (into theology), all we can say is what is necessary and this transcendental ideal is necessary as the source of complete determination of things, the “ground of the possibility of all things”.

Of course such logic is only possible when turning over completely, even if temporarily, to the metaphysics of subjective Idealists. He himself implies that phenomenal reality would proceed from this being of the highest reality’s determination of things as part of a series of effects.

What we see here is an interesting attempt to grapple with the idea of pantheism. Clearly Kant does not wish to go that route, but he doesn’t seem to know what else to do. The transcendental ideal would be necessary for the *determination* of things and this implies reality *stems* from it as a series of effects, but theology would jump to conclude that it is synonymous with “object-matter”, but Kant reserves objective existence for his world of noumenon and he clearly feels this ideal being, while necessary for the nature of things, is not real or objective like those things.

Kant’s problem with God’s existence could perhaps then be not a consequence so much of his Idealism as it is his belief that there is only one kind of objective existence, ours (noumena), and the ideal being cannot be like this. Objective existence is for *things* but God must be something else, and the only something else he knows of is an *idea*, so God must be the highest kind, and perhaps the highest reality is ideal, not a “thing-in-itself” reality. Thus the “transcendental ideal” is the *a priori*, necessary, idealistic truth of all things, whose *knowledge* lurks at the back of our own knowledge (makes our knowledge possible by giving us things to know). Thus Kant’s logic can be reconciled as a pretty good *approach* to Islamic monotheism. The reasons for Kant’s standing in Western philosophy might be a bit more apparent now. The scope of his work was indeed grand in nature, though he did default to the positions and attitudes of the subjective Idealists a little too often for our tastes. He tried sincerely to rescue both religion and reason from the skepticism of Hume (though he tried to do it in one fell swoop by equating the two through “transcendental idealism”).

From the perspective of Islamic theology, Kant’s “real predicates” correspond simply to the “real essences” of things. That is, the essences of things as they exist in reality and are experienced. Existence is therefore not a predicate of real essences because it is presupposed in the very idea. It *can*, however, be predicated of quiddities and the like (“plain” essence, with “logical predicates”).

Indeed God is necessary as the source of all possibility and the determination thereof in all things, and as Kant compared this determination to a “comprehension” outright, the clear parallel is made to the attribute of God we call God’s Knowledge. We do not consider existence in God’s knowledge to be “real”, which might seem counterintuitive to some approaching the issue from theology but it is because we, like Kant, distinguish

our existence (described as real) from God's existence, though this is reconciled since for us Existence itself is the "Essence" of God who is the necessarily existent and the source of all existence (the Creator). So God is described as being the source of "real existence" and as having conferred upon us "real existence"¹³⁰, but His existence is not phenomenal nor even noumenal because God is not a "thing", He is pure existence itself (and even the pronoun "it" does not truly suffice). Existence as *subject* (not predicate). If there is one thing we know, it is existence because experience, change, all of it points to existence. Existence by itself would be necessary for and before the experience of any thing. By the *possible* nature of existent things, then, which are subject to Kant's principles of determination, existence-in-itself must also possess attributes including knowledge (corresponding to Kant's transcendental ideal). Determination, therefore, happens in accordance with the attribute of Will (that is after all what can choose between two contradictorily opposed logical predicates of equal possibility¹³¹). The fact of *our* existence, where action/activity implies real substantial existence, along with the aforementioned characterizes this Being as the necessarily existent Creator (creation implying the conferring of existence to possible things from His Knowledge by the determination of His Will).

The problem of universals and predicates is often thought of in the context of Plato's Forms. For him the universals were "ideals" or "Forms" and possessed real existence. But Plato's Forms use logical predicates as the source of their universals so how do they come to get real existence? Aristotle is the one who pointed out that the real essences (i.e, real or actual predicates) must be distinct from what Plato said, and those are a part of existent things (or rather they exist "in" them or through their existence or "share" their existence). Obviously some *source* of universals (possible predicates) is necessarily implied, but why should these be as really existing universals? Existence for possible things is itself a logical predicate (i.e, possible) and therefore the idealized form of Existence must be treated distinctly. So all of Plato's "Forms" were mere idealized possibilities until they were joined by the idealized form of Existence, by which all reality and all actualization of possibility could occur. So Plato's Forms (in his conception) also

¹³⁰ It would be accurate to say we never *possess* existence in the first place. All of the existent things belong to God and He creates our actions for us and we acquire them from Him. The key to our reality is the breathing of a soul into our physical bodies, or the "linking" of one to the other such that both effect one another. One way to understand it is to consider existence as a house in which you are a guest. You do not possess the house, only that which the host gives you. You are responsible for that which you asked the host for. You "possess" the attribute of being "in-a-house" (i.e, existence) only because the host conferred it upon you by allowing you inside (so it is never really *yours* to begin with, it is subject to the will of another). This is just a rough parallel, or a simple metaphor. Another way to think of it is to distinguish *being [of] existence* (God) from *being in existence* (existent things). Anyone can understand what it means to be "in existence" without thinking this implies pantheism or any other such thing (being in a house does not make you the house or the host). The metaphor does not apply to God in the sense that "outside" or "inside" implies direction and there is no direction with respect to Him.

¹³¹ Refer to earlier discussion on *preponderance without a preferer*. For some reason, though not surprisingly, Kant avoided the clear parallel between Will and his principle of determinability.

relate most closely in Islamic theology to the notion of God's Knowledge.¹³² Plato's Forms, when corrected to account for Existence, relates to God Himself (though much of his philosophy would then no longer apply).

One thing to note is that this "divisive" treatment of Plato has stuck around throughout theology and philosophy in one form or another. It's the source of assertions by people arguing against theology that traits ascribed to God are in mutual opposition and cannot be unified or reconciled without contradiction. It's usually based on some rather emotional and subjective treatment of concepts like Mercy and Justice or arguments alleging inherent contradictions in omniscience or omnipotence. Most such arguments do not proceed from any logical foundation (because a basic understanding of ontology and the law of non-contradiction can suffice for almost all of them¹³³), but the arguments and philosophy of Plato and all those philosophers who came after him, for which attempts were made to ground them in logic, can be held to account. Kant argues for the monistic unity of possibility,

The logical determination of a conception is based upon a disjunctive syllogism, the major of which contains the logical division of the extent of a general conception, the minor limits this extent to a certain part, while the conclusion determines the conception by this part. The general conception of a reality cannot be divided a priori, because, without the aid of experience, we cannot know any determinate kinds of reality, standing under the former as the genus. The transcendental principle of the complete determination of all things is therefore merely the representation of the sum-total of all reality; it is not a conception which is the genus of all predicates under itself, but one which comprehends them all within itself. The complete determination of a thing is consequently based upon the limitation of this total of reality, so much being predicated of the thing, while all that remains over is excluded — a procedure which is in exact agreement with that of the disjunctive syllogism and the determination of the objects in the conclusion by one of the members of the division. It follows that reason, in laying the transcendental ideal at the foundation of its determination of all possible things, takes a course in exact analogy with that which it pursues in disjunctive syllogisms — a proposition which formed the basis of the systematic division of all transcendental ideas, according to which they are produced in complete parallelism with the three modes of syllogistic reasoning employed by the human mind.

It is self-evident that reason, in cogitating the necessary complete determination of things, does not presuppose the existence of a being corresponding to its ideal, but merely the idea of the ideal- for the purpose of deducing from the unconditional totality of complete determination, The ideal

¹³² See the Appendix on "The Command and the Creation: *Amr* and *Khalq*" for more.

¹³³ Including, for example, the Sophists' nonsensical challenges about creating a rock so heavy that even God cannot lift it.

is therefore the prototype of all things, which, as defective copies (ectypa), receive from it the material of their possibility, and approximate to it more or less, though it is impossible that they can ever attain to its perfection.

Another way to look at the issue is that for a school of philosophy which emphasizes ideas, the only aspect of God they will emphasize is similarly God's Knowledge. The Islamic conception of God can be approached from any facet of experience as our experience is more or less like a reflection of the ideal (of the Divine Attributes). If one approaches the concept of God from the avenue of Love then their attention will be dominated by that aspect of God. If one approaches God from the avenue of Justice, then their attention will be dominated by ideas of divine justice and Judgment Day, including the implementation of God's law here on earth. If one approaches God objectively, through experience of objective reality (i.e, mysticism), which focuses primarily on existence then the work of the Sufis and *wahdat al-wujud* (the unity of existence) would dominate their conception.¹³⁴ If one approaches God through reason then they will happen upon God's idealized Knowledge, and upon Kant's "transcendental ideal" if they deny the reality of the other approaches (that ideas are essentially all there are, so a person in such a position might say God is what we would call God's Knowledge and that this is the highest idea and reality).

This brings up an interesting (and overdone) theological debate. About whether God's Knowledge only encompasses the universals (idealized forms) or whether it also encompasses knowledge of the particulars. It's not much of a debate in orthodox Islamic theology (occasionalism) because the latter is required by necessity for a Creator who is necessarily existent and creates a real, existent, reality. God's knowledge of the future of the existent things, part of his omniscience, is a logically necessary consequence of His having created the very dimensionality (space and time) by which created things "express" themselves, from which the concept of a "future" arises. For God there is no time that He is subject to because He is not created, He already exists. Likewise, God's Knowledge is timeless. Furthermore, God is the source of change, He creates the change, so of course He will have knowledge thereof.

This problem about God's knowledge of the particulars is somewhat ironic because the rationale behind it is that God's knowledge must be unified (along the lines discussed earlier), but particulars are individualized and changing. This is a strange assertion because even Plato's Forms are individualized, so by this logic God would not even have knowledge of universals as such because universals are themselves divided. No wonder then that Imam al-Ghazali went so mercilessly after the philosophers following in the Neoplatonist and Peripatetic traditions on these issues. He did accuse them of reducing God to a passive forgettable entity (the road to atheism).

Before we return to Quine, we need to make one more stop at another philosopher. Bertrand Russell (the 19th-20th century British philosopher) and how he dealt with this

¹³⁴ Please see the Appendix on *Wahdat al-Wujud*

ontological problem. This came to be called his "theory of descriptions",

The theory of descriptions is the philosopher Bertrand Russell's most significant contribution to the philosophy of language. It is also known as Russell's Theory of Descriptions (commonly abbreviated as RTD). In short, Russell argued that the syntactic form of descriptions (phrases that took the form of "The aardvark" and "An aardvark") is misleading, as it does not correlate their logical and/or semantic architecture. While descriptions may seem fairly uncontroversial phrases, Russell argued that providing a satisfactory analysis of the linguistic and logical properties of a description is vital to clarity in important philosophical debates, particularly in semantic arguments, epistemology and metaphysics.

[...]

Russell's theory is focused on the logical form of expressions involving denoting phrases, which he divides into three groups:

1. Denoting phrases which do not denote anything, for example "the current Emperor of Germany".
2. Phrases which denote one definite object, for example "the present President of the U.S.A." We need not know which object the phrase refers to for it to be unambiguous, for example "the cutest kitten" is a unique individual but his or her actual identity is unknown.
3. Phrases which denote ambiguously, for example, "an Aardvark".

Indefinite descriptions constitute Russell's third group. Descriptions most frequently appear in the standard subject-predicate form.

Russell put forward his theory of descriptions in order to solve a number of problems in the philosophy of language. The two major problems are (1) co-referring expressions and (2) non-referring expressions.

The problem of co-referring expressions originated primarily with Gottlob Frege as the problem of informative identities. For example, if the morning star and the evening star are the same planet in the sky (indeed, they are both the planet Venus), how is it that someone can think that the morning star rises in the morning but the evening star does not? This is apparently problematic because although the two expressions seem to denote the same thing, one cannot substitute one for the other, which one ought to be able to do with identical or synonymous expressions.

The problem of non-referring expressions is that certain expressions that are meaningful do not truly refer to anything. For example, by "any dog is

annoying" it is not meant that there is a particular individual dog, namely *any* dog, that has the property of being annoying (similar considerations go for "some dog", "every dog", "a dog", and so on). Likewise, by "the current Emperor of Germany is gray" it is not meant that there is some individual, namely *the current Emperor of Germany*, who has the property of being gray; Germany is no longer a monarchy, so there is currently no Emperor. Thus, what Russell wants to avoid is admitting mysterious non-existent entities into his ontology. Furthermore, the law of the excluded middle requires that one of the following propositions, for example, must be true: either "the current Emperor of Germany is gray" or "it is not the case that the current Emperor of Germany is gray". Normally, propositions of the subject-predicate form are said to be true if and only if the subject is in the extension of the predicate. But, there is currently no Emperor of Germany. So, since the subject does not exist, it is not in the extension of either predicate (it is not on the list of gray people or non-gray people). Thus, it appears that this is a case in which the law of excluded middle is violated, which is also an indication that something has gone wrong.

[...]

Russell analyzes definite descriptions similarly to indefinite descriptions, except that the individual is now uniquely specified. Take as an example of a definite description the sentence "the current Emperor of Germany is gray". Russell analyzes this phrase into the following component parts (with 'x' and 'y' representing variables):

1. there is an x such that x is an emperor of Germany.
2. for every x and every y, if both x and y are emperors of Germany, then y is x (i.e. there is at most one emperor of Germany).
3. anything that is an emperor of Germany is gray.

Thus, a definite description (of the general form 'the F is G') becomes the [...] existentially quantified phrase in classic symbolic logic [...] Informally, this reads as follows: something exists with the property F, there is only one such thing, and this unique thing also has the property G.

This analysis, according to Russell, solves the two problems noted above as related to definite descriptions:

1. "The morning star rises in the morning" no longer needs to be thought of as having the subject-predicate form. It is instead analyzed as "there is one unique thing such that it is the morning star and it rises in the morning". Thus, strictly speaking, the two expressions "the morning star..." and "the evening star..." are not synonymous, so it makes sense that they cannot be substituted

(the analyzed description of the evening star is "there is one unique thing such that it is the evening star and it rises in the evening"). This solves Gottlob Frege's problem of informative identities.

2. Since the phrase "the current Emperor of Germany is gray" is not a referring expression, according to Russell's theory it need not refer to a mysterious non-existent entity. Russell says that if there are no entities X with property F, the proposition "X has property G" is false for *all* values of X.

Russell says that all propositions in which the Emperor of Germany has a primary occurrence are false. The denials of such propositions are true, but in these cases the Emperor of Germany has a secondary occurrence (the truth value of the proposition is not a function of the truth of the existence of the Emperor of Germany).¹³⁵

And a slightly more detailed depiction of it,

A definite description like "the present King of France", he suggested, isn't a referring expression, as we might naively suppose, but rather an "incomplete symbol" that introduces quantificational structure into sentences in which it occurs. The sentence "the present King of France is bald", for example, is analyzed as a conjunction of the following three quantified statements:

1. there is an x such that x is presently King of France:
2. for any x and y, if x is presently King of France and y is presently King of France, then x=y (i.e. there is at most one thing which is presently King of France):
3. for every x that is presently King of France, x is bald:

More briefly put, the claim is that "The present King of France is bald" says that some x is such that x is presently King of France, and that any y is presently King of France only if $y = x$, and that x is bald:

This is *false*, since it is *not* the case that some x is presently King of France.

