Özgür KOCA

M.A. Thesis in Philosophy

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Al-GHAZALI'S ACCOUNT OF CAUSALITY AND ITS IMPLICATIONS TO CONTEMPORARY SCIENCE AND RELIGION DISCUSSION

Thesis submitted to the

Institute of Social Sciences

in partial fulfillment of the requirements

for the degree of

Master of Arts

in

Philosophy

by

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This is to certify that I have read this thesis and that in my opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Arts.

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The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

Özgur KOCA

June, 2011

ABSTRACT

Özgur KOCA **June 2011**

Al-Ghazali's Account of Causality and Its Implications to Contemporary Science and Religion Discussion

This work extends the implications of Ebu Hamid al-Ghazali's account of causality to the contemporary science and religion discussion. Al-Ghazali holds the view that God is true casual agent and finite entities are devoid of casual efficacy. God is the creator of both cause and effect, and attaches them to each other on a self-imposed habitual pattern.

Questions about the nature of causality occupy a rather central place in medieval Islamic thought. There had been a concern with causality (especially Ibn Sina, al-Ghazali and Molla Sadra) due to its metaphysical implications. However this topic took on even a greater urgency today, due to a problem specific to religion and science discussion. Namely that the discussion between science and religion boils down to the questions about the nature of causality. The mission of science, since enlightenment, has been generally identified as providing a naturalistic explanation before a supernatural one. Therefore it conceives the universe as a causally closed system to frame all explanations in terms of matter and motion. The traditional Abrahamic concept of omnipotent God recognizes that God does not only create the cosmos and its contents but also sustains them for their existence. How to reconcile the dominant scientific naturalistic explanations of the world and the Abrahamic concept of God remains as a theoretical and practical controversy.

In my analysis, I tried to indicate some venues in which al-Ghazali's theory of causation can be read to address to this challenge. In this regard, Al-Ghazali's theory of causation has merits- namely, that it presupposes that the natural occurrences are lawful, regular, predictable and consistent. But it, also, has shortcomings. The new science (quantum mechanics, relativity theories, and

systems/complexity theory) that appears to point towards a direction which challenge the ontological presuppositions of al-Ghazali's theory of causation calls for some fundamental re-thinking on the topic of divine action. A new theory of causation which could convey the complex and multi-layered, and open nature of interactions in the natural world is needed.

Key Words: Al-Ghazali, causality, science, religion, metaphysics, God-cosmos relationship.

ÖZET

Özgur KOCA **Haziran 2011**

El-Gazali'nin Kozalite Anlayışı ve Din-Bilim Tartışması

Bu calışma Ebu Hamid el-Gazali'nin kozalite doktrininin ima ettigi felsefi tasarımlar ile cağdaş din-bilim tartışması arasındaki muhtemel iliskilerin izini surmektedir. El-Gazali Allah'ın herşeyin tek ve gerçek sebebi olduğunu, yaratılmışların herhangi bir kozal tesirinin olmadığını, sebeb ve müsebbeb arasindaki ilişkinin zaruri olmadığını düsünür. Allah sebebi ve musebbebi yaratmakta ve bunları iradesiyle vaz ettiği ve kendi taaluk biçimlerini de sınırlayan "adeti" istikametinde birleştirmektedir.

Kozalite tartışmaları İslam düşüncesinde önemli bir yer işgal eder. İbn Sina, el-Gazali, er-Razi, Molla Sadra gibi düşünürler kozalite meselesinin, özellikle, Allah ile alem arasındaki ilişkinin keyfiyetine dair imalarından dolayı önemle üzerinde durmuşlardır. Kanatimizce, bu mesele çağdaş din-bilim tartışmasına dair önemli bir felsefi problemden dolayı tekrar gündeme getirilmelidir. Şöyle ki, din ve bilim arasındaki tartışma önemli ölçüde kozalite sorusu etrafında temerküz etmektedir. Genel olarak anlaşıldığı şekliyle modern bilimin misyonu tabii olguların açıklamalarını yine tabiatın sınırları icinde kalarak ve herhangi bir tabiat üstü kaynağa müracaat etmeksizin sağlamak olmuştur. Dolayısıyla, modern bilimsel metodoloji tabiata kozal olarak kapalı bir sistem olarak bakar ve tabii fenomenler icin verdiği açıklamaları madde ve hareket cinsinden formule eder. Diğer taraftan, özellikle Semitik dinler (İslam, Hiristiyanlik ve Yahudilik) kainat ve icindekileri var eden ve varlığının temadisini sağlayan, tabiat üzerinde tasarruf eden ve eşyaya müdahil bir ilah telakkisi öngörür. Modern bilimsel açıklamaların tabii hadiselerin takip ettigi kozal zincire yaptığı titiz vurguyla, Semitik dinlerin aktif uluhiyet telakkisinin nasıl telif edileceği önümüzde önemli bir felsefi problem olarak güncelliğini korumaktadır.

Bu noktadan hareketle el-Gazali'nin savunduğu kozalite doktrininin bu felsefi probleme nasıl acılımlar teklif edebileceğini analiz etmeye calıstım. El-Gazali'nin doktrini tabii fenomenlerin arasındaki ilişkilerin düzenli, tahmin edilebilir, ve tutarlı olduğunu varsaydığı için bilimsel ve teolojik açıklamaların telifi adına çok onemli meziyetlere sahip. Öte yandan, bu teorinin bazı önemli kusurları olduğunu da söyleyebiliriz. Özellikle kuantum mekanigi, relativite teorileri, ve sistem biolojisi gibi yirminci yüzyılda olgunlaştırılan bilimsel yaklaşımlar, el-Gazali'nin doktrinin telkin ettiği düşünce tarzına ve bu doktrinin üzerine bina edildiği ontolojik varsayımlara ciddi elestiriler olarak okunabilir. Bu açıdan, tabii fenomenlerin birbirleriyle iliskisinin girift, cok katmanli ve "açık" yapısını teolojik dile taşıyabilecek daha gelişmiş bir kozalite doktrinine ihtiyaç olduğunu söyleyebiliriz.

Anahtar Kelimeler: El-Gazali, kozalite, din, bilim, metafizik, Allah-alem ilişkisi.

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INTRODUCTION

Ian Barbour offers a fourfold typology to relate religion and science; *conflict, independence, dialogue, and integration*.[1] One can conceive of religion and science as in an irreconcilable *conflict*[2] or treat them as *independent* domains with differing methods of inquiry, characteristics and language[3], or believe the possibility of a *dialogue*[4], or envisage a more systematic *integration* in which both religion and science can contribute the development of an inclusive metaphysics.[5]

Among these options, the second option, *independence*, appears to be prominant in scientific and philosophical circles. This option may be referred to as "dualistic solution".[6] Dualistic solution has been developed within the context of, and by using the conceptuals tools provided by, Descartes ontological dualism, Kant's epistemological dualism and Wittgenstein's linguistic dualism. By dualism I mean the Cartesian legacy of thinking in terms of binary oppositions; such as man versus nature, male versus female, reason versus intuition, civilized versus primitive.[7] Treating science and religion as independent disciplines with different aims, languages, methods of inquiry, is a useful strategy to avoid conflict. It also rightly points to and preserves the distinctive character of each enterprise. However, the dualistic solution has serious difficulties as well. First, as many scholars point out dualistic compartmentalization is at odds with the subtlety, complexity and diversity

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[1] Ian Barbour, *When Science Meets Religion* (New York: Harper Collins Publications, 2000), 2

[2] John William Draper. (1875). *History of the Conflict between Religion and Science*. Henry S. King & Co (reissued by Cambridge University Press 2009), for more contemporary accounts please see Richard Dawkins, *The Selfish Gene*, thirtieth anniversary edn. (Oxford: Oxford University Press, 2006), and Daniel Dennett, *Breaking the Spell: Religion as a Natural Phenomenon.* (New York: Viking Penguin, 2006)

[3] For example Stephen Jay Gould's Non-Overlaping Magisteria (NOMA) thesis.

[4] See, for example, Arthur Peacocke, *Theology for a scientific age: Being and Becoming- Natural, Divine and Human*, enlarged edition (Minneapolis Fortress, 1993)

[5] Among many great works please see Ian Barbour, *When Science Meets Religion* (New York: Harper Collins Publications, 2000) Philip Clayton, *God and Contemporary Science* (Edinburgh: Edinburgh University Press, 1997), and *The Problem of God in Modern Thought* (Michigan: Beerdsman Publishing, 2000)

[6] Philip Clayton, *God and Contemporary Science* (Edinburgh: Edinburgh University Press, 1997), 19

[7] It is not surprising to see that colonialism was founded on the very same assumption of "the inferior other" and the rise of colonialism coincides with the destruction of natural sources.

of the interaction as it has taken place in the past and in the twentieth century.[8] We simply do not experience religion and science relation as neatly divided into separate compartments. Scientific developments do have philosophical implications and, thus, influence theological conclusions. Facts and values necessarily affect each other because what we know about the world shape our attitude toward nature and people. Suffice to remember that the ethical implications of dominant interpretations of the theories of Darwinian evolution appear to be in conflict with the traditional ethos inculcated by religious traditions. Therefore, there is enough reason to hold that, as it pertains to religion and science discussion, dualism is a mental construction which does not correspond to the extra-mental reality as we experience it. Namely, that the existent things do not simply consist of two distinct units. In this regard, the very nature of dualistic mode of thinking strongly, -and insidiously, if you will- conditions us to miss the dynamic interpenetration and receptivity of scientific and religious domains. Putting religion and science into two watertight compartments imposes an artificial rupture between them and, thus, results in a clash. As Heidegger indicates, *every abstraction is a distortion*. The conflict between intra-mental constructions and extra-mental reality creates an imbalance in the very fabric of life.

Moreover, dualistic solution -maybe escaping the possibility of a conflict- but it also cancels out the possibility of constructive dialogue and mutual enrichment.[9] Third, there is also a theological-philosophical problem, namely that if any interaction between religion and science is separated so firmly that the problem of God's causative influence in the world becomes very difficult to conceptualize.[10] This is especially important because the very mode of thinking imposed by the dualistic paradigm precludes any constructive interaction if there is such possibility.