The negation of this sentence, i.e. "The present King of France is not bald", is ambiguous. It could mean one of two things, depending on where we place the negation 'not'. On one reading, it could mean that there is no one who is presently King of France and bald: [...] On this disambiguation, the sentence is *true* (since there is indeed no x that is presently King of France).

On a second, reading, the negation could be construed as attaching directly to 'bald', so that the sentence means that there is presently a King of France, but that this King fails to be bald: [...] On this disambiguation, the sentence is

¹³⁵ http://en.wikipedia.org/wiki/Theory_of_descriptions - Retrieved 06/03/12

false (since there is no x that is presently King of France).

Thus, whether "the present King of France is not bald" is true or false depends on how it is interpreted at the level of logical form: if the negation is construed as taking wide scope [...], it is true, whereas if the negation is construed as taking narrow scope (with the existential quantifier taking wide scope[...]), it is false. In neither case does it lack a truth value.

So we do *not* have a failure of the Law of Excluded Middle: "the present King of France is bald" is false, because there is no present King of France. The negation of this statement is the one in which 'not' takes wide scope: [...]. This statement is *true* because there does not exist anything which is presently King of France.¹³⁶

Regarding indefinite descriptions,

Take as an example of an indefinite description the sentence "some dog is annoying". Russell analyzes this phrase into the following component parts (with 'x' and 'y' representing variables):

1. there is an x such that x is a dog.
2. x is being annoying.

Thus, an indefinite description (of the general form 'an D is A ') becomes the [...] existentially quantified phrase in classic symbolic logic [...] Informally, this reads as follows: there is something such that it is D and A .

This analysis, according to Russell, solves the second problem noted above as related to indefinite descriptions. Since the phrase "some dog is annoying" is not a referring expression, according to Russell's theory, it need not refer to a mysterious non-existent entity. Furthermore, the law of excluded middle need not be violated (i.e. it remains a law), because "some dog is annoying" comes out true: there is a thing that is both a dog and annoying. Thus, Russell's theory seems to be a better analysis insofar as it solves several problems.¹³⁷

For more reading, including accounts of criticisms:

http://en.wikipedia.org/wiki/Theory_of_descriptions

http://en.wikipedia.org/wiki/Definite_description

¹³⁶ http://en.wikipedia.org/wiki/Definite_description - Retrieved 06/03/12

¹³⁷ http://en.wikipedia.org/wiki/Theory_of_descriptions - Retrieved 06/03/12

<http://plato.stanford.edu/entries/russell/#RTDD>

What Russell basically does is distinguish between how we logically depict proper names and descriptions. Descriptive phrases are “incomplete symbols” that take on meaning in certain contexts but which are meaningless in isolation. So problematic phrases are ones in which we confuse what are actually descriptions for names and can be resolved by treating them once again as descriptions.

For example, in the following sentence:

The present King of France is bald.

The problem arises from considering the subject (referent) to be “the present King of France” and the predicate “is bald”. According to Russell’s treatment, we call the referent “ x ”, and turn “present King of France” into a predicate (“*is the present King of France*”) along with the obvious one (“*is bald*”). So now there are *two* things predicated of the unknown subject x rather than just one as before.

Turning back to Quine in *On What There Is*, he utilizes Russell’s theory of descriptions to deal with ontologically problematic statements.

In the above explanation, x is more specifically a “variable of quantification”, like the words “something”, “nothing”, or “everything”. Quine also calls them “bound variables”.

Russell, in his theory of so-called singular descriptions, showed clearly how we might meaningfully use seeming names without supposing that there be the entities allegedly named. The names to which Russell’s theory directly applies are complex descriptive names such as ‘the author of *Waverley*’, ‘the present King of France’, ‘the round square cupola on Berkeley College’. Russell analyzes such phrases systematically as fragments of the whole sentences in which they occur. The sentence “The author of *Waverley* was a poet’, for example, is explained as a whole as meaning ‘Someone (better: something) wrote *Waverley* and was a poet, and nothing else wrote *Waverley*’. (The point of this added clause is to affirm the uniqueness which is implicit in the word ‘the’, in ‘*the* author of *Waverley*’.) The sentence ‘The round square cupola on Berkeley College is pink’ is explained as ‘Something is round and square and is a cupola on Berkeley College and is pink, and nothing else is round and square and a cupola on Berkeley College’.

The virtue of this analysis is that the seeming name, a descriptive phrase, is paraphrased *in context* as a so-called incomplete symbol. No unified expression is offered as an analysis of the descriptive phrase, but the statement as a whole which was the context of that phrase still gets its full quota of meaning—whether true or false.

The unanalyzed statement 'The author of *Waverley* was a poet' contains a part, 'the author of *Waverley*', which is wrongly supposed [...] to demand objective reference in order to be meaningful at all. But in Russell's translation, 'Something wrote *Waverley* and was a poet and nothing else wrote *Waverley*', the burden of objective reference which had been put upon the descriptive phrase is now taken over by words of the kind that logicians call bound variables, variables of quantification, namely, words like 'something', 'nothing', 'everything'. These words, far from purporting to be names specifically of the author of *Waverley*, do not purport to be names at all; they refer to entities generally, with a kind of studied ambiguity peculiar to themselves. These quantificational words or bound variables are, of course a basic part of language, and their meaningfulness, at least in context, is not to be challenged. But their meaningfulness in no way presupposes there being either the author of *Waverley* or the round square cupola on Berkeley College or any other specifically preassigned objects.

Where descriptions are concerned, there is no longer any difficulty in affirming or denying being. 'There *is* the author of *Waverley*' is explained by Russell as meaning 'Someone (or, more strictly, something) wrote *Waverley* and nothing else wrote *Waverley*'. 'The author of *Waverley* is not' is explained, correspondingly, as the alternation 'Either each thing failed to write *Waverley* or two or more things wrote *Waverley*'. This alternation is false, but meaningful; and it contains no expression purporting to name the author of *Waverley*. The statement 'The round square cupola on Berkeley College is not' is analyzed in similar fashion.

And his ontological conclusion:

So the old notion that statements of nonbeing defeat themselves goes by the board. When a statement of being or nonbeing is analyzed by Russell's theory of descriptions, it ceases to contain any expression which even purports to name the alleged entity whose being is in question, so that the meaningfulness of the statement no longer can be thought to presuppose that there be such an entity.

Actually you do not need to explicitly name an entity, only refer to it, in order to presuppose its existence. But let's accept Quine's reasoning. He continues,

Now what of 'Pegasus'? This being a word rather than a descriptive phrase, Russell's argument does not immediately apply to it. However, it can easily be made to apply. We have only to rephrase 'Pegasus' as a description, in any way that seems adequately to single out our idea; say, 'the winged horse that was captured by Bellerophon'. Substituting such a phrase for 'Pegasus',

we can then proceed to analyze the statement 'Pegasus is', or 'Pegasus is not', precisely on the analogy of Russell's analysis of 'The author of *Waverley* is' and 'The author of *Waverley* is not'.

In order thus to subsume a one-word name or alleged name such as 'Pegasus' under Russell's theory of description, we must, of course, be able first to translate the word into a description. But this is no real restriction. If the notion of Pegasus had been so obscure or so basic a one that no pat translation into a descriptive phrase had offered itself along familiar lines, we could still have availed ourselves of the following artificial and trivial-seeming device: we could have appealed to the *ex hypothesi* unanalyzable, irreducible attribute of *being Pegasus*, adopting, for its expression, the verb 'is-Pegasus', or 'pegasizes'. The noun 'Pegasus' itself could then be treated as derivative, and identified after all with a description: 'the thing that is-Pegasus', 'the thing that pegasizes'.

If the importing of such a predicate as 'pegasizes' seems to commit us to recognizing that there is a corresponding attribute, pegasizing, in Plato's heaven or in the minds of men, well and good. Neither we nor Wyman nor McX have been contending, thus far, about the being or nonbeing of universals, but rather about that of Pegasus. If in terms of pegasizing we can interpret the noun 'Pegasus' as a description subject to Russell's theory of descriptions, then we have disposed of the old notion that Pegasus cannot be said not to be without presupposing that in some sense Pegasus is.

Our argument is now quite general. McX and Wyman supposed that we could not meaningfully affirm a statement of the form 'So-and-so is not', with a simple or descriptive singular noun in place of 'so-and-so', unless so-and-so is. This supposition is now seen to be quite generally groundless, since the singular noun in question can always be expanded into a singular description, trivially or otherwise, and then analyzed out à la Russell.

We commit ourselves to an ontology containing numbers when we say there are prime numbers larger than a million; we commit ourselves to an ontology containing centaurs when we say there are centaurs; and we commit ourselves to an ontology containing Pegasus when we say Pegasus is. But we do not commit ourselves to an ontology containing Pegasus or the author of *Waverley* or the round square cupola on Berkeley College when we say that Pegasus or the author of *Waverley* or the cupola in question is *not*. We need no longer labor under the delusion that the meaningfulness of a statement containing a singular term presupposes an entity named by the term. A singular term need not name to be significant.

An inkling of this might have dawned on Wyman and McX even without

benefit of Russell if they had only noticed—as so few of us do—that there is a gulf between *meaning* and *naming* even in the case of a singular term which is genuinely a name of an object. The following example from Frege [3] will serve. The phrase ‘Evening Star’ names a certain large physical object of spherical form, which is hurtling through space some scores of millions of miles from here. The phrase ‘Morning Star’ names the same thing, as was probably first established by some observant Babylonian. But the two phrases cannot be regarded as having the same meaning; otherwise that Babylonian could have dispensed with his observations and contented himself with reflecting on the meanings of his words. The meanings, then, being different from one another, must be other than the named object, which is one and the same in both cases.

From the perspective of Islamic epistemology the different meanings would, *for us*, refer to knowledge of the same object referred to but there would be two *conceptions* of that object for each person because knowledge is comprehension (by the senses and reason) of conceptions (things conceived) and assertions (things asserted), and the two people in question asserted different things about different conceptions (and which included different perceptions for one saw it in the evening and the other saw it in the morning). As such the two people were, by their own accounts, referring to two different objects. Our comprehension (via both our senses and reason) is more advanced (specifically that by our senses due to greater knowledge and instrumentation, our reason as a human faculty is generally the same just armed with better information) and thus our conception encompassed both of theirs (and yet others).

Evening Star and Morning Star no longer mean what those who coined these terms meant. We kept the names but altered the meanings to suit our conception. The differences in meaning remain, however, but only in their reference to two different self-histories. While referring now to the same object, one term also references the person who coined Evening Star while the other references the person who coined the term Morning Star. These days it is hard to use one or the other term without also intending to relate the history and context of the term (i.e, who saw it in the morning and who saw it in the evening when coining the terms and who sees it in the morning and who sees it in the evening now). Even our modern context is varied since Morning Star, for example, could refer not only to Venus but also to Mercury or even the Sun depending on the context in which it is used. So the usefulness of Russell’s contextual approach is clear.

From the Islamic approach, without context, referring to the “meaning” of a term is like reading a Wikipedia page to find the definition of a term rather than using a dictionary (a Wikipedia page would attempt to contain all meanings, i.e, all knowledge conveyed by the term which can encompass multiple objects of reference and multiple histories and contexts). Meaningful logical analysis (like in the sense of ontology) is not done in isolated/reductionist treatment, but logical analysis in the sense of grammar is. Thus there is something we would distinctly call the logical or *grammatical meaning*.

Ontological meaning would be grouped under the former, not treated as grammatical meaning (which is the source of this problem in Western philosophy due to their different treatment of ontology). Russell's treatment would then be simple common sense for any ontological assessment of meaning. That it required a 20th century philosopher to come up with this indicates the Idealistic bias evident in earlier Western philosophy where only the reality of ideas is upheld and thus language (in the sense of grammatical meaning) is burdened with ontological connotations it should never have carried.

Returning to Quine,

Confusion of meaning with naming not only made McX think he could not meaningfully repudiate Pegasus; a continuing confusion of meaning with naming no doubt helped engender his absurd notion that Pegasus is an idea, a mental entity. The structure of his confusion is as follows. He confused the alleged *named object* Pegasus with the *meaning* of the word 'Pegasus', therefore concluding that Pegasus must be in order that the word have meaning. But what sorts of things are meanings? This is a moot point; however, one might quite plausibly explain meanings as ideas in the mind, supposing we can make clear sense in turn of the idea of ideas in the mind. Therefore Pegasus, initially confused with a meaning, ends up as an idea in the mind. It is the more remarkable that Wyman, subject to the same initial motivation as McX, should have avoided this particular blunder and wound up with unactualized possibles instead.

Emphasis mine. The term "unactualized possibles" merits greater discussion. Quine says earlier in describing his characters, McX and Wyman,

Subtler minds, taking the same precept as their starting point, come out with theories of Pegasus which are less patently misguided than McX's, and correspondingly more difficult to eradicate. One of these subtler minds is named, let us say, Wyman. Pegasus, Wyman maintains, has his being as an unactualized possible. When we say of Pegasus that there is no such thing, we are saying, more precisely, that Pegasus does not have the special attribute of actuality. Saying that Pegasus is not actual is on a par, logically, with saying that the Parthenon is not red; in either case we are saying something about an entity whose being is unquestioned.

Wyman, by the way, is one of those philosophers who have united in ruining the good old word 'exist'. Despite his espousal of unactualized possibles, he limits the word 'existence' to actuality—thus preserving an illusion of ontological agreement between himself and us who repudiate the rest of his bloated universe. We have all been prone to say, in our common-sense usage of 'exist', that Pegasus does not exist, meaning simply that there is no such entity at all. If Pegasus existed he would indeed be in space and time.

but only because the word 'Pegasus' has spatio-temporal connotations, and not because 'exists' has spatio-temporal connotations. If spatio-temporal reference is lacking when we affirm the existence of the cube root of 27, this is simply because a cube root is not a spatio-temporal kind of thing, and not because we are being ambiguous in our use of 'exist'.[1] However, Wyman, in an ill-conceived effort to appear agreeable, genially grants us the nonexistence of Pegasus and then, contrary to what we meant by nonexistence of Pegasus, insists that Pegasus *is*. Existence is one thing, he says, and subsistence is another. The only way I know of coping with this obfuscation of issues is to give Wyman the word 'exist'. I'll try not to use it again; I still have 'is'. So much for lexicography; let's get back to Wyman's ontology.