[8] To see the dialogic interaction between modern science and religion in Christendom please see John Heedley Brooke *Science and Religion: Some Historical Perspectives* (New York: Cambridge University Press, 1991)
[9] Barbour, *When Science Meets Religion*, 2
[10] Clayton, *God and Contemporary Science*, 67

Lastly, some critics suggested that dualistic conceptualization of the existence directly influences our attitude towards nature in a negative way.[11] According to such critics, dualist ontologies and epistemologies envisage a rupture between the two ends of dichotomies; such as man versus nature, male versus female, reason versus intuition. This leads to an ontological and epistemological alienation of man from both nature (*res extensa*) and other human beings –or other minds-. It not only isolates man from its surrounding environment but also distances them on a vertical plane. Moreover, the very nature of thinking in terms of binary oppositions leads to a hierarchy between parts of any dichotomy. Therefore, those possessing privileged properties (man, reason, and male) are justified to dominate those possessing inferior properties (nature, intuition, female). This mode of thinking constitutes the unconscious of modern humanity as it deals with nature. It seems to be paving the way for the exploitation of the nature and its resources.

Thus, I agree with Ian Barbour who suggested that a more systematic integration and constructive dialogue between religion and science can occur in a *comprehensive metaphysical framework* which can relate scientific and religious experiences of humanity in a coherent way.[12] Here, for Barbour, metaphysics is understood as "the search for a set of general categories" in terms of which diverse experience can be interpreted consistently.[13] Metaphysics as such, is "the province of philosophers rather than of either scientists or theologians, but it can serve as an arena of common concern".[14]

Accordingly, it will be my thesis in the coming study that there is a need for a non-dualistic metaphysics which can host religion and science discussion in a more comprehensive way. Al-Ghazali's account of causality is a promising candidate to

[11] For ecological criticism of dualism as well as anthropocentrism please see, for example, Micheal Zimmerman "Toward a Heideggerean *Ethos* for Radical Environmentalism,"in *Environmental Ethics*, 5 (Summer 1983): 99-131; "Anthropocentric Humanism and the Arms Race," in *Nuclear War: Philosophical Perspectives*, ed. Michael Fox and Leo Groarke (New York: Lang, 1985), pp.135-49
[12] Ian Barbour, *Religion and Science: Historical and Contemporary Issues* (New York: H.C. Publications, 1998), 75.
[13] Barbour, *Religion and Science,* 76.
[14] Barbour, *Religion and Science,* 75.

serve as grounding for the construction of such an inclusive non-dualistic metaphysics. The tentative hypothesis of this study is that occasionalism is not just a doctrine of casual relations in nature but rather a grand system which offers new prospects for specifying the complex dimensions of God-cosmos relationship in a way that addresses religious concerns and does justice to the methodology of scientific inquiry.

Al-Ghazali argues the relationship of God and the world from an Ash'arite theological point of view. The cornerstone of Ash'arite theology is its doctrine of divine attributes. Al-Ghazali further elaborates and expands on this doctrine. Very briefly, this doctrine states that the divine attributes of life, knowledge, will, power, speech, hearing and seeing are co-eternal with the divine essence and intimately related to it, but are not identical with it.[15] They are eternal coexisting uncaused attributes. This doctrine provides the basis for al-Ghazali's theories of causality, occasionalism, and acquisition (*kasb*).[16]

Al-Ghazali subscribes to a form of occasionalism that confines all casual action to God. He opens the discussion with his famous declaration and defense of the Ash'arite occasionalist doctrine: "*the connection between what is habitually believed to be a cause and what is habitually believed to be an effect is not necessary according to us*."[17] The connection between cause and effect, he argues, "*is due to the God's decree, Who creates them side by side, not to its being necessary in itself, incapable of separation*."[18] Observation shows only concomitance-not any necessary connection between cause and effect.

[15] Edward Omar Moad 2007. "Al-Ghazali on Power, Causation, and 'Acquisition.'." *Philosophy East & West* 57, no. 1 *Academic Search Premier*, EBSCO*host* (accessed December 12, 2009). 6.
[16] Michael E. Marmura, "Al-Ghazali." In *The Cambridge Companion to Arabic Philosophy*, ed. Peter Adamson and Richard C. Tylor (Cambridge: Cambridge University Press, 2005), 142-143, and **A**lon, Ilai, "Al-Ghazālī on Causality" Journal of the American Oriental Society Vol. 100, No. 4 (Oct. - Dec., 1980): 398. These essays attempts to trace the relationship between Asharite Theology and al-Ghazali's views on causality, occasionalism, and acquisition.
[17] Al-Ghazali, *Tahaffut al-Falasifa*, trans. Michael E. Marmura (Provo: Brigham Young University Press, 2000), 166
[18] Al-Ghazali, *Tahaffut al-Falasifa*, 166

Al-Ghazali also asserts that the denial of casual necessity in things does not lead inevitably to chaotic happenings in the world or irregular course of events. God ordains an order for the cosmos and sustains it with His power.[19] God ordains events to proceed along a uniform, orderly, habitual course and creates in humanity an epistemological trust that this uniformity will continue. It is precisely this *trust* in God provides the grounding for scientific inference.

With these caveats in mind I will attempt to provide a bridge between al-Ghazali's account of causality and contemporary religion-science discussion. I shall discuss the contributions or challenges posed by the new science (quantum mechanics, relativity theories, and systems/complexity theory) to occasionalist theory of causation. I will also investigate the possibilities presented by al-Ghazali's theory of causation for the construction of broader metaphysical system and for specfying the complex dimensions of God-cosmos relationship in a way that both addresses religious concerns and does justice to scientific method of inquiry.

The present work is comprised of three chapters and a conclusion. The first chapter gives a brief overview of the scientific developments 17th century onward that pertain to our discussion. As I will attempt to show in this chapter the discussion on the relationship of religion and science revolve around a central core: The questions related to God and cosmos relationship. The second chapter is a detailed and comperative study of al-Ghazali's doctrine of causality. I also, by means of dialogical reading of al-Ghazali, Ibn Sina and al-Farabi, will attempt to show the contradictory and complementary elements in their teachings. The third chapter, consisting of two sections, will draw out the implications of al-Ghazali's doctrine of causality for the contemporary religion and science discussion. In the first section, I shall concentrate on the strengths of al-Ghazali theory as it pertains to its ability to integrate the philosophical implications of most recent scientific theories. In the second section, I will focus on the weaknesses of al-Ghazali's theory in the light of the philosophical implications of the most recent scientific theories.

[19] Al-Ghazali, *Tahafut al-Falasifa*, 169

CHAPTER 1

SCIENCE AND RELIGION: A HISTORICAL SURVEY

The dawn of modern science is generally traced back to the Scientific Revolution that took place in 16th and 17th centuries. Within this period the scientific discoveries called for a decisive shift from Aristotelian natural philosophy and Ptolemaic astronomy. Traditional teachings in physics, cosmology, biology, astronomy were replaced by the new scientific insights.[20] Science and religion soon become competing explanatory frameworks. Western Christianity which was at the heart of this paradigm shift was the first among religions to encounter the challenge of modern scientific world view. The new scientific discoveries casted doubt on the Biblical text that appeared to utter truth statements about anthropogenesis, natural history, and cosmogenesis.

First Nicholas Copernicus (1473-1543) attacked geocentric model of the universe and offered a new heliocentric model which is more compatible with *hitherto* astronomical observations. However this explanatory success came at the expense of loosing world's unique central status that traditional and religious structures had assimilated into their teachings. This had a drastic impact on the interpretations of the world and human existence on it. Although the Catholic church that viewed heliocentrism as contravening the Scriptures banned the book in 1616, Copernicus' model had become established scientific orthodoxy within 100 years.[21]

[20] The following is a partial bibliography of works which explores this issue Allan Debus, *Man and Nature in the Renaissance*, (Cambridge: Cambridge Univ. Pr., 1978). John L. Heilbron, *The Oxford Companion to the History of Modern Science* (New York: Oxford University Press, 2003), Joseph Agassi, *Science and Its History: A Reassessment of the Historiography of Science* (Boston, 2007), Mary Jo Nye ed. *The Cambridge History of Science, Volume 5: The Modern Physical and Mathematical Sciences* (Cambridge University Press: Cambridge, 2002); and Katherine Park and Lorraine Daston, eds. *The Cambridge History of Science, Volume 3: Early Modern Science* (Cambridge University Press: Cambridge, 2006); Roy Porter ed. *The Cambridge History of Science, Volume 4: The Eighteenth Century* (Cambridge University Press: Cambridge, 2003)

[21] Angus Armitage, *The World of Copernicus* (New York, NY: Mentor Books, 1951)

The Copernican revolution led to the establishment of new physics through the works of Johannes Kepler (1571-1630) and Galileo Galilei (1564-1642). Kepler's three planetary laws provided scientific community with far superior conceptual tools than had ever produced before, solving problems that had confounded astronomers for centuries. The explanatory success of this model played a pivotal role in converting scientific community from traditional cosmologies (Ptolemaic astronomy) to Copernicanism.

But this was just the beginning of the journey of modern science which soon changed the way human beings perceive "objects". Galileo Galilei (1564-1642), generally referred to as the father of observational astronomy, made one the most important contribution to scientific thinking. He showed the applicability of the language of mathematics to the physical objects. Back to middle ages mathematics was regarded as dealing with purely abstract object, therefore not applicable to physical reality. Formulating the behavior of concrete objects within the framework of the abstract language of mathematics Galileo laid the foundation for the transmittion of the scientific knowledge with a universal language. This opens up new possibilities for the accumulation of scientific knowledge and bridge the gap between abstract thinking and concerete applicability. Out of this relation between mathematics and physics the most distinctive features of the scientific knowledge has emerged- namely, that it is *emprically testable*, and *universally transmittable*.

The scientific revolution culminated in the works of Isaac Newton(1643-1727). In his monumental work, Mathematical Principea of Natural Philosophy, published in 1687, he was able integrate Kepler's laws of planetary motion and Galileo's law of free-fall with certain modifications in the larger framework of his laws of motion and gravitation with great predictive success and mathematical rigor and precision. It is important to remember the contributions of such mathematicians as Leibniz (1646-1716) who provided mathematical tools to carry out such quantitative study of nature. The most significant contribution of Newtonian physics appears to be that it extended the scope of science to all universe by explaining the motion of objects in celestial and terrestial domains by applying same rules. Not only

does Newtonian physics open up new possibilities to explain natural phenomena in more and more detailed way but also it enables one to *predict* it. Due largely to the success of Newtonian physics, scientific confidence grew rapidly and gained prominence to other forms of human knowledge.[22]

The 18th and 19th centuries saw notable advancements, particularly, in chemistry, biology, optics, thermodynamics, electromagnetism, and in thecnological applications of scientific knowledge.[23] During these centuries the way human beings live changed at a scale never observed before with the inventions of steam engines, new and powerful telescopes, manipulation, accumulation and storage of electricity. The language of science also attained a universality during this period. This new language of science was able to transcend the local bounderies that other forms of communications encounter by relying upon highly mathematized structures and numerical analysis rather than linguistic constructs.

Another revolutıonary important development regarding our discussion on religion and science took place when Charles Darwin (1809-1882) published "The Origin of Species by Means of Natural Selection" in 1859 and his second work "The Descent of Man" in 1871. In its simplest form, evolution is the variation of species over time due to constantly changing environmental conditions. The interaction between the genetic flexibility of living organisms and challenging environmental conditions causes life forms to evolve upwardly (complexity) and outwardly (diversity). The popular, or received, view of the evolutionary process implies that both *chance* and *necessity* are interlocked in the stuff of life. Thus, life, design and even consciousness necessarily emerge out of the continuous interplay of the *natural laws and chance*. Clearly, the popular perception of Darwin's theory challenges the belief that the observed design in the natural world is handiwork of God. Theory of evolution also shattered the belief in the authenticity of the Judeo-Christian scriptures because the Book of Genesis clearly appears to assert that the different species had

[22] Allan Debus, *Man and Nature in the Renaissance* (Cambridge: Cambridge University Press, 1978), 12-3.
[23] Porter, *The Cambridge History of Science, Volume 4: The Eighteenth Century*, 42

been created separately by God, in very short period of time. Since then anthropegenesis had been a forefront of the ongoing discussion due to its anthropological implications.[24]

In the first half of the 20th century revolutionary developments in physics shattered the confidence to many assumptions of Newtonian mechanics. The independent works of such scientist as Werner Heisenberg (1901-1976), Albert Einstein (1879-1955) and Erwin Schrodinger (1887-1961) showed the shortcomings of Newtonian mechanism when applied to very massive, very small and very fast objects. Moreover these theories appear to endorse that there are insurmountable inherent limitations of scientific endavour, revealing the naivety of 19th century, so called "the Age of Certainty". Such developments as the incompleteness theorem of Kurt Gödel (1906-1978) and the uncertainty principle of Heisenberg are widely interpreted as showing the *relative impossibility* of constructing a complete and consistent scientific network of explanations for all of natural phenomena. To put it bluntly, these theories indicate that there is a limit for scientific knowledge emerging due largely to the fact that in some circumstances the mental and experimental tools themselves, by means of which we produce scientific knowledge, meet their natural boundaries. In other words, as Bohr puts, for some physical occurences observation causes distortion. It is as though every observation is an intervention. Distortive effects of the act of observation become sensible when we deal with extremely light-sensitive quantum systems. To use Kant's terminology thing-in-itself (*ding an sich*) is necessarily concealed because of the very nature of human interaction with the world.[25]

[24] There are myriad number of works tracing the philosophical, theological and ethical implications of the theory of evolution. But the following works are especially helpful: M. Greene and D. Depew, *The Philosophy of Biology: An Episodic History* (Cambridge: Cambridge University Pres, 2004); V. Hosle and C. Illies eds., *Darwinism and Philosophy* (Notre Dame: University of Notre Dame Press, 2005); D. Hull ed., *Darwin and His Critics: The Reception of Darwin's Theory of Evolution by the Scientific Community* (Chicago: University of Chicago Press, 1973) J. Maienschein and M. Ruse, eds. *Biology and the Foundations of Ethics* (Cambridge: Cambridge University Press, 1999) J. Moore, *The Post Darwinian Controversies* (Cambridge: Cambridge University Press, 1981)

[25] The followings are some texts introducing the philosophy of quantum mechanics. J. S. Bell, *Speakable and Unspeakable in Quantum Mechanics* (Cambridge: Cambridge University Press, 1987); R.K. Clifton, ed., *Perspectives on Quantum Reality* (Dordrecht: Kluwer, 1996); R.I.G. Hughes, *Structure and Interpretation of Quantum Mechanics* (Cambridge, MA: Harvard University Pres,

In the second half of the 20th century we see further compertmentalization and explosion of such new scientific disciplines as computer science, cognitive sciences, neurosciences. Still in infancy these fields may transform the understanding of human mind and spirit, and may trigger discussions about human uniquness, soul, sprit, free will which are also theological issues. The 20th century has also witnessed the emergence of molecular biology and molecular genetics which transformed of our understanding of heredity and our biological nature. In 1953 Watson and Crick discovered the structure of DNA, the hereditary material that makes up the genes in the cells of living creatures. From then on molecular biology has grown at a quick pace to the point of providing a molecular-level picture of human phenotype and –even- physchology.

The unparalleled advancements in natural science were accompanied by impressive changes in philosophy and theology. Scientific revolution proposed a new way of interpreting the natural order in the deepest sense of the term: a powerful new way of thinking about, and a new set of methods for investigating the natural world. Nature was deemed to be consumable and possible to encapsulate when it is translated into the language of mathematics or pure quantities that devoid of any intrinsic meaning. Whereas all qualitative aspects which are associated with nature such as harmony, telos, or beauty were considered as "secondary qualities"[26] which are merely subjective feelings of human with no corresponding reality in the extra-mental world. This historic break away from the religious view of nature marks the rise of secular world-view in which nature is merely a display of the interactions of quantifiable entities or, in other words, a giant machine.

1986) R. Omnès, *The Interpretation of Quantum Mechanics* (Princeton: Princeton University Press, 1994); M.L.G. Redhead, *Incompleteness, Nonlocality and Realism* (Oxford: Clarendon Press., 1989); A. Whitaker, *Einstein, Bohr and the Quantum Dilemma* (Cambridge: Cambridge University Press, 1996)

[26] For the importance of the distinction between primary and secondary qualities first envisaged by Galileo please see R. G. Collingwood, *The Idea of Nature*, (Oxford: Oxford University Press, 1945), 102-105; Wolfgang Smith, *Cosmos and Transcendence Breaking Through the Barrier of Scientistic Belief*, (Illinois: Sherwood Sugden & Company, 1984), 34.

The French philosopher, mathematician, and scientist Rene Descartes (1596-165O) was the first philosopher who systematized the new scientific insights in a philosophical framework. He traced the philosophical implications of the new science and proposed a dualistic framework for the new scientific era. Descartes was a strong proponent of doctrine of mechanism to which Newtonian mechanics, naturally, points to. According to this mechanistic model the physical world consists simply of inert particles or "corpuscles" of matter interacting and colliding with one another in a vacuum according to certain rule.[27] Every object–to a certain degree human beings as well-is envisioned as a multi-parted inorganic machine that lend itself to quantification and mathematization. As a result of remarkable success of Newtonian mechanics on the mathematical and physical plane, mechanistic model soon became dominant.[28]

These new set of methods were proposing that science shouldn't lose time with endless metaphysical speculations and should confine itself to physical reality which is what can be dealt with emprically and measured quantitatively. Epistemological doctrines were deeply influenced by the scientific methodology which is based upon emprical observation, quantification, mathematization and systematic analysis of data. The two competing epistemological doctrines of

[27] It is readily seen that the purpose of clock analogy is to expose the predictable and determinable character of universe; and thus provide a necessary base for the superiority and domination of mankind over nature to predict and determine the course of universe.

[28] Some crtitcs traces the root of the alienation between man and nature to Cartesian dualism which appears to draw an unbridgeable ontological and epistemological line between the knowing subject and object to be known. With this rupture, inevitably the knowing subject is pushed to "other" the known object, in other words the nature surrounding him and including other human beings. Centralization of humanity, accompanied with an ontological hubris, leads to the prioritization of its needs and pleasures and godlike security fantasies over other species. This justifies the transformation of the earth into a titanic factory that supplies security and pleasure whilst destroying the biosphere. This consequences as it pertains to ethics. Namely that ethical relativism seems to be the logical conclusion of human centeredness. When an individual human being becomes the center of the world subjectivity reigns, because there are as many centers as the number of cognizing human beings. Here vulgar forms of ethical relativism emerge. Different forms of Kantian ethics and utilitarianism tried to rescue anthropocentrism from this self-destruction. They wanted to establish anthropocentrism without ethical relativism and scepticism. Retrospectively, as postmodern criticism compellingly have argued, it is difficult to say we were able to avoid the tension between anthropocentrism and ethical objectivity. On such a ground it is very difficult to establish an all encompassing ethos regulating our relation to nature. If, as a species, we need to relate ourselves to nature consistently in a constructive way, then this extent of subjectivity seems to be pernicious.

Enlightenment, i.e., rationalism and empiricism attempted to integrate the scientific way of knowing the world in a consistent epistemology. Both rationalism and empricism object metaphysical speculations on the basis that they lack a solid rational and/or emprical grounding. Rationalism puts the emphasis on human reasoning and rejects alternative sources of knowledge. Empiricism takes a similar position by reducing reality to the sense experience and repudiates any principle which exceeds the limits of sense perception. In both case, the modern epistemology (rationalism and empiricism) placed man at the center of all cognitive activity by assigning to him the role of Promethean "creator of the world".

1.1 The Crisis of Enlightenment

However towards the end of 18th century the Enlightenment began to show signs of crisis. Scientific naturalism led to such dire consequences as materialism and scepticism. As Frederick Beiser aptly puts the fundamental principles of the Enlightenment were "rational criticism and scientific naturalism." These principles led to emergence of modern science and changed the world once and for all. However when these principles are extended two their logical conclusions they seemed to lead dire consequences as well. While rational criticism seemed to result in *skepticism*, naturalism appeared to end in *materialism*.[29]

This was unacceptable because it threatens our beliefs in freedom, *sui generis* status of the mind, immortality, and religion. To transcend this predicament, there have been attemtps to preserve naturalism and rationalism from the pitfalls of materialism and scepticism.[30] Even though there are a few intellectuals ready to admit these disastrous consequences, there were many philosophers who attempted to escape them. The task was a difficult one.

[29] Frederick Beiser, "The Enlightenment and Idealism" in *Cambridge Companion to German Idealism*, ed. Karl Emeriks, (Cambridge: Cambridge University Press, 2000), 18.
[30] Beiser, "The Enlightenment and Idealism", 18-20.