[1] The impulse to distinguish terminologically between existence as applied to objects actualized somewhere in space-time and existence (or subsistence or being) as applied to other entities arises in part, perhaps, from an idea that the observation of nature is relevant only to questions of existence of the first kind. But this idea is readily refuted by counterinstances such as 'the ratio of the number of centaurs to the number of unicorns'. If there were such a ratio, it would be an abstract entity, viz. a number. Yet it is only by studying nature that we conclude that the number of centaurs and the number of unicorns are both 0 and hence that there is no such ratio.

Emphasis mine. Quine really dislikes the idea of treating existences as a predicate because it gives him problems. This character "Wyman" would appear to follow an ontology which is superficially similar to Islamic theology's treatment of the subject though the comparison must end there because as we've seen, occasionalism in the European context led to all manner of theologies we would consider absurd and Quine's conception of Wyman is obviously in that context. Fortunately Quine avoids any theological issues.

On the one hand we would agree with Quine's assessment as elaborated upon in the footnote. If something exists but lacks dimensionality, then for us it would be the *Amr* (Command) of God, corresponding perhaps to a spiritual essence. But a Pegasus is a fiction, not an essence stored in the *Al-Ghayb* (Unseen). We believe in real essences, that the essences of things do possess real existence within the things themselves. There is no real essence for Pegasus (which is defined or essentialized in terms of spatio-temporal dimensionality in our world so if it existed, there would necessarily have to be an observable real essence) so there is no existence for it. Of course this conclusion takes some inductive liberties (assuming it is possible by the laws of nature then assuming our observations are enough to make a universal statement), so it's not as definitive as Quine's, but assuming a thing is possible by the laws of nature then no statement can be that definitive according to our epistemology (and including at

the very least other epistemologies from the tradition of “critical” philosophy involved in the Western discourse on the philosophy of science). The evidence can become overwhelming and the certainty similarly so, but it would not be absolute.

On the other hand, Quine is only right because Wyman is also his own fiction whose arguments Quine can construct and break down because these are Quine’s own arguments even if they are modelled on other real people. If we go just by what is said in the above then Wyman, likely referring to an Idealism of one persuasion or another, would agree a Pegasus *does* exist but without spatio-temporal dimensionality, as an unactualized possible. We *can* agree that it is an “unactualized possible”¹³⁸ but where is this possibility stored? In the human imagination, which *does* have spatio-temporal existence (or correlation) in our brains. For an Idealist, for whom ideas are essentially as real as anything gets (i.e, ideas are things, whether explicitly acknowledged or only treated as such), then this imagined representation of a Pegasus is fairly problematic to explain. For a naturalist, when we treat our minds as objects of nature, the problem remains. Quine’s solution in the footnote is no real solution at all because the number 0 there only references the number of *observed* unicorns and centaurs (he makes an unjustified use of induction). The distinction Wyman makes is between essence (quiddity) and existence. When he says a Pegasus *is*, he’s saying the essence, the quiddity, exists. And it does, because a quiddity is an abstract notion like a number and exists in our mind (quiddities are not real essences). When we study nature we will find the “existence” of the quiddity of a Pegasus in the same *real* manner of all other quiddities, as abstract ideas with real correlations to neuronal structure and activity in human brains. Quine has no real response for this.

We don’t even have to go as far as Idealism. We don’t need to go further than Aristotle. According to Aristotle, who pretty much made this terminology, it is species which have essences and they are defined by their *genus* and *differentia*. The genus is the kind under which the species falls, and the differentia tells what characterizes the species within that genus. As an example, human might be defined as animal (the genus) having the capacity to reason (the differentia).¹³⁹ When a predicate X is an essential predicate of Y (meaning it answers the question “What is it?”) but also of other things, then X is a genus of Y.¹⁴⁰ Now any philosophical genus for the Pegasus must therefore be expected to really exist because the only thing which distinguishes it from the horse (which is real) and other winged animals (which are real), is a particular combination of these real

¹³⁸ In reality we would not because there must be a holistic treatment of nature and by the laws of physics and the laws of nature in general (regarding our observation of fossil evidence) such a creature cannot exist in the form of the Pegasus as it is known. The concept would need many modifications to be a realistic possibility. On the other hand we would not go so far as to say impossible because it might be possible at least in another universe with a different set of laws of physics. Though we won’t need to go that far as will be shown shortly.

¹³⁹ Smith, Robin, "Aristotle's Logic", *The Stanford Encyclopedia of Philosophy* (Spring 2012 Edition), Edward N. Zalta (ed.)

¹⁴⁰ *Ibid.*

essential predicates. These essential predicates are real, they actually exist, just not within a species. So when these essential predicates are not existing within one thing (a member of a species), they do not have the necessary spatio-temporal configuration to be considered an existent species.

So, a Pegasus *is*. It exists as a possibility (which exists as an idea or conception in the human mind). Its essence (quiddity) is what we refer to. But with regards to possibility, even though its *real* essence does not exist, its essential predicates do. The genera exist for equines (from the family Equidae and biological genus *Equus*) and true flying winged mammals (bats). These essential predicates, which we can consider as essential “traits” encoded for by DNA (which a hypothetical Pegasus must surely have) really exist, just not in the same species’ DNA. Could they? If we, through genetic engineering, combined the genes for wings into the genome of a horse, would this resultant DNA strand be considered a Pegasus? Obviously not. Would it be conceivable to somehow engineer an entire organism (by implanting an engineered embryo into the womb of a horse, for example) from this strand and have it grow? At this point, it’s highly improbable but certainly possible. Such an animal, if it ever lived to see the light of day, would not fly (due to the laws of physics at the very least not to mention all the biological issues) but is a Pegasus merely a winged horse or a winged horse which can fly? The point has been made. The entire act of genetically engineering something is to alter the spatio-temporal configuration of certain real essential traits (“real predicates”). The only thing a Pegasus is lacking, then, is this spatio-temporal existence. This is why we cannot say with absolute certainty a Pegasus does not and can not exist (as Quine wants to), i.e., that it is impossible, though our level of certainty in the statement that it does not exist is really high but not in the statement that it *can not* exist.¹⁴¹

Quine says elsewhere that ontology and scientific theory would need to be discussed holistically but he doesn’t do that here.

Moving on, he says,

Possibility, along with the other modalities of necessity and impossibility and contingency, raises problems upon which I do not mean to imply that we should turn our backs. But we can at least limit modalities to whole statements. We may impose the adverb ‘possibly’ upon a statement as a whole, and we may well worry about the semantical analysis of such usage; but little real advance in such analysis is to be hoped for in expanding our universe to include so-called *possible entities*. I suspect that the main motive for this expansion is simply the old notion that Pegasus, for example, must be because otherwise it would be nonsense to say even that he is not.

Still, all the rank luxuriance of Wyman’s universe of possibles would seem to

¹⁴¹ The certainty in both statements, especially the latter, was lowered by modern scientific progress.

come to naught when we make a slight change in the example and speak not of Pegasus but of the round square cupola on Berkeley College. If, unless Pegasus were, it would be nonsense to say that he is not, then by the same token, unless the round square cupola on Berkeley College were, it would be nonsense to say that it is not. But, unlike Pegasus, the round square cupola on Berkeley College cannot be admitted even as an unactualized *possible*. Can we drive Wyman now to admitting also a realm of unactualizable impossibles? If so, a good many embarrassing questions could be asked about them. We might hope even to trap Wyman in contradictions, by getting him to admit that certain of these entities are at once round and square. But the wily Wyman chooses the other horn of the dilemma and concedes that it is nonsense to say that the round square cupola on Berkeley College is not. He says that the phrase 'round square cupola' is meaningless.

Unlike Wyman, we would not say a round square is "meaningless" except as a colloquialism. It might be described as an "impossibility" or perhaps an "absurdity". And contrary to what Quine says, there are no inherent logical troubles with posing impossibilities unless one's logic is bad.

Normally, positing any kind of "round square" thing would be considered a category error,

A category mistake, or category error, is a semantic or ontological error in which "things of one kind are presented as if they belonged to another", or, alternatively, a property is ascribed to a thing that could not possibly have that property.¹⁴²

It is related to the fallacy of composition,

The fallacy of composition arises when one infers that something is true of the whole from the fact that it is true of some part of the whole (or even of every proper part). For example: "This fragment of metal cannot be broken with a hammer, therefore the machine of which it is a part cannot be broken with a hammer." This is clearly fallacious, because many machines can be broken into their constituent parts without any of those parts being breakable.¹⁴³

And the fallacy of division,

A fallacy of division occurs when one reasons logically that something true of a thing must also be true of all or some of its parts.

¹⁴² http://en.wikipedia.org/wiki/Category_mistake - Retrieved 06/03/12

¹⁴³ http://en.wikipedia.org/wiki/Fallacy_of_composition - Retrieved 06/03/12

An example:

A Boeing 747 can fly unaided across the ocean.

A Boeing 747 has jet engines.

Therefore, one of its jet engines can fly unaided across the ocean.¹⁴⁴

With the case of a “round square cupola”, however, we assume Quine is referring to the “round square *copula*” which is a reference to a non-existent object from the philosophy of language.¹⁴⁵ A “cupola”, on the other hand, is a dome-like structure of a building. The principle behind the “round square copula” is a distinction between an abstract concept *encoding* properties and *exemplifying* them. Encoding properties is synonymous with ascribing properties to a concept, and exemplifying properties is synonymous with having them. What is meant here by “abstract concept” is described as *having* (i.e, exemplifying) the property of being an “*incomplete object*” or “incompletely determined”, meaning not existent but constituted of possible (not impossible) properties. They are necessarily non-existent and *impossible* by nature.

Quine’s use of the “round square copula” notion is a category error. He managed to avoid the plain category error of having a thing be both round and square, but he doesn’t avoid the error of positing existence of a thing which is literally defined as non-existent (which is an even bigger gaffe as it then proves absolutely nothing in the context of his debate with his fictional character). If he intended not to use this principle at all but merely refer to a cupola, a building’s structure, which is posited as round and square then he commits a simple and obvious category error anyway (that a thing which is round cannot also be square, by definition).

The Western philosophy behind this notion of non-existent objects (in the “round square copula” example) comes from Alexius Meinong and his “theory of objects”. The goal was the same as Quine’s, to preserve belief in non-existent objects. Quine’s character of Wyman actually represents Meinong’s philosophy. What Quine is attempting to accomplish by half-heartedly referencing an idea of Meinong’s, only in name, to make only the appearance of refuting Meinong, is beyond me. The properties necessary for a Pegasus are in no way contradictory in the way that the properties of roundness and squareness are inherently and fundamentally contradictory when posited of an existing thing (at least in the way that Quine did it, because he acknowledges the impossibility of it and then seems to think this analogy will apply to the Pegasus when it can not, at least not as how it was put in his work).

Regarding Meinong,

Philosophical writings on nonexistent objects in the 20th and 21st century usually take as their starting point the so-called “theory of objects” of the

¹⁴⁴ http://en.wikipedia.org/wiki/Fallacy_of_division - Retrieved 06/03/12

¹⁴⁵ http://en.wikipedia.org/wiki/Round_square_copula - Retrieved 06/03/12

Austrian philosopher Alexius Meinong (1853–1920).

Meinong was concerned about the problem of intentional states which are not directed at anything existent. The starting point of this problem is the so-called “principle of intentionality”, which says that mental phenomena are characterized by an “intentional directedness” towards an object. For instance, to love is always to love something, to imagine is always to imagine something, and so forth. In other words, every intentional act is “about” something. The problem is that sometimes people imagine, desire or fear something that does not exist. Some people fear the devil, although the devil doesn't exist. Many people hope for peace in the Middle East. But there is no peace in the Middle East. Ponce the Leon searched for the fountain of youth, even though it doesn't exist. It is easy to imagine a golden mountain, even if no such thing exists.

Cases like these seem to be clear counterexamples to the principle of intentionality. However, many philosophers found this principle too appealing to be given up completely. While some came to the conclusion that intentionality is not a real relation and therefore does not require the existence of an object (see, for instance, Brentano 1874, Searle 1983), Meinong offered another solution: there is indeed an object for every mental state whatsoever—if not an existent then at least a nonexistent one.¹⁴⁶

This is of course nothing new for Islamic epistemology. However, where we referred to the Pegasus as a *potential* object, Meinong makes non-existent objects a class outright and groups Pegasus therein. The problem with Meinong is the grouping of impossible non-existent objects along with possible ones. The obvious solution to which (distinguishing impossibility from possibility) is what Quine thought was a vulnerability, one which he did not care to exploit (so not really much of a vulnerability).

Meinong's basic goal though, which was to treat existence as a predicate and then conjecture about objects about which existence was not predicated as a means to positing non-existent objects, is more or less fine from the perspective of Islamic theology (and logic in general as even Quine had to acquiesce). Quine said he relinquished use of “exists” to Meinong, but took issue with his use of “*Is*”. Quine unfortunately picked the wrong examples because he talked initially of unactualized possibility so a Pegasus *is* meant a “Pegasus *is* (possible)” while the same cannot be said about a round square. In the most simple terms we can say one has a logically consistent (i.e, possible) essence (or set of essential properties or predicates) whereas the other has contradictions in its essence (and is hence impossible). All this proves is that Meinong's approach could stand for fine-tuning but is not fundamentally incorrect. A round-square *is* (impossible). To be more specific (and to avoid use of contradiction), the

¹⁴⁶ Reicher, Maria, "Nonexistent Objects", *The Stanford Encyclopedia of Philosophy (Fall 2010 Edition)*, Edward N. Zalta (ed.)

phrase “Pegasus *is*” simply means its essence (quiddity) exists, which it does, because it is a conception (its “whatness”). Likewise a round-square’s essence (quiddity) also exists, because we are discussing it right now. But a quiddity is not a *real* essence and in the failure to recognize this fundamental distinction lies their ontological troubles. Or to put it another way, a distinction is created by them between ourselves and nature. Either nature is real or we are, but not both.