The dynamic behind this long and bitter strugle is the belief that in a materialist and sceptic context joy and dignity of human life is in a serious danger. Many philosophical systems grew out of this intellectual crisis from then on. The majority of the philosophical systems used *dualistic* frameworks to overcome the difficulty. Descartes' ontological dualism, Kant's epistemological dualism, Wittgenstein's linguistic dualism were proposed to save a safe space for freedom, soul, and religiosity -and thus dignity and joy of humanity- by dividing the existence into two watertight compartments to resolve the *aporiai* of the Enlightenment.

Though these attemtps assumes such different, even incompatible forms, they share the same concern; saving naturalism from materialism, rational criticism from scepticism. Kant, for example, postulated a supra-sensible reality, *noumena*, not detectable by the categories of human reason to provide a grounding for belief in freedom and God, i.e., ethics. Similarly, Wittgenstein's *linguistic dualism* asserted that religious and scientific discourse are different language games in that what is said in one game does not affect what is said in the other game. These games are played in semantically watertight compartments.

Later generations find earlier solutions inadequate, thus one form of solution succeeded another to preserve the legacy of the Enlightenment without leading to its dire consequences. Some of these proposed solutions diverged from dualistic legacy. For example, the process philosophies, advocated by such eminent voices as Henri Bergson, Alfred N. Whitehead, offer ontologies based on all-encompassing movement. On this dynamic ontological ground, process thought attempts to construct overarching metaphysical systems in which scientific and religious experiences can be construed in a logically consistent way and linked to each other without doing violence to neither science nor religion.[31]

[31] For the defense of this position please see Alfred North Whitehead, *Adventures of Ideas* (Free Press, 1934) and *Nature and Life* (Chicago: University of Chicago Press, 1938) and *Modes of Thought* (Free Press, 1947).

We should also mention Existentialist epistemologies, which appear to stem from the urge to question the ability of reason to come up with overarching explanatory frameworks. From Kierkegaard to Sartre Existentialism based its critique on the presumption that the grand, the all-encompassing theories of modernism are instructive but lacks human substance. So a movement against the established way of reasoning is a dire need. A new way of thinking which is rooted in the intense confrontation of human individual with the world.[32] Practical rather than theoretical, local rather than universal, experiential rather than doctrinal. The journey starts from the depths of human individual and gushes over the world revaluing it at every level. Death, representing the comsummation of this experiential confrontation, colors every aspect of life sometimes with absurdity, dread, and despair, and sometimes with transcendence.

1.2 The New Science

During the last century we have lived through a paradigm shift in ontology and epistemology. The ontological and epistemological assumptions (mechanism, dualism, casual closeness of the world, determinism, (naive) rationalism and (naive) empricism which were hold dear in the Enlightenment writings of Descartes, Kant, Hume and many others have been challenged by groundbreaking scientific discoveries of Einstein, Heisenberg, Planck, Maxwells, Godel, Lorenz, Watson, Crick and by new philosophical insights provided in the writings of Heidegger, Quine, Popper, Kuhn, Lakatos, Polanyi, Feyerabend, Whitehead, Wittgenstein, Foucault, Derrida, and many others.

[32] This is, I think, why Heidegger is regarded as an *existentialist*. Heidegger seems to agree that our relation to the world is practical rather than theoretical. Philosophy should analyze this practical immersion in the world, pre-theoretical phase of our lives in order to understand the being fully. Our bodies interact with the world prior to our reflective conceptualization. Reflective conceptualization causes an unauthentic separation between the world and mind. The very act of conceptualization distances us and the world. However our being in the world can be understood by analyzing the practical immersion of man in the world. The 'glory' of man is his openness to being (*Da-sein*). This unconscious, inescapabable immersion is the pre-theoretical base of all theoretical knowledge. Heidegger philosophy is an invitation to listen life from within, and to decode it by flowing with it. The world does not speak to us unless *Da-sein*, 'the shepherd of all being', learns to 'dwell poetically'.

Relativity theory, chaos theories, system biology, emergent complexities, transfinite mathematics, artificial intelligence, Big Bang cosmologies challenged the Enlightenment assumption that the world is strictly deterministic and casually closed system. The new science impels a very different vision of the nature of the physical reality. In the light of these goundbreaking discoveries the universe reveals itself as a more open, subtle, numinous, interpenetrating, relational, interconnected system than we have assumed for centuries. Quantum physics, for example, appears to suggest that the same initial conditions in a sub-atomic system could produce different outcomes. This is in sharp contrast with mechanistic determinism. Chaos theories point to how some natural systems are very sensitively depend on the initial conditions and how even the tiniest change can render the whole system immediately incalculable. This shows an epistemological poverty before fluid dynamics. The recent developments in system biology reveal that the emergent complexities influence their underlying parts top-down, undercutting the reductionist ideal that aspires to explain the whole natural phenomena by tracing them back to interplay of particles and physical laws. System biology and complexity theories open up new possibilities to understand how the world works. In the light of emergence theories the world reveals itself as a system that works both top-down and bottom-up. And our growing understanding of the fragility of the eco-system calls for a acceptance of responsibility towards the whole life on the earth.[33]

In the last century we lived through a pradigm shift in philosophy too. The postmodern epistemologies attempted to shake our confidence towards "meta-narratives"[34] and to replace it with a profound sense of "incredulity"[35] towards all overarching ideologies. This includes science or, more appropriately, scientism

[33] Among many excellent works tracing the philosophical implications of the new science see especially Sidney Hook, ed., *Determinism and Freedom in the Age of Modern Science* (New York: Collier Boks, 1961), Viggo Mortensen, Robert Sorenson et al. (eds), *Free Will and Determinism: Papers From an Interdisciplinary Research Conference*, 1986 (Chicago, IL: Aarhus University Pres, 1987); M. Targett, "Determinism and Indeterminism, and Explanatory Bias" in *Progress in Neurobiology* 53 (1997): 533-45.

[34] The term is introduced by Jean-Franchois Lyotard in his *Introduction to Postmodern Condition: A Report on Knowledge,* trans., Geoff Bennington and Brian Massumi (Minniapolis: University of Minnesota Press, 1984), xxiv-xxv.

[35] To quote Lyotard: "Simplifying to the extreme, I define postmodern as incredulity toward metanarratives." *Introduction to Postmodern Condition: A Report on Knowledge,* xxiv

which views science as an overarching meta-narrative. Simplifying to the extreme, these epistemologies emerged out of the deep realization that all of our cognitive activities interpenetrate with surrounding structures (political, economical, linguistic), rendering us subjective beings. Whereas we once thought that we could appeal, unambiguously, to sense-data, we realized that even scientific data is theory-laden. We once envisaged a rupture between subject and object and thus believed the possibility of an objective inquiry, we now know that the route between theory and mind, and theory and surrounding political, economical and linguistic structures is much more complex. We now that the propensity toward a certain theory is motivated by metaphysical, aesthetic and even religious pre-suppositions of the inquirer as well as political and economical structures.[36] This explains why the agreement is seldom achieved as far as the philosophical interpretation of the scientific data is concerned.

1.3 Rethinking Religion and Science

The discussion between religion and science was deeply affected by these scientific and philosophical developments. Within the past four decades, inspired by the above-mentioned scientific and philosophical advancements, philosophical theology has produced a body of literature, dedicated to the investigation of the new possibilities of novel interactions between science and religion. Particularly due to the pioneering works of such scholars as Ian Barbour, Stuart Kaufman, Homes Riolston and Arthur Peacocke; and of such philosophers, scientist, theologians as John Polkinghore, Nancy Murphey, John Haught, Philip Clayton, Tom Torrence, Nicholas Wolterstorff and many others a renewed interest in these issues has

[36] A good example of this is the divergence of the scientific community as it pertains to interpretation of Quantum mechanics. Einstein deeply rooted in Spinoza refused intrinsic indeterminancy whereas Bohr deeply rooted to Kierkegaard, and Schrodinger an avid reader of Vedanta enjoyed the idea of ambiguity embedded in the very fabric of the nature. Their philosophical propensities affected their theory selection, the way they formulated the questions and the methodology they used to seek the answers.

emerged. The writings of this thinkers can be classified, I think, philosophical theology with an eye on the contemporary science.[37]

Although written largely from a Judaeo-Christian perspective, this literature should prove to be of great interest to the followers of other religious traditions who are interested in this discussion between religion and science. The discussions in this literature mostly revolves around the questions concerning the nature of God-cosmos relationship, causality, divine action, the cosmological-religious implications of the contemporary scientific findings. This, if I use Ian Barbour's's phrase, is *theology of nature*, i.e. theology with an eye on the best available data produced by science.[38] This literature attempts to walk a fine line between religious and scientific concerns and make sense of the divine action in the age of science where Abrahamic concept of God acting in the history appears to be unintelligible, because scientific explanations depicts the cosmos as a casually closed system where there is no gap to fill with "metaphysical speculations". To transcend this predicament several solutions have been proposed in the last three decades. Some traced the philosophical implications of the quantum mechanics to argue that since the world is intrinsically indeterministic and some domains are indetectable, then the Divine Action is intelligible without violating the lawfulness of the nature in higher levels.[39] Some argued that God effects universe as a whole, God is the sustainer of the universe at all points of time.[40] Some used chaos theories to suggest that the universe cannot be understood by using such mechanistic models as clock. It is more like a "cloud" where the Divine intervenes in a way that is essentially scientifically

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[37] There are a number of excellent works providing the development of this discourse. Such as Ian G. Barbour, WHen Science Meet Religion (New York: Harper Collins, 2000); Ted Peters, *Science and Theology: The New Consonance* (Oxford: Westview Pres, 1998).

[38] For Barbour's distinction between "natural theology" and "theology of nature" please see Ian G. Barbour, WHen Science Meet Religion (New York: Harper Collins, 2000), 31.

[39] For the defense of this position please see Murphy, Nancey. *Theology and Science: A Radical Reformetion Perspective*. (Kitchener, Ontario: Pandora, 1997); Robert J. Russell, Nancey Murphy; Arthur Peacocke, *Chaos and Complexity: Scientific Perspectives on Divine Action* (Vatican City State: Vatican Observatory Publications, 1995).