Regarding the further development of Meinongian object theory,

One feature of Meinong's mature object theory not mentioned so far is the “doctrine of implexion”. Iplexion is a relation between incomplete and complete objects which seems to be very close to what is often called “instantiation”, i.e., a relation between universals and particulars. Incomplete objects are “implected” in complete ones. (See Meinong 1972, §29.) Meinong himself eventually came to interpret incomplete objects as universals (see Meinong 1972, 739f). Meinongian object theory may thus be interpreted as a sophisticated theory of universals, in particular as a theory of *types* (as opposed to properties), which might open further fields of application.¹⁴⁷

Hence we can define an impossibility as something which can not be instantiated, actualized, or implected. A Pegasus is an unactualized possibility (which implies it is *actualizable*) but a round-square is an *unactualizable* possibility (*impossible*). Saying that an “unactualizable possibility” is a contradiction is like saying the word “impossible” is a contradiction because it contains the word “possible” and “impossible” means the opposite of it. “Unactualizable possibility” is the same as saying “not possible” or “impossible” so we can just use the word impossible in its stead. The term Quine uses, “unactualized impossibility”, implies there are actualized impossibilities which is fallacious. That term is completely unnecessary. So, in effect, we only need to ground the language primarily in “possibility” and “impossibility” rather than “actualizable” since the word possibility, on its own, carries connotations of “actualizable” and the word impossibility carries connotations of “unactualizable”. So the terms we need are just four: possible (divided into actualized and unactualized), impossible (always unactualized), necessary (always actualized). One will note that most impossibilities, if not all, reduce to logical errors in the statement (or essence if referring to an object). Meaning violations of the fundamental laws of logic.

From the perspective of Islamic theology we can say that the fundamental logical laws (such as the classic laws of thought) are derived from the distinction between the Creator and the creation (one of the most fundamental principles of monotheism).

The law of identity:

¹⁴⁷ *Ibid.*

It states that an object is the same as itself: $A \rightarrow A$ (if you have A, then you have A); While this can also be listed as $A \equiv A$ (A if-and-only-if A,) this is redundant.¹⁴⁸

Which also implies that the object is not the same as another (the same with itself and different from the other). This is the most basic principle of logic, language and, as Islamic theology holds, of existence. Without identity there would be no meaningful communication of any concepts within symbolic language. And the only reason this is true of how we think and communicate is, we assert, because it holds true in reality in the distinction between the Creator and the creation. It would otherwise have been argued that it does not hold true in empirical reality which appears to be constantly changing. Knowledge, however, has a fundamentally opposite nature (an unchanging or stable form) which reflects somewhat on Kant's transcendental ideal (or God as an idea, or reflecting God's Knowledge).

From this two correlates can be derived,

The law of non-contradiction:

It states that contradictory statements cannot both at the same time be true, e.g. the two propositions "A is B" and "A is not B" are mutually exclusive.¹⁴⁹

This is a fairly obvious one though it is subject to subjective interpretation depending on how we judge whether statements are contradictory or not. For the most part there isn't an issue.

And the law of excluded middle:

It states that for any proposition, either that proposition is true, or its negation is.¹⁵⁰

Regarding these two being correlates of the first:

The principle of excluded middle, along with its complement, the law of contradiction (the second of the three classic laws of thought), are correlates of the law of identity (the first of these laws). Because the principle of identity intellectually partitions the Universe into exactly two parts: "self" and "other", it creates a dichotomy wherein the two parts are "mutually exclusive" and "jointly exhaustive". The principle of contradiction is merely an expression of the mutually exclusive aspect of that dichotomy, and

¹⁴⁸ http://en.wikipedia.org/wiki/Law_of_identity - Retrieved 06/03/12

¹⁴⁹ http://en.wikipedia.org/wiki/Law_of_noncontradiction - Retrieved 06/03/12

¹⁵⁰ http://en.wikipedia.org/wiki/Law_of_excluded_middle - Retrieved 06/03/12

the principle of excluded middle is an expression of its jointly exhaustive aspect.¹⁵¹

The law of excluded middle covers more of a grey area in its applicability to reality. There are apparent issues with applying it to empirical reality in the field of quantum mechanics for obvious reasons, though this should probably be considered more of a law of thought/logic, rather than a law of empirical reality. For if the laws of nature allow multiple possible outcomes then judging the “negation” of an empirical proposition is not so straightforward.

We can think of it as distinguishing the idea of Creator from the idea of creation (law of identity), but judging both as mutually exclusive or jointly exhaustive is not necessarily arrived at from that initial premise in a panentheistic view of the world. It is effectively so, but we can not say absolutely enough to the point of being a law of nature. For a law of thought, especially in natural language, it works. For the most part their applicability to reality isn't troublesome either until we get down to the scale of quantum mechanics, but there we are dealing with physics/metaphysics regarding creation and presumably the “boundary”, where creation is occurring, would appear “fuzzy” from our perspective, especially if there is a Many-Worlds scenario involved.

The point is, however, precisely that nature is not the absolute determinant. The point is in the distinction between the Creator and the creation (nature), not in just the creation (and not in a distinction between us and creation). These principles correspond to this relationship and that is all that is needed for the purposes of occasionalism. These principles or laws must be true and derived from an objective source but we do not find their ultimate source in nature itself which only furthers the case for monotheism. That they are reflected more perfectly in our knowledge and thought, and in the distinction of the Creator from creation, but not as perfectly (so far) in the empirical reality establishes a relationship between our capacity for knowledge and the “transcendental ideal” of Kant, which points towards God for us. Our knowledge and rationality “transcends” the natural and points to the ideal. In the existential sense, nature might be our “bridge” to God (as the deeper into it we look, the closer we get to raw creating, the *amr* of God). But in the essential sense (which encompasses our logical and rational disposition), nature is not our bridge to God: we are nature's bridge to God (and it is in this capacity that in Islamic theology man is appointed as God's vice-regent in this world). It is for this reason that mystics often pursued related interests in the natural sciences but were rarely a part of the tradition of *rational* philosophy (which correspondingly would not hold divine illumination, mysticism, as a means of knowledge). They (mystics) were more concerned with natural philosophy (philosophy related to endeavors in the natural sciences). Most theological speculation and discussion fell under the purview of rational philosophy which is where all the debates happened. And yet the opponents in this arena often had no trouble seeing eye to eye in the context of natural science/philosophy and mysticism (for empiricism was a strongly evident characteristic of all the

¹⁵¹ *Ibid.*

theological schools in Islam, even its rationalists). This is the same relation expressed in how the rest of physical creation, nature, adheres unflinchingly to the Will of God (manifested as the natural order) but differences arise where free will comes in, for mankind and its social orders. The former can be seen as one avenue of attaining nearness to God in this world, but the latter is the fundamental approach every single soul is destined to take through Judgment Day and beyond where our free will is held accountable for its choices. Yet free willed creation was made to be the ultimate reflection of the glory of God, of the Divine Attributes (and thus the transcending of even nature). Which also implies that even our rational/logical ability must be secondary to something else fundamentally variable between individuals.¹⁵² For even though our logic seems idealized and perfect, moreso than is manifested by nature, it still allows each of us to come to different conclusions about matters concerning ourselves (from psychology on up through the various social sciences).

Returning to the discussion on Quine, he remarks,

Wyman was not the first to embrace this alternative. The doctrine of the meaninglessness of contradictions runs away back. The tradition survives, moreover, in writers who seem to share none of Wyman's motivations. Still, I wonder whether the first temptation to such a doctrine may not have been substantially the motivation which we have observed in Wyman. Certainly the doctrine has no intrinsic appeal; [...]

Moreover, the doctrine of meaninglessness of contradictions has the severe methodological drawback that it makes it impossible, in principle, ever to devise an effective test of what is meaningful and what is not. It would be forever impossible for us to devise systematic ways of deciding whether a string of signs made sense—even to us individually, let alone other people—or not. For it follows from a discovery in mathematical logic, due to Church [2], that there can be no generally applicable test of contradictoriness.

Though we do not share “Wyman's” doctrine of the meaninglessness of contradictions (in fact it can be argued they are quite meaningful on their own as abstract notions), Quine's opposition is insufficient.

Firstly, implying there is no intrinsic appeal to the notion of “meaninglessness of contradictions” is clearly disingenuous when he admits just moments earlier “the tradition survives [...] in writers who seem to share none of Wyman's motivations”. If that doesn't

¹⁵² Which was indicated earlier to point to our immortal souls as akin to “laws of nature” which governed our bodies (more specifically, our consciousness, which might act as the intermediary between our spiritual hearts and our physical minds), but were fundamentally inconsistent, very much unlike traditional “laws”, though law could just be seen as a word for strongly consistent behavior, whether self-limited or limited by external forces (in our case as free willed beings, self-limited).

imply an intrinsic appeal, then what would?

Secondly, his assertion that it is the doctrine of “*meaninglessness* of contradictions” specifically which *makes impossible* the task of figuring out what is meaningful... is itself a meaningful contradiction because it results in a certainty (an impossibility) from a contradiction (the doctrine that contradictions are meaningless is meant to make meaningfulness more clear but it does the opposite, thus it is a contradiction, furthermore it is meaningful) which can be said to convey some useful knowledge (that it is impossible to devise an effective test of meaningfulness).

Thirdly, even the above is wrong because it is not true that it is Wyman’s doctrine which makes assessment of meaningfulness impossible. Quine goes on to say the basis for this assertion is actually the work of Alonzo Church whose contribution to the Church-Turing thesis basically explores the limits of *mechanical calculability* or *computability* regarding assessment of the provability of formulas. Quine’s reference to Church is completely misleading. It has no relevance to human mathematicians. It might follow in the footsteps of Gödel’s incompleteness theorem however but that is not what Quine is invoking here because Gödel does not say that there can be *no* test of contradictoriness in human logic either. Furthermore, the Church-Turing thesis is based on the assertion that a certain class of abstract machines can perform any mechanical computing procedure. First of all there could be mechanical computing procedures not performable by this specific class of abstract machines but which are computable by another type or class of machine, and even if it were taken as truth, there’s no reason to suppose the human brain belongs to this class of abstract machines. There’s no problem with supposing or treating the brain as a machine, the only problem is in assessing how it works. Moreover, the Church-Turing thesis does not entail the notion that any process with a mathematical description can be simulated by this class of abstract machines. It would have to be a mathematical description whose functions are *mechanically computable* (i.e, can be computed by their mechanical computing procedure, which is synonymously termed “effectively calculable” or “mechanically calculable”). The comparison to humans is in the following sense,

Turing introduces his machines with the intention of providing an idealised description of a certain human activity, the tedious one of *numerical computation*, which until the advent of automatic computing machines was the occupation of many thousands of people in business, government, and research establishments. He prefaces his first description of a Turing machine with the words:

We may compare a man in the process of computing a ... number to a machine. (Turing 1936: 231.)

The Turing machine is a model, idealised in certain respects, of a human being calculating in accordance with an effective procedure. Wittgenstein put

this point in a striking way:

Turing's "Machines". These machines are *humans* who calculate. (Wittgenstein 1980, 1096.)

It is a point that Turing was to emphasise, in various forms, again and again. For example:

A man provided with paper, pencil, and rubber, and subject to strict discipline, is in effect a universal machine. (Turing 1948: 9.)

The electronic stored-program digital computers for which the universal Turing machine was a blueprint are, each of them, computationally equivalent to a Turing machine, and so they too are, in a sense, models of human beings engaged in computation. Turing chose to emphasise this when explaining these electronic machines in a manner suitable for an audience of uninitiates:

The idea behind digital computers may be explained by saying that these machines are intended to carry out any operations which could be done by a human computer. (Turing 1950a: 436).

He makes the point a little more precisely in the technical document containing his preliminary design for the Automatic Computing Engine or ACE. (The ACE was an electronic stored-program computer built at the National Physical Laboratory, London. A pilot version first ran in 1950 and at the time was the fastest computer in the world. The commercial model was called the DEUCE.)

The class of problems capable of solution by the machine [the ACE] can be defined fairly specifically. They are [a subset of] those problems which can be solved by human clerical labour, working to fixed rules, and without understanding. (Turing 1946: 38-9.)

(Turing went on to characterise the subset in terms of the amount of paper and time available to the human clerk.) It was presumably because he considered the point under discussion to be essential for understanding the nature of the new electronic machines that he chose to begin his *Programmers' Handbook for Manchester Electronic Computer* with this explanation:

Electronic computers are intended to carry out any definite rule of thumb process which could have been done by a human operator

working in a disciplined but unintelligent manner. (Turing 1950b: 1.)¹⁵³

So, the purpose of a Turing machine is to model the behavior of a human who is doing rote calculation which can be reduced into a clear number of steps (and requiring no insight or understanding on the part of the human). The reference to a “human calculator” is the source behind much of the confusion surrounding Turing machines. “Effectively calculable” (mechanically computable) functions are “those functions that can be calculated by an arbitrary machine whose principles of operation are such as to mimic the actions of a human computer”. It remains to be proven that human consciousness can be reduced to such a mechanically computable procedure (Church described these as recursive functions). Which is unlikely to ever happen because of the result Quine is likely referring to.

David Hilbert, the German mathematician, called for a formalization of mathematics which, generally speaking, proves all true statements, features no contradictions, and asks that there should be a well defined procedure (algorithm) for deciding whether any statement within the formalism is true or false. The last of which is called the “decidability” requirement. Kurt Gödel showed the first requirements (everything other than the decidability issue) were impossible. This is called his “incompleteness theorem”, which means we cannot have both consistency and completion. The theorem proves that any consistent logic system (which is developed enough to describe mathematics) will have true but internally unprovable statements (they cannot be proven from within the system only, this theorem will be discussed in a little more detail later).

Church (and later Turing) published the response to the last issue, the decidability problem, which asked for an algorithm which could decide whether any statement within the formal system was true or false. It’s also called the “Entscheidungsproblem” and Church showed that this, too, was not possible. It is this result to which Quine is referring.

...the Entscheidungsproblem can also be viewed as asking for an algorithm to decide whether a given statement is provable from the axioms using the rules of logic.

In 1936 and 1937, Alonzo Church and Alan Turing, respectively, published independent papers showing that a general solution to the Entscheidungsproblem is impossible. This result is now known as Church's Theorem or the Church–Turing Theorem (not to be confused with the Church–Turing thesis).

The origin of the Entscheidungsproblem goes back to Gottfried Leibniz, who in the seventeenth century, after having constructed a successful mechanical

¹⁵³ Copeland, B. Jack, "The Church-Turing Thesis", *The Stanford Encyclopedia of Philosophy* (Fall 2008 Edition), Edward N. Zalta (ed.)

calculating machine, dreamt of building a machine that could manipulate symbols in order to determine the truth values of mathematical statements. He realized that the first step would have to be a clean formal language, and much of his subsequent work was directed towards that goal. In 1928, David Hilbert and Wilhelm Ackermann posed the question in the form outlined above.

[...]

Before the question could be answered, the notion of "algorithm" had to be formally defined. This was done by Alonzo Church in 1936 with the concept of "effective calculability" based on his λ calculus and by Alan Turing in the same year with his concept of Turing machines. It was recognized immediately by Turing that these are equivalent models of computation.

The negative answer to the *Entscheidungsproblem* was then given by Alonzo Church in 1935–36 and independently shortly thereafter by Alan Turing in 1936–37. Church proved that there is no computable function which decides for two given λ calculus expressions whether they are equivalent or not. He relied heavily on earlier work by Stephen Kleene. Turing reduced the halting problem for Turing machines to the *Entscheidungsproblem*. The work of both authors was heavily influenced by Kurt Gödel's earlier work on his incompleteness theorem, especially by the method of assigning numbers (a Gödel numbering) to logical formulas in order to reduce logic to arithmetic.

[...]

Some first-order theories are algorithmically decidable; examples of this include Presburger arithmetic, real closed fields and static type systems of (most) programming languages. The general first-order theory of the natural numbers expressed in Peano's axioms cannot be decided with such an algorithm, however.

This does not prove that what humans do is impossible, illogical, or unjustified. In fact their findings technically do not answer Hilbert. He was asking for an algorithm in a mathematical formalism for human mathematicians (not just humans, but people who knew the math they were doing). Since formalizing all of human mathematics itself is a daunting task which has not been done, Church and Turing use an abstract machine and assert that anything effectively calculable (mechanically calculable by humans) would be encompassed by these. There were doubts initially but even as their argument picks up support over the years it can not be proven until the complete human approach to mathematics is formalized (and with them, there is the added condition that it apply to humans who do not utilize any insight or understanding). So the only thing this proves is that mathematicians can not be replaced by computers (for now). So it is

plainly apparent that Quine had no basis by which to challenge the understanding of contradictoriness as displayed by his character, Wyman. Of course this was likely never Quine's intent (even from a superficial reading it should be somewhat obvious he's just messing around, distracting from how he has not much to respond with) but the author having since passed away there's always the matter of those who would take his words literally as the basis for some other argument. In this matter particularly there is always that concern these days.

Moving on, he invokes Russell's theory of descriptions to settle the ontological ambiguity of these statements. He converts the problematic names into descriptions and uses bound variables (something, nothing, everything, etc) as the referent objects. Quine liked this so much that he would treat *all* names as convertible into descriptions. He says,

Whatever we say with the help of names can be said in a language which shuns names altogether. To be assumed as an entity is, purely and simply, to be reckoned as the value of a variable. In terms of the categories of traditional grammar, this amounts roughly to saying that to be is to be in the range of reference of a pronoun. Pronouns are the basic media of reference; nouns might better have been named propronouns.

So with him *to be* is to be the value of one of these variables.

One other note before continuing,

Confusion of meaning with naming not only made McX think he could not meaningfully repudiate Pegasus; a continuing confusion of meaning with naming no doubt helped engender his absurd notion that Pegasus is an idea, a mental entity. The structure of his confusion is as follows. He confused the alleged *named object* Pegasus with the *meaning* of the word 'Pegasus', therefore concluding that Pegasus must be in order that the word have meaning.

Which is another insufficient criticism since a mental idea or entity (conception) is a representation of an object and the idea is generally called the same as the object. The idea (i.e, mental *entity* to use his own words) can itself be referred to as the "named object" Pegasus. The object that the word Pegasus names is a winged horse and this object exists as a conception in the mind, a representation that via our wonderful imaginations can appear as a three dimensional object which moves through time. A simulation of a Pegasus is still a Pegasus. When one sees a picture or video of a Pegasus, the object is referred to as Pegasus. Not "a picture of a Pegasus" or "a video of a Pegasus" but simply Pegasus. Play a video of a Pegasus for any human (who knows what a Pegasus is), point at the representation, and ask them what they are looking at. The context in which the object subsists (a representation in a computer program) is treated distinctly (usually ignored or suppressed) from the object itself. Any

given average person will agree that what they are looking at is a Pegasus, but it is not real. Suitability for common use is apparently not one of Quine's requirement for a philosophy, yet the ontology of Islamic theology is not only utilized in common sense by most people, Muslim or otherwise, it remains flexible and robust in dealing with these problems and being suitable enough for complicated scientific theories.

Quine goes on to turn the name "Pegasus" into a description by rephrasing it as "the thing that 'Pegasizes'" where the predicate "pegasizes" is synonymous for the predicate "is-Pegasus".

This leaves him to tackle the annoyance of universals. When it is said "there are red houses, red roses, and red sunsets", he can now deny that we can conclude from this that "there is an attribute 'redness' which these all have in common". The reason being because he wishes to dispute any assertions that would claim there is an actual entity named by the word "redness". According to Russell's theory of descriptions, there is no need to treat "redness" to be a reference to an object, a universal entity in order to make it meaningful. Quine believes his goal of immunity from ontological commitment is realized by throwing out names and meanings (he says meanings can be treated as irreducible matters of fact or a reference to something people do in the presence of the linguistic utterance in question). Commitment to an ontological entity (positing an existent) can only be done now by use of bound variables where a statement is explicitly made in the sense of "*there is something* (bound variable) which red houses and sunsets have in common" or "*there is something* which is a prime number larger than a million".

I want to take this moment to make clear that while, from the perspective of Islamic theology, we agree with what Quine *wants* to do, we don't agree with how he is doing it. He wants to bring into question every abstract entity used in math or science which can only be a laudable affair considering the extremes to which some have went in those fields in recent history.

Classical mathematics, as the example of primes larger than a million clearly illustrates, is up to its neck in commitments to an ontology of abstract entities. Thus it is that the great mediaeval controversy over universals has flared up anew in the modern philosophy of mathematics. The issue is clearer now than of old, because we now have a more explicit standard whereby to decide what ontology a given theory or form of discourse is committed to: a theory is committed to those and only those entities to which the bound variables of the theory must be capable of referring in order that the affirmations made in the theory be true.

He draws a parallel between current doctrines of philosophy of mathematics and classical views of universals,

The three main medieval points of view regarding universals are designated by historians as *realism*, *conceptualism*, and *nominalism*. Essentially these same three doctrines reappear in twentieth-century surveys of the philosophy of mathematics under the new names *logicism*, *intuitionism*, and *formalism*.

Realism, as the word is used in connection with the medieval controversy over universals, is the Platonic doctrine that universals or abstract entities have being independently of the mind; the mind may discover them but cannot create them. *Logicism*, represented by Frege, Russell, Whitehead, Church, and Carnap, condones the use of bound variables to refer to abstract entities known and unknown, specifiable and unspecifiable, indiscriminately.

Conceptualism holds that there are universals but they are mind-made. *Intuitionism*, espoused in modern times in one form or another by Poincaré, Brouwer, Weyl, and others, countenances the use of bound variables to refer to abstract entities only when those entities are capable of being cooked up individually from ingredients specified in advance. As Fraenkel has put it, logicism holds that classes are discovered while intuitionism holds that they are invented—a fair statement indeed of the old opposition between realism and conceptualism. This opposition is no mere quibble; it makes an essential difference in the amount of classical mathematics to which one is willing to subscribe. Logicians, or realists, are able on their assumptions to get Cantor's ascending orders of infinity; intuitionists are compelled to stop with the lowest order of infinity, and, as an indirect consequence, to abandon even some of the classical laws of real numbers. The modern controversy between logicism and intuitionism arose, in fact, from disagreements over infinity.

Formalism, associated with the name of Hilbert, echoes intuitionism in deploring the logicist's unbridled recourse to universals. But formalism also finds intuitionism unsatisfactory. This could happen for either of two opposite reasons. The formalist might, like the logicist, object to the crippling of classical mathematics; or he might, like the *nominalists* of old, object to admitting abstract entities at all, even in the restrained sense of mind-made entities. The upshot is the same: the formalist keeps classical mathematics as a play of insignificant notations. This play of notations can still be of utility—whatever utility it has already shown itself to have as a crutch for physicists and technologists. But utility need not imply significance, in any literal linguistic sense. Nor need the marked success of mathematicians in spinning out theorems, and in finding objective bases for agreement with one another's results, imply significance. For an adequate basis for agreement among mathematicians can be found simply in the rules which govern the manipulation of the notations—these syntactical rules being, unlike the notations themselves, quite significant and intelligible.

The description of formalism is quite interesting because it has implications far behind the philosophy of mathematics or science. One can see it as implying that math (in the sense of its notations) isn't significant, only the rules we agree on are. These rules govern behavior or our action (I have to use the word action here to avoid the holistic connotations associated with "behavior"). So with any set of rules we agree on, rules by which to act, our resulting coordinated action is the key to success. The key to that is the rules, not the action. Any action might seemingly be made to work if we all agreed on the rules coordinating it. Perhaps Quine might argue that the significance of language is also only in its syntactical rules.

While there is no real problem with his taking to task of mathematicians and using parallels from classical philosophy for that (since, in this context, there is no issue from our side with what he is doing), our stance on universals is different. We are not Platonic realists but our realism (with regards to universals) is more in line with Aristotle's where universals are seen as really existing only within the existent things of which they are predicated. Unlike some Western derivations of Aristotle's "moderate realism" (notably immanent realism), we do hold to the notion of non-existent or abstract objects. This "realism" with regards to universals is rather conservative and typically not extended into mathematical domains as a matter of axiom but only used to "police" it (in the same sense where Quine wanted to move away from the continuous and careless positing of abstract entities). Unlike the physicalists' approach to realism, we allow for the treatment of universals as abstracts too. What allows us to simultaneously hold to an Aristotelian and somewhat Platonic view is our treatment and focus on existence.

Imagine, if you will, that the universal attribute of "redness" is an abstract *field*, along with fields for all other universals. On top of this is another field for the existence, itself treated as a universal, and where determinations are made in the field of existence, the other fields overlapped on that point in a particular configuration gain spatio-temporal dimensionality (gain spatio-temporal meaningfulness).

This is an obvious parallel to quantum field theory and the Higgs mechanism.

But while QFT is describing an aspect of our physical reality, the above is not. It is not even a metaphor for any particular belief of Islamic theology, it's just to illustrate the relationship between existence and other "properties" or attributes. To take that example literally would be akin to a form of naturalistic pantheism perhaps (although not one I've ever heard of). Each "universal" there is referring to the *possibilities* which remain with God (i.e, in God's Knowledge). Perhaps there is a degree, however minute, of existence to them (so they gain existence outside God's Knowledge and within creation) but that is beyond our speculation. The universals take form in the prototypes or archetypes of things in God's Knowledge (because God's Knowledge would not be only of universals/attributes, but all the possible particulars). So the "field of existence" corresponds to God's determining between the contradictory logical predicates (in Kant's terms) of existence and non-existence, i.e, His Will. Since most of the configurations or

arrangements of various attributes and qualities already occurred timelessly in God's Knowledge, what's left (involving time) is creation (the attribute of existence). It is not unreasonable to assume that possibilities (regarding existence) are manifested, however transiently, in the process of creation (for example, the results of the dual slit experiment could be interpreted to indicate overlapping possibilities being created).

Treating the universals as fields of possibility is not that inapplicable to our view of reality. If we had fields of colors only, red, green, and blue, and another field determining which particular configurations would be manifested at each point in space and time, assuming a 2D space, it would be just like a television/computer monitor. This gets back to the holographic universe theories. Now reduce colors to interactions of light and physical matter and we've got our normal view of physics.

The actual fields of physics (the fundamental forces or interactions) would all be aspects of the manifestation of existence (i.e, creation). If we only had a universe of colored vision (like a hologram or projection), even then we could derive from the finished image the commonality of certain colors (similar to the reasoning behind the notion of philosophical genus) and then treat it as an interaction of fundamental fields of red, green, and blue. But the universe is not merely a vision, nor a hologram.¹⁵⁴ We don't experience fields of colors (otherwise our brains' function would not be possible and we would not be sentient, thinking beings). The fields of interaction we see are regarding existence and the multiplicity thereof (the four fundamental forces) corresponds to the different modes of existence of fundamental substances. When taken over time (gravity, the force which is considered to more or less give "dimensional form" to the universe as we experience it), these manifest as actions or behaviors in space which are then divided into three more interactions.

Our objection to these holographic universe-type theories may seem counterintuitive because our entire philosophical outlook seems to suggest that very notion. Even the idea of *amr* and *khalq* lends itself very well to this. Our objection isn't in principle, it may well be that the dimensional form of the universe has yet to be properly and fully explained. But we can not doubt the materiality of our world and how important that notion of materiality or corporeality is to our awareness and experience as living beings. Our bodies are corporeal in form and thus our minds inherit a bias towards associating that concept with "reality" and then that in turn with "meaningfulness". Any assertion to the contrary, doubting or denying the "reality" of nature winds up doing nothing but posing *false* existential issues for humanity. It may not be as much of a concern for the general population in today's materialist society but it isn't that way everywhere, nor was it always that way. Organized religion's prime concern is the social order which directly

¹⁵⁴ The assertion that it is a 3 dimensional material "projection" like in some holographic universe theories are taking liberties with the idea of "projection" or "hologram" which do not contain connotations of materiality. Their assertion is regarding the dimensionality of the universe, for which "holography" fits, but the term carries added connotations of immateriality which do not apply to the universe.

impacts on how we experience our lives which in turn directly impacts on our thoughts and emotions. Theology's prime concern, at least in the case of the Abrahamic faiths, is man's relationship with God and when the former can affect the latter for essentially no good or *real* reason then we have a problem. The entire point, then, of theology is to keep our attention focused on reality as it exists, not as we imagine it. Conversely, science is more often involved with the latter than the former because empirical philosophy really can say little to nothing about reality as it exists. Recognizing this is the essential issue in the philosophy of science.

Quine reaffirms his focus on the latter,

We look to bound variables in connection with ontology not in order to know what there is, but in order to know what a given remark or doctrine, ours or someone else's, says there is; and this much is quite properly a problem involving language....

But, he continues,

...But what there is is another question.

In debating over what there is, there are still reasons for operating on a semantical plane. One reason is to escape from the predicament noted at the beginning of this essay: the predicament of my not being able to admit that there are things which McX countenances and I do not. So long as I adhere to my ontology, as opposed to McX's, I cannot allow my bound variables to refer to entities which belong to McX's ontology and not to mine. I can, however, consistently describe our disagreement by characterizing the statements which McX affirms. Provided merely that my ontology countenances linguistic forms, or at least concrete inscriptions and utterances, I can talk about McX's sentences.

Another reason for withdrawing to a semantical plane is to find common ground on which to argue. Disagreement, in ontology involves basic disagreement in conceptual schemes; yet McX and I, despite these basic disagreements, find that our conceptual schemes converge sufficiently in their intermediate and upper ramifications to enable us to communicate successfully on such topics as politics, weather, and, in particular, language. In so far as our basic controversy over ontology can be translated upward into a semantical controversy about words and what to do with them, the collapse of the controversy into question-begging may be delayed.

Philosophy of ontology is an important subject to be developed at least for the purposes of finding common ground for discussion. One of the things Quine sees as problematic here is the predicament one finds themselves in where they are forced into the

ontological commitments of the person with whom they are communicating, against their own intentions. When people presuppose their ontological views in discussion with others as not ontological but simply reality how it is (i.e, assume that everyone sees the world the same as they do) then this obviously will lead to argumentation which can go nowhere.