[40] For the defense of this position Arthur Peacock, *Theology for Scientific Age: Being, Becoming-Natural, Divine and Human* (Minneapolis: First fortress Press, 1993)

indistinguishable.[41] Some applied to the system biology, the emergence theories to argue against the scientific reductionism that holds the lower level structures always determine the upper level occurences. These theories point to the idea that the world works top-down as well as bottom up. For the proponents of this approach this insight provided by science exhorts us for a paradigm shift in which the conception of the Divine Action needs to be re-formulated**.**[42]

1.4 Islam and Views of Science

The earliest encounter of modern science and Islamic world dates back to 18th century.[43] The immediate response appears to be *perplexity,* a torn pychology between the glorious past of Muslims and striking advancements and victories of so called "infidels" over Muslims. As Muzaffer Ikbal points out, when the Muslim world encountered the modern science, the most of Muslim lands had been colonized, and seen from the perspective of the colonized it was the sheer force of the new science what made it possible for England and France to colonize a large part of the world.[44] Therefore the first emerging aspirations towards science were colored by a desire towards *power*, especially military power.[45]

The second level of encounter between traditional beliefs about Islam and modern science was of intellectual nature. A closer look at the contemporary religion and science discussion among Muslims shows that there are a number of positions, each undergirded by differing metaphysical assumptions and philosophical perspectives. Ibrahim Kalin uses a revealing taxonomy and classifies these positions

[41] For the defense of this position see John Polkinghore, *Science and Providence : God's Interaction with the World.* (Boston : Soc. For Promoting Christian Knowledge, 1989); and *Science and Theology: An Introduction*. (Minneapolis: First Fortress Press, 1999).
[42] For the defense of this position please see, Philip Clayton, *In Quest of Freedom: The Emergence of Spirit in the Natural World* (Gottingen: Vandenhoeck and Ruprech, 2009); and *Mind and Emergence: From Quantum to Consicousness* (Oxfor: Oxford University Pres, 2004)
[43] Ibrahim Kalin. "Three Views of Science in the Islamic World" in *God, Life and the Cosmos: Christian and Islamic Perspectives*, eds. Ted Peters, Muzaffar Iqbal, Syed Nomanul Haq, (Ashgate, 2002), pp. 43-75.
[44] Muzaffer Ikbal, *Islam and Modern Science* in God, Life and the Cosmos: Christian and Islamic Perspectives, eds. Ted Peters, Muzaffar Iqbal, Syed Nomanul Haq, (Ashgate, 2002), pp. 43-75.
[45] Bernard Lewis, *The Muslim Discovery of Europe* (New york: Norton Company, 2001), 221-238.

under three headings as *ethical, epistemological and ontological-metaphysical views of science*.[46]

For Kalin, the *ethical view* of science regards scientific methodology as essentially neutral and objective. Science, due to its universal mathematical language, rigorous methodology, and its success in accumulating and manipulating the scientific data, is envisaged as an objective, culture-free, and transnational domain of human quest. This view also acknowledges the problems which are related to the misuse of science. For the proponents of this view science, as an objective and neutral domain, can be used for better purposes in the hands of moral men and women. Science would not resist such moral treatment, because it is free of any philosophical component and, therefore any ethical inculcations. Such problems as the global ecological crisis, agriculture, energy policies, urban development, and transportation, etc., all of that are linked to the misuse of the scientific knowledge, can be solved by 'inoculating' an ethos to the neutral and ethically submissive body of modern science.

Moreover the holders of this view appear to endorse that the modern science, as a value-free domain, does not suggest a worldview. Therefore there is no inherent conflict between science and religion *per se*. Positivism and materialism which have long been viewed as logical conclusions of modern science are merely philosophical components that are, groundlessly, attached to it. Scientific theories lend themselves to different readings and do not necessarily point to a particular philosophy. From a perspective of a believer scientific findings unearth the hidden treasure of art, harmony, beauty and design embedded in the world by the Divine. In other words, if Islamic ethics is attached to the practice and theory of scientific activity such hard problems as enviromental crisis and such ideological problems as positivism and materialism can be solved. The ethical view of science is promoted by such forerunners of Islamic modernism as Jamal al-Din Afghani, Muhammad Abduh.

[46] Ibrahim Kalin, "Three Views of Science in the Islamic World" in *God, Life and the Cosmos: Christian and Islamic Perspectives*, eds. Ted Peters, Muzaffar Iqbal, Syed Nomanul Haq, (Ashgate, 2002), pp. 43-75.

The second position, which Kalın calls *epistemological view* of science, is deeply affected by the postmodern criticism of science. As I alluded above the independent works of Heisenberg, Schrodinger, and Einstein showed the shortcomings of Newtonian mechanism when applied to very massive or very small and very fast objects, reducing it to a subset of quantum mechanics. These develpoments regarded as an invitation for paradigm shift and for new sense of reality. In the light of these developments above such philosophers as Popper, Polanyi, Kuhn, Feyerabend, Lakatos etc., challenged the hegemony of 19th century positivism, scientific objectivism and scientific realism.

In the writings of these figures many assumptions pertaining to the nature of scientific activity, which seemed altruistic to the proponents of the ethical view of science, were problematized. In accordance with these developments in Western thought, such thinkers as Ismail Faruki and Ziauddin Serdar attempted to appropriate the new insights presented by the new science and the postmodern critic in an Islamic framework. As Kalin observes this particular approach takes "science as a social construction"[47], and therefore puts a special emphasis on the evaluation of science within the social, historical and linguistic context it evolves. Science is perceived as a time-bound and culture specific activity deeply penetrated by surrounding social and political and linguisitic structures. The inseparability of scientific activity from its context clearly casts doubt on so called scientific objectivity. As Kalın writes this approach stil remains as an attractive position for students and scholars in that it, first, questions the epistemic status of modern science then relativizes it. It follows that religion has a legitimate and incommensurable epistemic status as well.[48] In short this is an attempt to preserve the dignity of religious epistemology by questioning the ability of science to produce all-encompasing meta-narratives.

[47] Kalin, "Three Views of Science in the Islamic World," 52.
[48] See Ismail Al-Faruqi, *Islamization of Knowledge: General Principles and Work Plan* (Washington DC: IIIT, 1982); Ziauddin Serdar, *Explorations in Islamic Science* (London: Mansell Publishing Ltd., 1989)

Finally, there is the *ontological/metaphysical view* of science. This particular attitude is largely based on the wrtitings of Seyyed Hossein Nasr. It appears that the "traditionalist" critique of modern worldview developed by such eminent members of traditionalist school of thought as Fritjof Schuon, Rene Guenon, Ananda Coomrasway, Titus Bruckhart deeply influenced Nasr's attitude towards modernism and, thus modern science. In accordance with the general attitude of the traditionalist school, Nasr attacks the metaphysical and the philosophical foundations of modern worldview in general and modern science in particular, and exhorts for a remembrance of the value of the traditional way of seeing the world and doing science. Traditional cosmological doctrines envisage the world as a sacred display of a higher reality. Nasr, along with Alparslan Acikgenc, Osman Bakar, Mahdi Golshani and others, hold that the pre-modern and modern sciences have differences in their conceptions of nature, methods, cosmological presumptions, and epistemological stance as well as the parametric framework through which they process the "facts" found by observation and experimentation. It is also argued that Islam as an all-encompasing religion should be taken into account even when the most "secular" aspects of scientific activity, like its methodology, are studied and practiced. Accordingly, *tawhid*, the basic tenet of Islam, transforms how one perceive the world. *Tawhid* implies unification, interpenetration, interrelatedness, openness, relationality of all natural phenomena through a higher metaphysical domain. This, in turn, changes the most essential metaphysical assumptions we have about the nature of the world, and thus affects how we formulate scientific questions, and how we seek for their answers.[49]

[49] Nasr has authored a number of important works on the relationship of Islam and the modern science. See his, *An Annotated Bibliography of Islamic Science* (Lahore: Suhail Academy, 1985) 3 vols, *Science and Civilization in Islam* (Cambridge: Cambridge University Press, 1987), *An Introduction to Islamic Cosmological Doctrines* (Cambridge: Cambridge University Press, 1964). Nasr has also written many articles on the meaning of Islamic science and its relation to modern Western science. Also see Alparslan Acikgenc, *Islam Medeniyetinde Bilgi ve Bilim*. (Istanbul: Turkiye Diyanet Vakfi, 2006); Osman Bakar, *Classification of Knowledge in Islam* (Cambridge: The Islamic Text Society, 1998)

Nasr as an unflinching opponent of the philosophical foundations and premises of modern world view insists that Western science is the primary cause underlying the desacralization of universe and in turn proposes revitalizing the metaphysical outlook of traditional-sacred sciences -whether Chinese, Hindu or Islamic- as a remedy**.** But as Kalin reminds us it is important not to lose sight of the fact that Nasr is not opposing science itself but its philosophical claims which are seemingly exceeding its legitimate boundaries and metaphysical outlook in which it functions and interprets its findings. His criticisms projected towards not only the ethical considerations and methodological amendments of modern science but also its metaphysical-ontological premises. In this regard his attempt can be seen as a part of a larger project of constructing a new metaphysical framework in which "sacred and knowledge" can be integrated. Ontological-metaphysical view suggests deconstructing the modern world view by changing our most fundamental assumptions on the nature of the reality which are dictated by the dominant dualist-mechanist-anthropocentric paradigm.[50]

1.5 Conclusion

Our brief historical survey testifies that the discussion between religion and science never looses its vibrancy in both West and Islamic world. Judeo-Christian and Islamic traditions responded to the multi-faceted challenge of modern science in variety of ways, especially when philosophical and metaphysical attachments of science collide with cosmological assumptions of religious-traditional worldviews. Our survey also points that the discussion of religion and science appears to boil down to the consonance, or lack thereof, of the intellectual foundations of modern science and the metaphysical assumptions of religious worldviews, especially as it pertains to the God-cosmos relationship. Therefore, for a proper understanding of the relationship between Islam and modern science the fundemental metaphysical, epistemological and ontological assumptions of modern science and the Quran

[50] For a through examination of Nasr's view see Ibrahim Kalın "The Sacred versus the Secular: Nasr on Science" in *Library of Living Philosophers: Seyyed Hossein Nasr*, ed. L. E. Hahn, R. E. Auxier and L. W. Stone (Chicago: Open Court Press, 2001), 445-462.

should be studied. Deeper reflection on the philosophical underpinnings of modern science and Islamic worldview could open up new possibilities in terms of construing their relations. With these caveats in mind, now I will turn to examine al-Ghazali's understanding of the God-cosmos relationship.

CHAPTER 2

THE RELATIONSHIP OF GOD AND THE WORLD IN AL-GHAZALI

Philosophical theology, which appears to emerge in almost all major religious traditions, devotes significant effort to elaborate on the nature of God-cosmos relationship. The importance and attractiveness of this issue stems not only from the intellectual challenge and resulting satisfaction it presents but also from the profound importance and implication to humanity's religious experience. Namely, that the God-human relationship is a subset of the God-cosmos relationship. The fundamental aspects of humanity's lived existential situation are thoroughly intertwined with the answer given to this question. So, understanding the God-cosmos relationship is especially important in terms of clarifying the psychological aspects of the religious experience. How do I relate to God? How does God relate to my sorrows and joys? How do I pray and in what psychology? How do we explain monstrosities in the world? How do I relate to other humans and nature? How do I explain essential beauty and order in the world? These and similar existential questions are inevitably answered in the light of the presumptions and convictions regarding the nature of the relationship of the Divine and the world. The ways we explain this relationship determine the conceptual nature of our religious experience and, thus, shapes our appropriation of the real nature of God. In this way, a study of this relation would necessarily have profound implications for the study of religion. For example in formulating an answer to the problem of theodicy, the entire relationship of God and the world must be examined.

A closer scrutiny of Islamic intellectual history shows that the question of God-cosmos relationship has been dealt with a great care and curiosity. Philosophers, theologians and mystics have employed differing models by which the relationship of God and the world has been described. Among them three models come forth: the

unity of existence (*wahdat al-wujud*), emanation, and creation *ex nihilo*. Ibn al-'Arabi employs the first model, advocating that there is no true existence except God's Existence and that conceiving the world as a separate and independent being is an illusion. The second model, emanation, is examined in Al-Farabi's and Ibn Sina's (and al-Suhrawardi) writings in which the physical world *necessarily* emanates (or emerges) from God after a serious of stages and has an indirect responsibility for everything. The third alternative is elaborated by Al-Ghazali's *continuous creation ex nihilo* and which asserts that God created and continues to create everything out of nothing.

Al-Ghazali defended his theory of creation against the views of Islamic Peripatetism. Therefore, for a proper understanding of al-Ghazali's doctrine of causation, I will first introduce the perspectives of Ibn Sina and al-Farabi on the question of God's causative influence in the physical world. Then I will examine al-Ghazali's account of God and cosmos relationship. I also, by means of dialogic exposition, aim to show the contradictory and complimentary elements in their accounts of causality.

2.1 God-Cosmos Relationship in Al-Farabi and Ibn Sina

Al-Farabi opens the *Virtuous City* with a discussion of the One, the First Cause which generated the whole existence through the process of emanation.[51] Al-Farabi's emanation theory integrates the Aristotelian concept of God with a highly refined version of Plotinian emanationism, and Ptolemaic astronomy.[52] In the theory

[51] As Fakhry observes, al-Farabi follows the Islamic approach which envisages politics and ethics as an extension or development of metaphysics or its highest manifestation, theology, i.e., the science of God. Therefore, al-Farabi opens the *Opinions of the Inhabitants of the Virtues City* not with a discussion of man's relation to the state, as in Plato's republic, which was al-Farabi's model, but with a discussion of the One, the First being which generated the whole existence through the process of emanation. This, I believe a good example which shows the influence of Islamic system of beliefs on al-Farabi's thought. Majid.Fakhry, *A History of Islamic Philosophy* (New York: Columbia University Press, 2004), 121.

[52] David C. Reisman, "Al-Farabi and the Philosophical Curriculum." In *The Cambridge Companion to Arabic Philosophy*, ed. Peter Adamson and Richard C. Tylor, (Cambridge: Cambridge University Press, 2005), 59

of emanationism (the hierarchical descent from the First cause), al-Farabi attempts to construct a new concept of God which can be incorporated to nearly every element of major philosophical systems of his day. His theory of causation, psychological views and theory of prophecy are developed within this context.

God is the first cause (principle) of the emanationist scheme. The *active intellect* is an emanation from this first principle, and man is a candidate of the ultimate bliss which consists in the contemplation of the first principle. Al-Farabi defines God as the first principle of all things, who enjoys the everlasting-bliss of self-contemplation.[53] For Al-Farabi the essential characteristics of this being, which rises above the contingent realm, are *necessity* and *unity*.[54] The entity of this kind is without cause, quality, position and time, and therefore, indefinable and indemonstrable, and neither its being nor its action can be fully understood by human reason. The First cause is also perfect, necessary, eternal, uncaused, immaterial, wise, one and full of life.[55] The process of emanation is generated by the act of self-apprehension of God. In other words, the act of self-apprehension is the cause of all beings and the laws governing the cosmos. The universe is described as an eternal procession, or emanation from God.

Al-Farabi presents six principles of being in the system: The First Cause, the Secondary Causes, and the Active Intellect governing the sublunar world, Soul, Form, and Matter.[56] The emanationist scheme offered by al-Farabi envisages a hierarchical descent from the First Cause through the incorporeal intellects to a final intellect which governs the sublunar world. The First Cause (God), in thinking itself, emanates the incorporeal being of the first intellect. The first intellect thinks of itself and of the First Cause. Because of the "multiplicity"[57] of its essence the first

[53]Reisman, "Al-Farabi and the Philosophical Curriculum", 67.
[54] Walzer, R. "Al-Farabi" in *TheEncyclopedia of Islam*, ed. Bernard Leis and J. Schacht (Netherlands, 1965), 779.
[55] For Nasr al-Farabi is trying to secure Qur'anic conceptualization of God within emanationist scheme. Please see S. H. Nasr, "The Qur,an and Hadıth as source and Inspiration of Islamic Philosophy" In *Hıstory of Islamic Philosophy*, ed. Seyyed Hossein Nasr and Oliver Leaman (London: Routledge, 1996), 27-37.
[56] Nasr, "The Qur,an and Hadıth as source and Inspiration of Islamic Philosophy", 29.
[57] Majid.Fakhry, *A History of Islamic Philosophy* (New York: Columbia University Press, 2004), 117.

intellects emanates the second intellect and the soul and body for the next stratum. In turn the second intellect thinks of itself and of the first intellect, and produces the third intellect and the substantiation of body and soul for the next stratum. This hierarchical descent continues through the nine intellects until it reaches the Active Intellect which governs the sublunar world. Each intellect is associated with a sphere. The first intellect is associated with the first heaven, the outermost sphere of the universe. The second intellect is associated with the fixed stars. Remaining seven intellects are associated with the seven "planets" known in al-Farabi's time. The final intellect which is associated with the sublunar world governs the world of generation and corruption.[58]

It is readily seen that this rather bizarre emanationist model attempts to incorporate the astronomical knowledge of his day with the Aristotelian metaphysics of causation. Another interesting observation is that al-Farabi refers to various incorporeal beings envisaged by his system through Islamic concepts. For instance, he says that one must call the Intellects the "spirits" and "angels" and Active Intellect the "Holy Spirit," i.e., the angel of revelation, *Gabriel*. The intellects are deficient in the sense that their being is caused by a "more perfect" being. Moreover, each intellect exhibits a multiplicity in the act of intellection. They think of not only themselves but also the intellect that casually precedes them.[59] Each intellect desires to emulate what precedes it. This desire serves to set each sphere in motion.[60]

Ibn Sina elaborates on al-Farabi's emanationism. Mostly, he repeats al-Farabi's thoughts and occasionally expounds differing views with respect to God-cosmos relationship. The Knowledge, an attribute of God, gains central importance in Ibn Sina's metaphysics. Everything emerges out of the Knowledge. Being and Becoming are *necessary* outcomes of God's self-contemplative act. The object of the Divine Knowledge is the Divine Essence (*dhat*). The Divine self-contemplation is

[58] For a detailed discussion on Farabian cosmology please see Majid Fahkry, "The Ontological Argument In Arabic Tradition: The Case of Al-Farabi" *Studia Islamica*, No. 64 (1986), 6
[59] Reisman, "Al-Farabi and the Philosophical Curriculum," 69.
[60] Reisman, "Al-Farabi and the Philosophical Curriculum," 71.

the initiatory of the process of being and becoming.[61]

It follows that the subject matter of the Divine Knowledge is solely the Divine Essence. Here a duality emerges. The divine contemplative act brings about a "second thing" which is distinct from, and cannot be reduced to the Divine Essence that contemplates the Divine Essence. Ibn Sina, following al-Farabi's footsteps, calls this contemplative emergence as the first intellect (*akl evvel*). But for Ibn Sina the number of intellect are not ten as ın al-Farabi's system.

For Ibn Sina, the first intellect act like a semi-autonomous intermediary between God and the matter. The first intellect relates to the matter and triggers the whole generations and corruptions. Here Ibn Sina exposes metaphysical grounding of his physics. As the first intellect penetrates the matter, firstly the defining features of the four elements (earth, air, water, fire) emerges. Secondly, with the association and dissociation of the four elements composite elements, plants and animals emerge. Human body is the culmination of the progressive interaction between immaterial intellect and matter. When an individual human being emerges as such the first intellect finds an abode to reside in, or in other words a locus of manifestation. Thus, the potential existence of the first intellect is actualized in the existence e of humanity.[62]

It appears that in Ibn Sina's system the relationship between the first intellect and the cosmos is given priority over God and the cosmos relationship. The first intellect as a conscious emergence from the Divine Essence not only intermediates the relationship between God and the cosmos, but also conditions. Through such mediation the Divine Essence relates to the world. As such this relation is necessary and uninterrupted. This is also an infinite process, there is no end to necessary creative act, because the Divine Knowledge can never exhaust the Divine Essence,

[61] Avicenna, *The Metaphysics of The Healing*, trans. Michael E. Marmura (Brigham Young University Press, 2005), 347-370

[62]It follows that Ibn Sina rejects reencarnation

thus emanation can never cease.[63]

In short, Ibn Sına and al-Farabi agree that the first intellect is an incorporeal entity mediating between the higher and the sublunar world and the human mind. The first entity emanating or overflowing from the First Principle is the active intellect. The active intellect is conscious of itself and its author. It contemplates of itself and its author. Through its author, it is necessary as well. In addition to self-apprehension it is also engaged in the contemplation of the first principle. In the last analysis the theory of emanation draws a hierarchical picture of being. In this picture the active intellect, as an emanation from the first principle, serves as a bridge between the first principle and the rest of being, thereby linking Man to his Creator and Purpose.

2.2 Al-Ghazali's Theory of Causality

Al-Ghazali argues the relationship of God and the world from an Ash'arite theological point of view. There are two tenets of Ashari school of thought which are important to understand al-Ghazali's theory of causation: The theory of Divine Attributes and Ashari Atomism.