He continues,

It is no wonder, then, that ontological controversy should tend into controversy over language. But we must not jump to the conclusion that what there is depends on words. Translatability of a question into semantical terms is no indication that the question is linguistic. To see Naples is to bear a name which, when prefixed to the words 'sees Naples', yields a true sentence; still there is nothing linguistic about seeing Naples.

Our acceptance of an ontology is, I think, similar in principle to our acceptance of a scientific theory, say a system of physics: we adopt, at least insofar as we are reasonable, the simplest conceptual scheme into which the disordered fragments of raw experience can be fitted and arranged. Our ontology is determined once we have fixed upon the over-all conceptual scheme which is to accommodate science in the broadest sense; and the considerations which determine a reasonable construction of any part of that conceptual scheme, for example, the biological or the physical part, are not different in kind from the considerations which determine a reasonable construction of the whole. To whatever extent the adoption of any system of scientific theory may be said to be a matter of language, the same—but no more—may be said of the adoption of an ontology.

But simplicity, as a guiding principle in constructing conceptual schemes, is not a clear and unambiguous idea; and it is quite capable of presenting a double or multiple standard. Imagine, for example, that we have devised the most economical set of concepts adequate to the play-by-play reporting of immediate experience. The entities under this scheme—the values of bound variables—are, let us suppose, individual subjective events of sensation or reflection. We should still find, no doubt, that a physicalistic conceptual scheme, purporting to talk about external objects, offers great advantages in simplifying our over-all reports. By bringing together scattered sense events and treating them as perceptions of one object, we reduce the complexity of our stream of experience to a manageable conceptual simplicity. The rule of simplicity is indeed our guiding maxim in assigning sense data to objects: we associate an earlier and a later round sensum with the same so-called penny, or with two different so-called pennies, in obedience to the demands of maximum simplicity in our total world-picture.

Here we have two competing conceptual schemes, a phenomenalist one and a physicalist one. Which should prevail? Each has its advantages; each has its special simplicity in its own way. Each, I suggest, deserves to be developed. Each may be said, indeed, to be the more fundamental, though in different senses: the one is epistemologically, the other physically, fundamental.

He compares ontology to a scientific theory. Where a scientific theory is a conceptual scheme which fits the results of *experiment*, ontology can be seen as a conceptual scheme which fits the results of *experience*. The physicalist (i.e., realist) framework for ontology has many advantages in simplicity he notes, but the phenomenalist (i.e., empiricist) focus has the advantage of being able to hold the former to account. Especially in untangling the problems of convoluted ontologies which have taken too many liberties (by forcing the discussion back to an epistemological one: the knowledge which served as the basis for the development of that ontology). In the end, because of our nature, our view of what there *is* depends on what we *know*.

The physical conceptual scheme simplifies our account of experience because of the way myriad scattered sense events come to be associated with single so-called objects; still there is no likelihood that each sentence about physical objects can actually be translated, however deviously and complexly, into the phenomenalist language. Physical objects are postulated entities which round out, and simplify our account of the flux of experience, just, as the introduction of irrational numbers simplifies laws of arithmetic. From the point of view of the conceptual scheme of the elementary arithmetic of rational numbers alone, the broader arithmetic of rational and irrational numbers would have the status of a convenient myth, simpler than the literal truth (namely, the arithmetic of rationals) and yet, containing that literal truth as a scattered part. Similarly, from a phenomenalist point of view, the conceptual scheme of physical objects is a convenient myth, simpler than the literal truth and yet containing that literal truth as a scattered part.

Now what of classes or attributes of physical objects, in turn? A platonist ontology of this sort is, from the point of view of a strictly physicalist conceptual scheme, as much a myth as that physicalist conceptual scheme itself is for phenomenism. This higher myth is a good and useful one, in turn, in so far as it simplifies our account of physics. Since mathematics is an integral part of this higher myth, the utility of this myth for physical science is evident enough. In speaking of it nevertheless as a myth, I echo that philosophy of mathematics to which I alluded earlier under the name of formalism. But an attitude of formalism may with equal justice be adopted toward the physical conceptual scheme, in turn, by the pure aesthete or phenomenist.

He goes on to focus on the convenient fictions or myths of physics. Here we have the fascinating case of a naturalist talking about a subject usually reserved for the critical rationalists who follow in Kant's footsteps.

The analogy between the myth of mathematics and the myth of physics is, in some additional and perhaps fortuitous ways, strikingly close. Consider, for example, the crisis which was precipitated in the foundations of mathematics, at the turn of the century, by the discovery of Russell's paradox and other antinomies of set theory. These contradictions had to be obviated by unintuitive, ad hoc devices; our mathematical myth-making became deliberate and evident to all. But what of physics? An antinomy arose between the undular and the corpuscular accounts of light; and if this was not as out-and-out a contradiction as Russell's paradox, I suspect that the reason is that physics is not as out-and-out as mathematics. Again, the second great modern crisis in the foundations of mathematics—precipitated in 1931 by Gödel's proof that there are bound to be undecidable statements in arithmetic—has its companion piece in physics in Heisenberg's indeterminacy principle.

Here he suggests that some of the conundrums encountered in modern physics (wave-particle duality and the uncertainty principle) are a result of ontological commitments to outdated ontological models (and thus should ideally not be conundrums at all if we exercise restraint in committing ourselves to such models in the future).

As agreeable as Quine may be to naturalists, the philosophical tone of his work is pretty apparent here. Some students of physics may object to his line of reasoning here for both the wave and particle theories of light were based on actual empirical evidence and the conundrum arose because we can observe this seemingly contradictory nature simultaneously in nature. Or they might object that the uncertainty principle is a statement about reality, not how we view it. They might have missed Quine's point. His solution is to imply that perhaps reality, *what there is*, is not as we thought. Instead of thinking about it in a reductionist manner, that I have in front of me an object named a desk which at the atomic and sub-atomic level is constituted of such and such particles and forces... we should think "holistically" by constructing, from the ground (of existence) up a constructive view of the desk as mere transient arrangement of the fundamentally "truer" substance(s), whatever that is (in the case of physics, "energy", whatever *that* is).

There is some confusion engendered by Quine's language here. He tries to emphasize the distinction between ontology and language but on the other hand he does not give a sufficient discussion of these "convenient myths" (physical objects). First of all that is a term, as mentioned earlier, perhaps best suited for rationalists. The word "fiction" or "myth" implies a product of the human mind. But our ontology, even that of the most

Careful naturalist, is reflecting the world we experience. Quine did not mean to assert that nature is a product of our mind. If the desk in front of me is a convenient myth it is only because the universe “decided” it was a convenient enough form to take. It “decided” to appear to me not in its substantial or constitutive form (let’s say pure energy, perhaps as light) but in this manner instead. In fact, I am a part of it. It also decided to appear as me, yet I am not it because I don’t know what its motivations were when it decided to do this. Of course we can not speak of the universe so anthropomorphically. Unless we were of the naturalistic pantheist sort (and plenty are these days). The universe, the rest of mainstream science will say, didn’t “decide” anything. It simply follows laws or rules which made it do this (become me and then become my desk in front of me). What was it that Quine said about rules?

...the formalist keeps classical mathematics as a play of insignificant notations. This play of notations can still be of utility—whatever utility it has already shown itself to have as a crutch for physicists and technologists. But utility need not imply significance, in any literal linguistic sense. Nor need the marked success of mathematicians in spinning out theorems, and in finding objective bases for agreement with one another’s results, imply significance. For an adequate basis for agreement among mathematicians can be found simply in the rules which govern the manipulation of the notations—these syntactical rules being, unlike the notations themselves, quite significant and intelligible.

Emphasis mine. Here “insignificant notations” being the same as physical objects or any “convenient myth” of math or physics for Quine. So for Quine the laws of nature would be more significant than the form of nature, since the form is subjective (it is dependent on our constitution and how we see things). Objects, corresponding to “notations”, might vary from one interpretation (ontology) to the next, but the rules governing the manipulation of these entities is significant. Significance here for Quine is what we might typically call “meaning” (it’s the term he prefers to use over the latter). Insignificant does not mean it is of no consequence, just that it is not what has *objective* meaning. It is not that *truth* is in the laws of nature or that nature itself has no truth, but the laws of nature are *truer* than nature. They are more fundamental, “more real”. This is a typical 20th century Western view. Our issues with this point of view have all already been raised. Do we presuppose the laws of nature, then, as springing nature itself into existence? Then what sort of “existence” did the laws of nature possess antecedent to (or outside of) nature itself? If they exerted influence on nature from outside of nature (as must be the case in any scientific account of the birth of the universe¹⁵⁵), then this necessarily implies some mode of existence outside what we would have called everything existent, which sounds like a contradiction. And the problem with going the traditional route of positing eternal substantiality (substance from metaphysics) is that the “substances”, likely energy in whatever its fundamental form (perhaps strings), are

¹⁵⁵ Whether it is our universe or our parent universe or our parent universe’s parent universe and so on in a causal regress.

just another set of “insignificant notations”. So if the laws of nature possess existence apart from substantiality, then what mode of existence is this? This is what Quine wanted to desperately avoid when he took issue with the statement “Pegasus *is*”. Sure, the laws of nature might not “exist” in our common sense of the word, but then what does it mean for them *to be*? For they had to have *been* to have exerted influence on nature from outside dimensional constraints.¹⁵⁶

The other issue with Quine here is his continued refusal, like much of the rest of his tradition, to acknowledge that Aristotle’s “final causes”¹⁵⁷ are thoroughly natural and that we have the largest body of evidence describing their actual existence in nature (within ourselves). So to refuse to allow for the possibility of intelligence in a discussion of “significance” when the concepts of “meaning” or “significance” in *all cases* derive from the human concept of *intention* is a mystifying non-natural or artificial account of nature. If there is one ultimate reality the place for it which every single rational and sane human being to have ever lived would allow for is within the realm of our subjective experience which is built around the notions of existence, unity of identity (“*I*”), and will. From this absolute truth, on which even the pantheist monk and the solipsist atheist philosopher must agree, all of Quine’s ontological formalisms are themselves convenient myths... like nature itself.

Which leads us to the anti-realism which evidently tinges his entire work. He is a phenomenalist and is wary of making ontological commitments to an extreme or radical degree because he is skeptical of either the real existence of things or of whether we can have any knowledge of the real existence of things.¹⁵⁸ The point of view is thousands of years old. Furthermore he makes no advancement of the doctrine of phenomenism as it exists in Western philosophy which is entirely insufficient for common sense, to say nothing of science. And that is putting it mildly. Phenomenalism has needed a major reworking since Kant and it’s never gotten one. Instead, those wise to it have moved on to greener pastures (like “critical” rationalism). There is little excuse for a philosopher (or really anyone) of the late 20th century to entertain phenomenism,

¹⁵⁶ I keep saying “laws of nature” and so do scientists but they should be saying “*law* of nature” because at the Big Bang or whatever mechanism existed antecedent to it, they have been trying to reduce everything to unity. If there was one fundamental force described by a “theory of everything”, thus there would be one law of nature. So far we’re having trouble trying to find this law of nature from within nature. That’s not to say (from the perspective of theology) that it can’t be done but if we’re expressly looking for a unity as the source of everything (which doesn’t sound so scientific when you think about it in those terms), it might indicate that unity isn’t within nature.

¹⁵⁷ “The purpose, end, aim, or goal of something.” In other words, the *intention*. Which clearly implies an intelligence.

¹⁵⁸ And hence we can have no certainty whatsoever in knowledge, because if we did, he’d have contradicted his own stance and have committed himself to some ontological statement... of course he allows himself this out by professing neutrality and objectivity, he’s “open” to more serious ontological commitments if they seem warranted after further investigation though this is the constant mantra of phenomenists and they never seem to find such warrant.

much less a naturalist. There are plenty of problems in science and philosophy of science but phenomenalism has not solved or answered any of them, rather it has been the source of problems. Naturalism with the full extent of modern scientific knowledge behind it must necessarily exclude this doctrine in its primitive form. We can no longer go on denying the relevancy of the mind's material constitution to what Kant called the forms of its intuitions or the categories of its understanding, especially not now when we have everyone trying to reduce the mind into a Turing machine.

Which brings us to Quine's ontology and how we might relate to it.

Since the philosopher we most readily understand is Aristotle, let's contrast Aristotle with Quine. Aristotle's metaphysics focused on the *essence* of being, what makes one thing different from another. It didn't presuppose existence, it acknowledged the existence we readily perceive and observe and did not presuppose anything more (at least relative to Plato). So we can say, roughly, that for Aristotle *to be* is to have essence.

For Quine, on the other hand, *to be* is to be the value of a bound variable. Quine's metaphysics focused on simply defining what there *is*. Quine gave up on trying to talk about "existence", so his ontology only focused on "being".

With Aristotle (or at least Aristotelian philosophy) there was a connotation of existence with being (to have being is *to be* or when something *is*). One might even call it a denotation. A "Pegasus" might have being or in other words have an essence, but since it does not exist in its definitive form (a flying winged horse), this essence does not exist in a species belonging to any genus of animal. It exists, however, as a species of *idea*, a different kind of genus. Like "red" is a species of the genus *color*. What distinguishes the species of one genus from another species of that same genus is the *differentia* or "definition" which characterizes its essential attributes. Definition for Aristotle is applied to things, not words, an important distinction to keep in mind. The *essence* of a species, therefore, is the genus and *differentia* together.

In Islamic theology we have,

The "identity" of a thing - (*ma bihi 'l shay' huwa huwa*) -

Where "a thing" - (*shay'*) - is simply "that which exists" (i.e, an entity)

So the identity of a thing is constituted by its real essence (*al-haqiqa*) and its quiddity (*al-mahiya*) where quiddity refers to its "whatness" and is another term for Aristotle's idea of essence (i.e, genus + *differentia*). The identity of a thing is only its quiddity with respect to not having verified external reality. When a thing's existence is verified as having external reality its identity is then a real essence. If the identity (of a thing) is individualized, it is a particular (thing). So we can see that the identities of "existent things" are "real essences". This can be expressed in the relationship between an

abstract object as a quiddity and a real object as a real essence.¹⁵⁹ We can also have knowledge of the real essences (as for instance with the notion of genus and differentia). The ontology is hence realist. To be is to exist. Existence is not linguistically determined, by how we speak of something. The ontological commitment is only made through empirical/experiential investigation. Much of the Western debate about ontology would be seen as specious argumentation though it would no doubt be seen as necessary by its participants who, like Quine, claim to be defending themselves from being forced to take on someone else's ontological commitments.