2.2.1 The Theory of Divine Attributes

The cornerstone of Ash'arite theology is the doctrine of divine attributes[64] that was developed and enhanced by such thinkers as Cuveyni, al-Ghazali, er-Razi, Kadi Beyzavi, Bâkıllânî, Şehristânî, Teftâzânî ve Cürcânî. The doctrine revolves around a central question: What one can know about the Divine essence (*dhat*) by extrapolating from the created order? The eminent members of Ashari school of thought appear to endorse the idea that such attributes we perceive in physical beings and occurrences as knowledge, will, power etc., are manifestations of the Divine

[63] Avicenna, *The Metaphysics of The Healing*, 198-207, 232-336.
[64] Michael E. Marmura, "Al-Ghazali." In *The Cambridge Companion to Arabic Philosophy*, ed. Peter Adamson and Richard C. Tylor (Cambridge: Cambridge University Press, 2005), 142-143

attributes, yet should not be equated with the Divine attributes. In other words, they point to, and give a "glimpse" of the Divine attributes, but not identical with them. Underlying concern is to walk a fine line between immanance (*teshbih*) and transcendence (*tenzih*). Since God is immanent, a limited knowledge of God by extrapolating from the cosmos is deemed possible to acquire.

Al-Ghazali elaborates and expands on this doctrine. He appears to hold that the divine attributes (*sifat*) of life, knowledge, will, power, speech, hearing and seeing are co-eternal with the divine essence (*dhat*) and intimately related to it, but are not identical with it.[65] They are eternal coexisting uncaused attributes. For al-Ghazali divine attributes are manifested each and every moment in physical and non-physical occurrences. Divine will and power are pervasive and divine attributes are the direct causes of each and every temporal event.[66]

2.2.2 Ashari Atomism

Secondly, Ashari atomism that is developed mainly as a reaction to the cosmological views of Islamic peripatetism, provides a grounding for Al-Ghazali to elaborate a causal theory which is in accord with the above-mentioned doctrine of divine attributes. Here one can also see the close affinity between ontology and metaphysics. Metaphysical framing of the God-cosmos relationship is inescapably done with an eye on the best available physical ontology stated in accordance with the emprical observations and logical rules. For this reason Ashari atomism, despite al-Ghazali's reluctance to embrace it full-heartedly, was significant for him in respect to construction of a casual theory.

There are two schools of thought as it pertains to Islamic intellectual history which expounded systematic ideas on the ultimate underlying structure of the

[65] Edward Omar Moad 2007. "Al-Ghazali on Power, Causation, and 'Acquisition.'." *Philosophy East & West* 57, no. 1 *Academic Search Premier*, EBSCO*host* (accessed December 12, 2009). 6.
[66] Ilai Alon, "Al-Ghazālī on Causality," Journal of the American Oriental Society, Vol. 100, No. 4 (Oct. - Dec., 1980): 398.

universe: Islamic Peripatetism and Asharism. There are substantial differences between the cosmologies of these schools. However the main thrust of their quest is the same. It is to make sense of this world where there is both change and stability. The concepts of *jawhar* and *a'raz* which they inherited from Aristotelian physics were employed to relate change and stability- namely, that jawhar stands for the unchanged substratum and a'raz stands for everything else that is caused by the nature and changing modes of jawhar i.e. underlying unchanging reality. A great deal of intellectual energy was spent to connect change and stability in a logically consistent way and always with an eye on our emprical confrontation with the world, and metaphysical concerns.[67]

Under the influence of Elea school and Aristotelian cosmology the eminent members of Islamic Peripatetic school -al-Farabi and Ibn Sina- defend the idea of "continuous-unfragmented universe" and reject that the universe is constituted by distinct atoms and emptiness between them.[68] The latter view of "discrete-fragmented universe" is first asserted by Leucippus, sytematized by Democritus and developed in the works of Epicurus and Lucretius. For Democritus the world consists of fragmented atoms and a vacuum in which they move. These atoms are made up of the same "stuff", but their physical properties, i.e., size and shape vary infinetely. The pervasive change one observes in the world is an outcome of continous motion and resulting association and dissociation of these atoms. In other words all of the properties of existent things (color, smell, shape) is just epiphenomena resulting from the interaction between unchanging atomistic fragments of ultimate substratum. Only atoms and vacuum have an ontological reality in the perfect sense of the word. All other secondary properties (color, smell, sound…) can be categorized as mental delusion with no extra-mental reality. Couching physical occurences in terms of interactions between underpinining atomistic fragments leads to a strictly mechanistic, deterministic, and reductionistic worldview. This worldview is

[67] To my amazement the Theory of Everything, a putative theory of theoretical physics, seeks a fundemental structure or law (cawhar) that all other laws and structures (araz) that apply within the universe are consequences of. It seems to be the case that we are still trying to connect changing and unchanging aspects of the world in a coherent cosmology.
[68] S. H. Bolay, *Felsefî Doktrinler Sözlüğü* (İstanbul: Otuken Yayınevi, 1981), 180.

premised on the assumptions that there is no casual gap in the world (mechanism), that the same outcome is preceded by the same initial income (determinism), that there is no teleology in the world, that natural phenomena are merely epiphenomena (reductionism).

Aristotle finds atomistic model unsatisfactory on the basis that it is incompetent as it pertains to explaning the natural phenomena, i.e., generation and corruption in the natural world. In sharp constrast to "discrete-fragmented universe" envisaged by atomistic model he proposes the model of "continuous-unfragmented universe". According to Aristotle the most basic structure of the world is not fragmented or atomistic, but it is infinitely divisible, continuous, unfragmented "stuff". This "stuff" grounds the physical world, but it is hardly physical in itself. It is more like "potentiality" which is somehow actualized. Aristotle strips the first substance from physicality and physical properties. It follows that the first substance is not constituted by physical atoms distinct from each other. It is in this context of competing cosmological doctrines Islamic Peripatetism leans toward Aristotelian cosmology and subsequently appropriates it from Islamic perspective, holding that the universe is "continuous and unfragmented".

Ashari cosmology sharply contrasts this view and argues that the universe is fragmented, divided and composed of discrete atoms and emptiness in which they move. Theological concerns of Asharism do play a role in the acceptance of "atomistic model". The foremost concerns can be listed as such; to secure the ontological distance between God and cosmos, to affirm the creation *ex nihilo* and continuous creation of the world, to defend the all-pervasiveness of the Divine Attributes, to reject intermediaries between God and cosmos that connote any kind of dependency and detract from God's independency. Such a world view can only be sustained if one sees the world as finite, dependent, limited, relative. Ashari atomism is an attempt to provide such a physical ontology that renders the world as relative and submissive plane of existence, thus secure above mentioned metaphysical-theological concerns.

But as I alluded above "atomism" -as it is formulated by Democritus- envisage the world as mechanistic and deterministic. Transcending this predicament requires some modifications. There are certain agreements between Ashari atomism and Greek atomism. They both envision physical occurrences as an outcome of association and dissociation of atoms. However Ashari atomism diverges from Greek atomism in certain important respects that "atoms" are limited in number, are finite, are created continuously by The Divine Power and Will, and they do not possess distinct physical properties in shape and size. The only thing that can be attributed to atoms is "motion" and "absence of motion". Atoms do not possess dimension and thus do not occupy space, but yet they have a location in the spatio-temporal realm and their constitution can bring about the existence of physical objects. Such properties of physical objects (*araz*) as color, scent, heat, shape are not merely mental delusions as it is envisaged by Democritus or Lucretius, but have ontological reality distinct from their parts. Although physical properties (*araz*) are dependent upon atomic constitutions (*jawhar*) they are not reducible to them. Physical properties emerge out of the proper association of atomistic fragments as ontologically independent realities. But all of these occurrences can not be conceived of without taking Divine action into consideration. Both atoms and the properties of physical objects are constantly created by the Divine Will and Power. The universe is penetrated by robust Oneness living no single spatial or temporal domain outside of the manifestation of the Divine Attributes.

These atoms are refered to as indivisible singularities (*Cüz-i lâyetecezzâ*). They are different from the atoms of Democritus and Lucretious in that their number is limited, they are not eternal, and they are continuously created in time. They oscillate between existence and nonexistence-namely, that God creates every moment in time and every particle in space continuously.[69] In other words time does not stand beyond the scope of the continuous creative act, both *temporal and spatial atoms are continuously created.* That means not only space but also time is

[69] S. H. Bolay, *Felsefî Doktrinler Sözlüğü*, 82

quantized, consists of temporal fragments-atoms and vacuums.[70] As such Ashari atomism may be seen as a reaction to Aristotelian substance metaphysics which is more coherent with the perception of God as merely a "prime mover". Its primary aim is to secure the continuous divine agency.[71] It seems that for Asharism once this spatio-temporal view is established it is easy matter to demonstrate that God exists, omnipotent, omnipresent and omniscient. This ontology readily paves the way for the ultimate religious ideal; "to see God everywhere" or "to live in the presence of God" (*Ihsan*).

2.3 Metaphysics of Causality

Most thinkers who wrote about al-Ghazali's theory of causality agree that al-Ghazali rejected causality, i.e., necessary connection between cause and effect. But one can see variety of opinions on the degree of this rejection. There is especially divergence of opinions on al-Ghazali's treatment of angelic intermediation, of appropriateness of linguisitic employment of casuality, of distinction between ontological reality of causality and logical necessity of causality, and of causality as a mental category without corresponding extra-mental reality.

Majid Fakhri claims that while Al-Ghazalf rejected ontological causal necessity, he accepted the logical one. In Wensinck's interpretation Al-Ghazali's regards God as the only agent in the world, thus rejects causality, although he does not refrain from using the term itself for linguistic purposes.[72] H. A. Wolfson maintains that Al-Ghazali did not accept causality, despite some modes of expression he used. W. J. Courteney argued that al-Ghazali, like Occam, was misinterpreted on

[70] Later al-Ghazali developes a casual doctrine within this framework. He defends the idea that the relation between cause and effect is not necessary, and cause and effect are illusions created by the constant conjunction, and talking of them is legitimate as linguistic necessity. Nursi's view of causality is in accord with al-Ghazali in that casual language, or mechanisitc or material symbolism is a linguistic necessity. He writes "creates both cause and effect and conjuncts them together with his name, the Wisdom." Translation is mine. Bediuzzaman Said Nursi, *Sozler* (Istanbul: Sozler Publications, 1996), 25 Soz

[71] The definition of the perfection of religiosity in Islam is to live as if God sees you as in the prescence of God. Such a degree of closeness can be achieved in realization of divine closeness. Both for theological and physchological reasons for Muslim mind Ashari atomism has become the grounding for this dynamic cosmology.