Regarding the concept of "existence" in Islamic theology, it is the essential attribute of God alone. Therefore only God must necessarily exist. However, existence can be predicated of other things, but this is a manner of treatment of existence, not its attribution to the definition or identity (essence) of these other things. When we predicate existence of an essence, it is (with respect to its verification) a real essence. Things do not truly "possess" existence, this term is for us merely a colloquialism. It is meant thereby that a thing can possess the attribute of existence but this attribute, being not essential, is *accidental*. A quick and rough workable distinction between essential versus accidental properties is that essential properties can not change. Essential properties here can refer to *real* essential properties (i.e, DNA). Their change is associated with the destruction of the object and/or its real recognizable identity (since matter, or energy rather, is not destroyed in terms of physics). And as stated in the earlier commentary on the Nasafi Creed, the differing facets or aspects of things is reflective of their existence.

And the verification of this is to be found in the fact that a thing may have different aspects, in consequence of which when something is predicated of it the judgment may be useful when the thing is seen in one aspect, and useless when it is seen in another. In the case of man, for instance, when taken with respect to his being a body of some sort, to predicate of him animality conveys useful information, but, when taken with respect to his being a rational animal, then to predicate animality of him is tautological.¹⁶⁰

So to predicate rationality of man with respect to his being considered in the genus of animals is essential but to predicate rationality of man with respect to the difference between one man and another or the difference in states between one man at a certain time and the same man at another time is accidental, not essential.

So, if existence is not a universal and not a predicate, what is it? **What follows is a line of reasoning leading to the conclusion from the perspective of Western ontology, not a single statement which answers that question from the Islamic perspective.**

Existence can be treated as a subject which when predicated of itself *refers* to God and when predicated of others refers to God's having "conferred existence" upon them. They

¹⁵⁹ An essence is not an object, it is its identity.

¹⁶⁰ *Sharh al-'Aqid an-Nasafiyah* - The Commentary on the Creed of An-Nasafi

have the attribute not really of existing (in a manner of speaking, since they *are* obviously existing, but it is not their essential attribute) but, to be more ontologically/metaphysically precise in the English language, of *being in existence* (refer to the example of the house used earlier). We might say something is “in existence” but we do not say something is “in God” because the latter, due to ambiguities in the translation of Aristotle’s terminology and within his own work, implies that one thing is part of another. You can be in something or subsist in something without being [conflated with] it (and this Aristotle did try to argue). This is a difficult and perhaps controversial concept to distinguish because of various Sufi doctrines which have espoused something similar and become distorted over the years into various deviations from the authentic occasionalistic root of Islamic theology.¹⁶¹ If we, like Quine, were to adopt a policy of shunning the notion of meaning (or meaningfulness / significance / intention), then we might say God is the only entity which exists and we do not exist. But this is clearly erroneous, not just in light of our experience, but also from the perspective of theology and the Qur’an which assert the meaningfulness of our mode of existence so much so that Islamic theology has this epistemological doctrine of “real essences” referring to the creation. *Khalq* is what’s treated as “real” whereas the *Amr* is the “refined abstract”, though from the perspective of Quine’s reasoning it would be the reverse since he ignores “final causes” (in other words that position would have to argue for *amr* being “more real” than *khalq*). Either way the path to pantheism is shut off because even if only one mode of existence is admitted, whether God’s or ours, it necessarily excludes the other. So from the perspective of Western reductionism, either God is and we are not or we are and God is not. The choice preferred in the Western discourse is obvious and parallels the path of the mystics but takes the opposite fork in the road. Both are based on our respective modes of experience of existence of life in this world. The mystics having spent it in worship, contemplation, and controlling their natures and Western society by indulging in hedonism and suppressing spiritual (and eventually even rational) expression. Is it therefore any surprise that one path finds meaning in everything and the other in nothing, not even in itself (denying the concept of meaning)?¹⁶² The path to Islamic theology is then culminated by describing the “conferring of existence” as *creation* to properly distinguish the two modes of existence (and avoid

¹⁶¹ And no, we do not subsist in God’s Knowledge because His Knowledge is timeless whereas our existence is not. Time implies we subsist in a changing medium which must be other than God because God is unchanging (and to posit anything else of Him is to invite many logical contradictions in metaphysics).

¹⁶² I’m definitely not implying Quine was a hedonist in his personal life. He was a philosopher who devoted his life to exploring the philosophical grounding of a hedonistic culture. I use the term “hedonism” rather than materialism because Islam itself is materialistic to an extent since materialism is a part of the doctrine of existentialism and Islamic theology upholds existence and reality. That would also distinguish Muslim mystics from those of other traditions (notably other Eastern traditions who favored pantheism). There was a time once when even Europeans considered the Muslim world to be materialistic and hedonistic.

confusion).¹⁶³ God exists and creates. We are created. Persistent existence for us is illusory in its substantiality but not in its reality since it is a real meaningful/intentional consequence of God's creating. That does not mean that substantiality is itself illusory either since it is not, only persistent existence is (we separate the two though Western philosophers often did not before or after the Enlightenment). The substances are continuously created and annihilated. It should then be understood that there can be no relation between our existence and what is meant by "God is existence" because that latter statement is not a theological one for Islam, we say existence is God's essence and God is the *creator*, which separates His essence from ours (but it does not separate our essences, the essences of creation, from His Knowledge which, while His Divine Attribute and from Him, is also distinct from His essence). Thus the orthodox call themselves the People of Reality and speak of "reality" rather than "existence" because while both can be synonymous there is a clearer meaning conferred with the word "real" than "existent" (to avoid pantheism, atheism, and other doctrines seen as deviations from the truth) since "existent" covers different modes of existence of different entities. By speaking of Creator, creation, and reality rather than just using one word "existence" we preserve the unity of existence (in God) without conflating creation with Creator and reducing everything to an incoherent pantheist mess where no objective foundation is even left for the laws of logic. Furthermore, since the word "existence" is now so rarely predicated of God (rather we use the term *necessarily existent* or *wajib al-wujud*), we are free to return to using it colloquially for our own experience (since the trouble was that existence was a subject, not a predicate, but now we have a proper referent for that subject, *God*, and can use the term existence in predicate form to refer to the reality of His creation). The other prime reason for preferring *Creator* is that the term "existence", linguistically, implies transcendent passivity. To say God is "existence" is to really not say much about God except that He *is*, even though the intention behind that usage is to imply that God not only *is* but gives existence to other things (makes them *be*). Everyone knows existence intimately. But what they claim to know is as different as the different claims of knowledge about God and some do not even draw the link between God and existence. When we say *Creator* we are saying something about existence which is not immediately conceived from just the word "existence". It requires some rational derivation and through process which is subject to error in any given person attempting to reconstruct the comprehension from just the language given. Saying *Creator* easily gets around that because the meaning, along with many of the desired or intentioned connotations, is immediately conceived.

So, it is more appropriate or precise to say one is *given existence*, not that one "has existence". It is better to say we *acquire existence* than to say we "possess existence". These other ways of speaking are just that, ways of speaking. Just as how God creates our acts and we acquire them, God creates our existence and we acquire it. Unlike our

¹⁶³ There is no duality between Creator and creation. Creation is completely dependent on the Creator. The distinction itself is necessary to preserve the unity of identity which is itself *more* necessary so it is not in any way arbitrary or a modification of pantheism. Rather, it is the default and logical position which makes sense and, we contend, which others deviate *from* not *to*.

acts, however, which are created in accordance with our intention and for which we acquire responsibility (ownership), God retains responsibility for existence. God creates the material body for the soul ("essence" in its non-strict sense, especially when referring to inanimate bodies) and gives it to the latter. This is how our soul acquires "reality" or "real existence". Even the phrase "real existence", used so often here, implies a "non-real existence". This has been referred to previously as the world or dimension of *Amr*, the command of Allah, also sometimes called the "refined abstract" (i.e, the world of essences of real things (the non-real essence of real things or the essence before it becomes a real essence, it is not just God's Knowledge of essence but also God's Will or determination regarding its possible existence)). This brings us to the heart of the issue. Why would we refer to the creation (*khalq*) as the "reality" as seemingly opposed to the *amr*? Even though the soul (*ruh*) is from the *amr* and all the souls were created before the *khalq*? The answer to this is contained in the very word *amr* itself, which means "command". To understand the nature of soul, or the spiritual/non-real essence of a real thing (meaning not its genus or physical essential attributes), the best indicator is this word itself. *Ruh*, for example, is translated sometimes as "inspiration". God's command is the inspiration for the action of the creation. If one were to make a robot possessed of behavior which invited comparisons to "soul", what, in actuality, would be that "soul" to which people referred? There is surely something there which is inviting the comparison. It is, in actuality, the entire set of commands given to the machine which determine its behavior. That would seem to be its soul. I had previously described the human soul (*ruh*) as a kind of "inconsistent command" or a command which doesn't behave as a command. That was really a simplification (to stop the discussion right there). The range of God's command (*amr*) includes the command to "Be" (*kun*, "to Be", *fayakun*, "and it is"), which means, above all else, to "exist". So if this command is the "soul" of a thing, its inspiration *to be*, does that then not mean that existence is in its essence, an essential attribute of it? The answer is no because the soul (in the sense of how its spoken of in the Qur'an, as being *from* the command) is not the real essence of a thing. It is just the essence before being given reality (through *khalq*), but not before the issuance of the command (in other words, it is the essence *in the act of being given* reality). To put it most simply, the command of God is not the same as the knowledge of God. Even though we usually associate essences of all possibilities as being "stored" timlessly in God's Knowledge, the soul is from the command. The essence of the command to "be" is to exist,¹⁶⁴ but not the essence of the thing at which this command is directed at. Which is the essence of the thing as it exists in God's Knowledge as a mere possibility (which is not a real essence). So *ruh*, or soul, as distinct from *amr*, or command, is that it is the *inspiration to act* (and coming-into-existence is an action). This obviously comes from command. So this inspiration to act comes from the command to act but it also involves consideration of the act itself and the nature of the action is determined by the content of the command (i.e, what the command intends).

¹⁶⁴ Which is synonymous with "come into existence" for us as mentioned earlier in the Nasafi Creed.

Inspiration, the word itself, usually carries connotations of a specific nature or character to the act which it is predicated of, linking it to the thing inspired. The connotation is of the cause behind the act but conflated with that notion is the idea of the *intention* behind the act. When one asks an artist what is their inspiration for painting a picture, one is not asking what their intention was in the sense that their intention was obviously to create a painting. Rather, one is asking what they intended that painting for, the ultimate intention of their command to their limbs. The “true” cause, the inspired cause, for their painting can be gauged by the intention behind the act.¹⁶⁵ When it is asked what is a human being’s soul? The notion of soul there is conflated with the essence of a person, their particular individualized character which is the common nature evident in the set of all their decisions. The answer is actually a rephrasing of the question. What is your inspiration for the set of all your decisions? It is more than simply the sum of your inspirations behind each decision since each decision carries in it the timeless signature of the individual (which is apparent in how we recognize one another as having individual natures). It is your inspiration to exist which comes from the command of your Lord directed at *you*. You are asking what is it that God directed the command of creation at? Was it directed only at the substances and accidents and are you merely an accidental arrangement thereof? The answer is that it was, in addition to the basic command or *amr* which is *given* to the *khalq* to come into being through substances and accidents,¹⁶⁶ a command *directed* at *you* (which we are made to understand by our experience of intention in the human experience). You, as you are, as you were, and as you will be. In one sense we can say it is partly God’s timeless Knowledge of you. But your soul is not *literally* a part of God’s Knowledge (which is getting into some kind of pantheism-Idealism) because knowledge is, in our experience, a representation of something which, while being something known, remains distinct from the representation or knowledge thereof. Now, obviously, everyone knows the answer to the question “what is the human soul”, because the answer is that it is *you* (i.e., your *act* of existing and self-identifying). You are your soul. The Qur’an says that you are from the command of your Lord who ordered you to exist. The inspiration for you to exist and self-identify is this command which was done via God’s Will in accordance with His Knowledge of all possibilities. One really tempting abstract way of putting the answer to this question is saying that your soul or your essence is who you choose to be but that isn’t really answering the heart of the question which is that it is the fact of your existence as a command from God.¹⁶⁷ The answer in the Qur’an is hence aimed at the question of *what* (substance) the soul is. Is your soul (and hence, you) a thing? A body? The answer is that it is from the command of God and we are not given knowledge more than this. The world or dimension of *amr*, as has been mentioned, is sometimes mentioned as

¹⁶⁵ In fact this teleological association with Aristotle’s “final causes” is inseparable from the idea of causality which is one reason many have tried to define it as a structure that man imposes on the world.

¹⁶⁶ Which is manifested as God’s Power of creating and is often attributed to be the metaphor for “God’s Hands” and other such terminology.

¹⁶⁷ Which could be seen as containing connotations of “who you have chosen to be from a timeless perspective of your existence”.

a “refined abstract” and in many orthodox interpretations has been associated with some kind of metaphysical materiality (i.e, *nur* or heavenly light). More on this is covered in the appendix section entitled “The Command and the Creation: *Amr* and *Khalq*”, because it is beyond the scope of this work which was not meant to engage in theological speculation.

For our purposes we wish to only entertain notions of materiality within our universe. Hence the realm of *amr* encompasses the command for the existence of every existent thing including all inanimate bodies and their command or “soul” is seen by us manifested as the laws of nature. The laws of nature are often identified as the cause of everything in nature these days.¹⁶⁸ Now since the very concept of causality has teleological implications and theology traditionally has sought to answer the question of causality with “God is the (First) Cause”, we see that the essence of every real object or event must be the command of God. Every state of every subatomic particle must have been in accordance with the command of God as “intentionally” directed toward that (since God cannot create unintentionally if you claim to adhere to true monotheism). So it makes no difference whether one posits God issued one really deep command filled with information from His Knowledge or whether God commanded each and every thing because the two positions must be equivalent (monotheism). Even occasionalism fits perfectly fine with the former position and that is likely the conception most Muslims have. But both conclusions necessitate a picture of reality that is changing from one state or moment to the next purely on God’s command at each and every instant, whether that command was one issuance or many. God could have commanded His Knowledge of the entire universe’s history from beginning to end to have come into existence with one command and it would be the same as if He commanded His Knowledge of each particular individually or separately. In both cases every particular happens as a result of God’s command and knowledge of particulars. And since a thing is not the same as the knowledge of that thing, then the real existence of the universe, which includes a temporal dimension, must have unfolded in time. This is the theological essence of occasionalism. The cause of every thing or event is God. The entire manner of the creation through substances and accidents is then a matter for metaphysics which takes into account the nature of our world. In the case of Islam, the Qur’an gives clear statements about the finite nature of creation thus the receptivity to atomism was only natural. But in order to preserve this monotheistically necessary doctrine of God retaining causal responsibility over all events and particulars (including for the existence of our actions as physically manifested) requires the denial of any doctrine which asserts, to the contrary, that natural causes exist (that the cause for a natural event is in

¹⁶⁸ Which does not in fact get around the objection as stated by Hume since one has to answer the question of whether the laws of nature are merely abstract entities (convenient myths) used to describe the behavior of actual, existent entities or whether they are something more. If we treat nature completely physicalistically, as no more than what our five senses inform us, then the laws of nature do not exist as such except, perhaps, if one is an Aristotelian realist, within the objects of nature. As Quine overtly implied, once we ontologically commit to these as entities unto themselves, then we’ve done no more rational a thing than invoke Zeus or Odin.

the natural objects associated with that event). One such doctrine is the Neoplatonist conception of substantiality and those resembling it which assert that a substance is an unchanging eternally existing atom or unit of material existence. The logical fallacies involved in such beliefs which posit eternal existent entities other than God is detailed in Imam al-Ghazali's *Incoherence of the Philosophers*.¹⁶⁹

So the command to be can be seen in the context of our own attempts at mimicking creation. When we command our limbs to do a thing, and that thing is done, the soul of that thing is not just in our command to our limbs to act but also in what the intention behind that command was. In the case of God willing a thing into existence, the command to be is directed at a thing directly (with no intermediary as such (i.e, limbs), though *khalq* can be metaphorically seen as that through the metaphysics of substance, but obviously it all comes down to a command to come into real material existence from nothing (no real material existence)). The soul of the thing is what inspired it to be *as it is*, which is this. It involves the command to be and God's Knowledge of the essence to be, but it comes from the command of God, it does not passively emanate from God's Knowledge (which gets into some kind of Neoplatonist spin on Idealism). The essence of Islamic occasionalist theology is thus clearly contained in clear language all throughout the Qur'an which is where the doctrine of *amr* and *khalq* come from.¹⁷⁰ One can contrast the "transcendental ideal" of Kant's conception of God (and which when applied to our theology would better characterize the *knowledge* of God) from the "immanent command" of Islamic theology. Thus the Islamic conception of God can never "die" as it is said in philosophy of the concept of transcendence in Western culture (re: Nietzsche). The command of Allah, at least, is immanent and points to His other transcendent attributes. The 99 names of Allah are the immanent characterizations of His Divine Attributes and transcendental unity.

Returning to the question of Western philosophy and "being", being for Aristotle was not a genus. A genus was like a "natural kind" but being was not a "kind" (not even a "highest kind"). Being was categorized into essential (self-subsistent, not present in others) and accidental (present in others). The essential particulars (non-accidental particulars) was "primary substance". Basically he reduced being into real existence through matter (the "substances" of metaphysics) which acted as sort of the highest or most general genus. It is more or less the same in Islamic theology except whereas Aristotle's body of work does not seem entirely cohesive, this (reduction to existence) is front and center in every aspect of our theology. This also leads into the ontology of Quine and other naturalists like him where ontology is used to distinguish different *forms* of primary substance. Contemporary Western philosophy of science (at least with regards to the empiricists and phenomenologists) just dropped off the substance/existence

¹⁶⁹ Though this work contained many approaches to occasionalism from different (often scientific) angles I felt an approach from within general monotheist theology was also needed. However a clear parallel to modern philosophy exists as outlined in the previous footnote.

¹⁷⁰ In contradiction to the assertion that it evolved from a dialectic, the last resort of those who cannot find any precursor theology by which to assert plagiarism.

part and kept only the being, causing much confusion. Especially since within the context of our theology it is hard to find any meaningfulness or significance in discussion of identity itself without referencing what it is identifying. As the commentary on the Nasafi Creed said of this nominalist/conceptualist stance, "But the truth is that there is no way to enter into discussion with them ... because they do not admit anything known by which an unknown is to be established". Quine sought to bring a little order to this chaos by laying down some ground rules for ontological discussion but clearly maintained that nature of refusing to ontologically commit to anything by which another person can (logically or empirically) establish an unknown which he would be forced to accept. This is useful in, for instance, wanting to avoid controversial metaphysical interpretations of science. We want to take the science but keep the metaphysics at arm's length. Quine argued that this is inherently impossible and so the metaphysical speculation inherent in scientific theory should be rigorously and transparently established and policed. This goal is completely in line with the aims of Islamic theology with regards to the natural sciences.

So, did Quine succeed? His philosophy is viewed as very successful within the scope of current Western philosophy of science, his attack on the logical positivists having brought to its knees a dominant school of early 20th century philosophy of science. His views on empiricism are viewed as having cleared up some of the discourse in philosophy of science last century by pushing confirmation holism and instrumentalism, both views natively favorable to Islamic epistemology. But his ontology seems to have left us wanting. He did a lot of work in logic, set theory, and expressing a naturalist skepticism of language. His assertion that the natural sciences would be best suited in the end to discuss epistemology demanded a better treatment of knowledge from within his philosophical school of thought, the Western naturalists and empiricists (which never really came).

There are two criticisms from our point of view worth mentioning. First is his opinion that physicalism is merely the most simplest way to describe our stream of sensory input which was the "literal truth". So the notion of physicalism is for him a convenient myth. Our opposition to this was summarized earlier. The other criticism follows in a similar vein. It regards his distinction between physicalism and phenomenalism.

The physical conceptual scheme simplifies our account of experience because of the way myriad scattered sense events come to be associated with single so-called objects; still there is no likelihood that each sentence about physical objects can actually be translated, however deviously and complexly, into the phenomenalistic language.

Which we disagree with because our modern scientific knowledge can translate sentences about physical objects into phenomenalistic input, even if not in a sensible abstract language (perhaps the very concept is counterintuitive) then at least in mathematics, especially by treating our phenomena-perceiving sense organs as objects

themselves. In fact, this isn't just philosophy anymore, it's computer science. One would have to think he came around a little later in life having lived long enough to witness, for example, the advances in technology behind films and cinema, based on computer simulations of reality. And it goes yet further with true 3 dimensional holographic technology not far off. The fields of computer science, neuroscience, and physics are beginning to overlap. There are software packages which model light and how it scatters off mathematically described objects and into "the eye" which generates a picture and it is indistinguishable from our sense experiences (and soon it will be the case in 3 dimensions). We are becoming experts in conjuring up our own phenomenalistic renderings of worlds. Even our fiction now describes future worlds where people retreat into our created "fake" realities to escape from the real one not under our control. At some point even the most skeptical empiricist must acknowledge we've come to know a thing or two about the mind and how it perceives and understands sense experience and what that sense experience is actually of.

On an additional note, when Quine must take recourse to pragmatism to justify his ontological commitments, one can't help but notice how little his view changes when we just replace the word "pragmatic" with "paradigmatic". Pragmatism has its own downfalls and complicating factors. Occam's Razor is not, and never will be, the objective tool people have taken it to be.

Finally, in spite of all the effort he focused to the contrary, he still gets caught up in the ontological problem. As Richard Routley argues in *Exploring Meinong's Jungle and Beyond*, the Meinongians get the last word in the argument with Quine. He can not keep entities like either Pegasus or even God out of his ontology according to his logic. The issue is discussed in pp. 132-135 of his book which can be found online as a free download. The "Quinean" argument for God is an interesting one.

We start with a statement of the form, "There is something which God-izes". If the uniqueness condition is satisfied ("And there is no other thing which God-izes") then monotheism is upheld. If it fails then God is the same as the "null set". If God is the same as the null set, then God exists.

The basis for this conclusion is that the null set is a value of the bound variable (specific references to Quine's work are in Routley's book). To be or to exist, for Quine, is to be a value of a bound variable. Therefore the null set "exists".

Thus the God exists in the one and only sense of 'exists' that Quine will really tolerate. Similarly for nonentities such as the Pegasizer: attempts to deny their existence in the applied system ML force the admission of their existence. Quine seems to have got entangled in Plato's beard.

Some features of Quinean deism are easily adducible. In particular, the deism is a monodeism. Further, it is a very hospitable religion, in an odd way;

for everything that is in the ordinary way said to not exist, Pegasus, Sherlock Holmes, all the gods of the Greek pantheon, are one with God (at least if the religion is approached from the “atheistic” direction).¹⁷¹

Of course there is no theology at play here so what exactly it means to be “one with God” is up for debate. In Islamic theology this kind of conclusion makes perfect sense if we consider that everything which does not exist but which could potentially exist is a possibility and that with God are all possibilities. We would not say God “contains” all possibilities or that possibilities are “one with God”, but we would refer specifically to Knowledge, as God’s attribute, which “contains” all possibilities. It is God in His capacity as the Creator which actualizes, via His Will, the possibilities according to His Knowledge. God *controls* existence.

There is this tendency to distinguish God *as* existence from the idea of God *controlling* existence when they are one and the same in Islamic theology. We do not mean it in the same sense as saying “God is Time” because God is responsible for [creating] Time since Time is synonymous with creation, it is almost a property of creation. It signifies *internal* change, something which God does not do. God expresses Himself through creation and the creation brings with it change and the passage of time. Existence, on the other hand, applies to God directly since He is the necessarily existent and existence is His essential attribute. But people think that “to be” existence itself means becoming a passive emanator of existence, where all possibilities contained within existence treated as a subject must automatically be brought into existence. This obviously makes no sense because even if all possibilities are seen to fruition, they are done so in an order (the multiverse). What makes this order and applies it to existence? Either existence itself retains this control meaning you factor in the necessary attributes of *will* and *life*, or you must invoke a controlling force antecedent or superior to existence itself (and make that God). The latter while perhaps seeming desirable from a theological approach which values distinguishing God from known things has the consequence of being beyond the logic even of our natural language. We know logic is physically important in the order of existence so instead of throwing out all logic and getting a dubious answer we get the one answer which makes complete and total sense when we make existence the essential attribute of God, a subject which also has other attributes.

The type of God described by this Quinean approach is monotheistic. God is *other than* existent things (created things). As I said earlier, when one admits only one mode of existence, that of having come-into-existence, then God cannot be seen as existing because God never came into existence, He always was. And when one admits the opposite, only that which necessarily exists, then God is the only existent and everything else (including us) would be nothing.

This is the essence of Islamic theology. “Outside” of the universe, assuming there is only the one universe we can see, there is pure existence overlapped with pure will in pure

¹⁷¹ Routley, Richard, *Exploring Meinong's Jungle and Beyond*, 1980, p. 135

being. For us there is no such thing as “nothing” outside of the vacuum (the spatial dimensions of the universe) either. There are only the relative states of existence or non-existence for any given possible thing and one cannot have either of these possible states dominate over the other for that violates the doctrine of preponderance without a preferer. Even for existent created things their existence is still only *possible* and therefore requires a determinant. Likewise, one can see the issue of existence as subject versus will as the idea that even the non-existence of things is still only possible without a determinant. The fact there is order in the universe is our proof against realist pantheism. If existence as subject somehow lacked will there would have to be pure contradictory being of literally everything (every possible thing) which is not even possible to comprehend logically. In order to explain the order of existence, such views of God would require Him to be subservient to other “laws” and hence become not-God. This is an assertion that would not even be argued against by pantheists because their conception of God is obviously very different from monotheism. Whereas we define God in the Aristotelian rationalist manner as the *First*, or the *Prime*, where the property of being antecedent to existent things takes precedence and from which are derived other necessary attributes to preserve that, pantheism instead sees God as simply *everything there is*, which, from the perspective of a monotheist is not really a deity at all but merely the sum total of all the things there are. Pantheism of course also involves grouping everything in a monistic spiritual union into one essence, and treating that as the Supreme Being but this one is considerably limited in terms of attributes although it does get the relation to existence right (that the Supreme Being is synonymous with existence in an essential manner). On the other hand, *deism*, that specific flavor of monotheism which typically results from the Aristotelian treatment taken to its furthest logical extent, tends to get all the *other* attributes right (will, life, knowledge, etc) but separates God from existence in either an ambiguous or inconsistent way. And that is only considering realist theologies. There are plenty of anti-realist ones which attempt to combine the two. The shift towards pantheist notions of a Supreme Being in the current environment of materialist/physicalist-existentialism is not surprising in that context.

As much as Islam emphasizes existential realism it also emphasizes *will*, both as it applies to God’s Will and as it applies to the creation and their will.

The alternative approach to the Quinean method outlined above is to identify God with the set of things which exist, which results in pantheism. The author of the book in question suggests that route for making better sense of things since it was considered saying things like “Pegasus” or “Sherlock Holmes” were “one with God” was heretical. However, if it’s heretical to consider Pegasus as one with God why is it any less heretical to consider any kind of existent horse one with God?

“Exists” is a “referentially transparent” predicate in Quine’s language (it is true of everything), so the only matter is whether the notion of God satisfies the uniqueness condition. Whether God is one (monotheism). It then turns out that to deny the statement “There is something which God-izes and nothing else which God-izes” can

either mean a denial of the membership of “the thing which God-izes” in the set of all “things”, or a denial of the uniqueness of “the thing which God-izes”. In the second case, that can lead straight to pantheism, but only if we accept that there is something which God-izes. The first method means the null set exists and God is the same as the null set, which means God exists, but not in the way other things do (i.e. is not a “thing”), and “contains” the non-existent things.

In the case of the pantheistic conclusion, it’s possible to accept there is something which God-izes, but refuse to accept that everything God-izes. It means those coming from a theological approach are looking for a Supreme Being which is like the pantheistic conception but isn’t actually the pantheist Supreme Being. In other words “the God that is everything but not the things which exist”. It can be seen as pointing to panentheism (immanent, not emanent). Or it can be seen as saying that this thing which God-izes is not really *one*. This poses questions about what we mean when we say “God-izes”. Quine’s language as used here is not without its faults and was never meant to be more than a crude workaround. By predicating “God-izes” of something which already exists (i.e. as a predicate distinct from existence), we’re talking about an aspect of God other than His existence. Hence, we must be talking about His Knowledge or another attribute of His, and yes, this indeed cannot be standalone, it is only an attribute of God and contains all the non-existent possible things. The fundamental way to treat God in such a logical statement (which approaches the idea from an “atheistic” direction) would be to predicate existence of itself as a subject which is not what’s done here and which would not be addressable by Quine’s use of Russell’s theory of descriptions.

[The Following Is A Work In Progress And Should Not Be Read By Other Than a Scholar As It Likely Contains Errors Or Things I Would Like To Write Differently](#)

The Further Evolution of Islamic Theology: Understanding God

Having covered a sufficient amount of topics related to philosophy, metaphysics, ontology, and theology, we can come to a simpler understanding of the previous issues which were debated within Islamic theology, particularly since we stand to gain much by the use of certain doctrines which were in and of themselves not opposed to the orthodox creed but only by the use thereof and which hold some usefulness with regards to making the theology easier to understand and approachable for new members of the faith or those coming back to it after some time.

1. The Essential Attribute: Existence as subject - Being itself