[72] A. J. Wensinck, *La Pensee de Ghazali*, (Paris 1950), 6-9.

the topic of causality.[73] Ilai Alon thinks that al-Ghazali attempts to reconcile philosophical and kalamic views in a logically consistent way which can preserve, at once, God's omnipotence, omnipresence and the possibility of miracles without having to interpret them as anological literature stories.[74] For Marmura al-Ghazali al-Ghazali denies not only casual necessity between subsequent events but any type intermediation whether angelic or anthropic between God and the world.[75] The only writer, I know of, who tries to re-evaluate Al-Ghazalf's views is Abrahamov who focuses on al-Gahzali's non-philosophical writings, especially on Ihya, al-Arbain, al-Maksadal Asna and infers that al-Ghazali combines divine casuality with secondary casuality. God creates both cause and effect and maintains their relation, but cause and effect have also inherent natures which renders causality relatively necessary.[76]

The difficulty appears to stem from the fact that Al-Ghazali's works spread accross different genres and styles, address diverse audience, and call on different techiniques and discursive strategies. How to evaluate such a philosopher-theologian-sufi remains as a controversy. Mainly because of this difficulty we see variety of opinions on Al-Ghazali's casual doctrine. But what concerns us here is the core of his argument- namely that God is the creator both cause and effect and attaches cause and effect on a self-imposed pattern (*adattullah*). Since there seems to be an agreement on this particular aspect of al-Ghazali's doctrine of causality I will move on to examine the construction of this idea through his writings.

Al-Ghazali opens the discussion with his famous declaration and defense of the Ash'arite occasionalist doctrine: "*the connection between what is habitually believed to be a cause and what is habitually believed to be an effect is not necessary according to us*."[77] The connection between cause and effect, he argues, "*is due to*

[73] William J. Courtenay, "The Critique on Natural Causality in the Mutakallimun and Nominalism," *Harvard Theological Review*, 66 (1973): 77-94.
[74] Ilai Alon, "Al-Ghazālī on Causality," *Journal of American Oriental Society*, Vol. 100, No. 4 (Oct. - Dec., 1980): 398
[75] Michael E. Marmura, "Al-Ghazali on Bodily Resur-rection and Causality in Tahafut al-Falasifa and the Iqtisad," *Aligarh Journal of Islamic Thought* 1.2 (1989): 62
[76] B. Abrahamov, "Al-Ghazli's Theory of Causality," *Studia Islamica*, 67 (1988), 75-89
[77] Al-Ghazali, *Tahaffut al-Falasifa*, trans. Michael E. Marmura (Provo: Brigham Young University

the God's decree, Who creates them side by side, not to its being necessary in itself, incapable of separation."[78] Observation shows only concomitance-not any necessary connection between cause and effect. These assertions clearly deny any causal efficacy in created things.[79]

One of the basic premise of al-Ghazali's is that the "mystic vision" (*dhawq*) is necessary for understanding the real nature of God and the world relationship.[80] It is one thing to formulate a theory of causation which is coherent with the Qur'an's teachings, and it is completely another to understand what it means in the cosmic scheme of things. They tell us quite plainly that understanding, in the perfect sense of the word, is attainable through "mystical experience".

One of the main concerns of al-Ghazali is to secure possibility of *miracles* without having to interpret them as analogical literature stories. Prophetic miracles, according to al-Farabi, are confined to the Prophet's ability to influence nature and to receive direct knowledge from the divine. Al-Farabi (and Ibn Sina) does not accept literally such scriptural affirmations as the miraculous survival of a prophet cast into a fiery furnace or the prophet's changing a staff into a serpent.[81] And it is here that al-Ghazali's doctrine of the "habitual causes" comes in. It is meant, among other things,

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Press, 2000), 166

[78] Al-Ghazali, *Tahafftut al-Falasifa,* 166.

[79]For further discussion on Al-Ghazali's casual doctrine please see L. E. Goodman, "Did Al-Ghazali deny causality?," Studia Islamica, 47 (1978), 83-120, especially 88, 97, 103-4, 108, 110, 118. Michael E. Marmura, "Al-GhazAlT's Second Causal Theory in the 17th Discussion of his Tahafut," in Islamic Philosophy and Mysticism, ed. Parviz Morewedge (New York, 1981), 85-112, and especially 74 (n. 55), 50, 59-65. Marmura, "Al- GhazAlT on Bodily Resurrection and Causality in Tahafut and the Iqtisad," Aligarh Journal of Islamic Thought, 1 (1989), 46-75, and especially 86. 91-92, 97-103. See also Simon Van Den Bergh, Averro's' Tahafut al-Tahafut (The Incoherence of the Incoherence): Notes (London, 19782), II, 184, note on 1.329.5. Majid Fakhry, Islamic Occasionalism (London, 1958), 24, 33, 46-47, 58, 67, 69, 71; William J. Courtenay, "The Critique on Natural Causality in the Mutakallimun and Nominalism," Harvard Theological Review, 66 (1973), 77-94; B. Abrahamov, "Al-Ghaz5lT's Theory of Causality," Studia Islamica, 67 (1988), 75-89; Eric L. Ormsby, Theodicy in Islamic Thought: The Dispute over al- GhazalT's "Best of All Possible Worlds" (Princeton, 1984), 182-216; and George E Hourani, "The Dialogue between al-Ghazali and the Philosophers on the Origin of the World," The Mus- lim World, 48 (1958), 183-91, 308-14. **A**lon, Ilai, "Al-Ghazālī on Causality" Journal of the American Oriental Society, Vol. 100, No. 4 (Oct. - Dec., 1980): 398

[80] For the importance of mystical vision" in Al-Ghazali's whole epistemology please see his otobiography *Al-Minkizu mined-Dalal* that speaks of the significance of dhawq in overcoming doubt and attaining certainity in matters of belief.

[81] For al-Farabi's views on miracles please see M. Mahdi, *Al-Farabi's Philosophy of Plato and Aristotle* (Ithaca, New York:1969)

to allow the occurrence of such miracles.[82] Continuing with the use of the concepts outlined in the preceding pages, it is perhaps best to refer to these events as "extremely rare interruptions" in the strict regularity of habitual causes and effects. These interruptions are also divinely pre-ordained. Thus, miracles are possible precisely because the connection between cause and effect is *not* necessary. Al-Ghazali asserts that if only al-Farabi and Ibn Sina can, logically and empirically, demonstrate necessary connection between subsequent events then they can demonstrate the impossibility of the miracles.[83] But they are unable to do this either logically or empirically. Thus the prophetic miracles are not merely analogical literature stories; they are possible yet extremely rare. This is the main point of the seventeenth discussion of al-Ghazali's Incoherence.

Al-Ghazali also speaks of *intermediaries*, particularly angelic intermediaries. Al-Farabi endows the angelic intermediaries with casual efficacy; his emanationist model necessitates that God is "bound" to act "through" angelic mediation. In al-Farabi and Ibn-Sina, the generations and corruptions in the world are attributed to either celestial intelligences or celestial souls. Al-Ghazali, in some of his writings, appears to endorse the idea that intermediaries mediate between divine power and its locus of manifestation. But does mediation mean that the intermediary is endowed with causal efficacy? I think not, because some of al-Ghazali's statements indicate opposite of this. For example al-Ghazali tells us that "*there is no agent except God...and that has no partner sharing his act.*"[84] He also asserts that the same act is attributable to an agent in the sense that he is the locus of divine action. It is in these terms that the Qur'an attributes the same act sometimes to God, sometimes to the angels, sometimes to the human servant. To quote al-Ghazali, "*God, exalted be He, related acts in the Qur'an one time to the angels, one time to the servants and another time to Himself.*"[85] It is clear from this that the angels are intermediaries only in the sense that they are the locus of divine action. Hence God is the only true agent, and the angels are *pseudo-agents* -if I may say so-. Therefore, it seems, al-Ghazali's

[82] And, hence, the literal acceptance of their scriptural accounts.
[83] Al-Ghazali, *Tahafftut al-Falasifa*, 169
[84] Al-Ghazali, *Mi'yar al-'Ilm*, ed. S. Dunya (Istanbul, 1961), 191
[85] Al-Ghazali, *Mi'yar al-'Ilm*, 192

theory of causation allow employing the term "cause" for intermediaries because of a linguistic necessity.

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As I alluded above, for al-Farabi and Ibn Sina whole cosmos emanated from God as the necessary consequence of the divine essence. For al-Ghazali this meant the denial of the divine attributes of life, power, will, and knowledge. As al-Ghazali saw it the theory of emanation implies that God creates the world by necessity in the same way the sun produces its light by its very nature.[86] Due to the logical consequences of the theory of emanation, he maintains, the God of the philosophers is not the "God of the 'Qur'an", and their cosmological principles are at odds with the "Qur'anic" point of view.[87] Moreover, Al-Farabi maintains that the world is the necessitated effect of an eternally necessitating cause and hence must be eternal. For al-Ghazali the doctrine of an eternal world entails the denial of God's will.[88] The issue here is whether God acts voluntarily or by the neccessity of the divine nature. [89]

The cosmos for al-Ghazali is a system of predetermined complex concomitant ordered events, the direct creation of divine power. It is a perfectly designed cosmos, and behaves like a perfectly designed unified organism.[90] This concept of a perfectly designed cosmos is the very basis for al-Ghazali's argument for the existence of the

[86] Al-Ghazali, *Tahafful al-Falasifa*, 166
[87] Al-Ghazali, *Tahafful al-Falasifa*, 169
[88] Al-Ghazali, *Tahafful al-Falasifa*, 172
[89] Ibn al-'Arabi rejects the theory of emanation for a different reason. A well known maxim, probably used first by al-Farabi (or ibn Sina) to ground emanation, asserts that "nothing proceeds from the One but one." Ibn al-'Arabi rejects this maxim. He understands it to mean that God is the cause of a single being and that this being is the cause of the cosmos. For Ibn al-'Arabi, when the issue is posed with these terms, it may appear that al-Farabi's first intellect is identical with the Breath of the Merciful. So the philosophers who defend the theory of emanation are guilty of associating things with God, of *shirk*. He writes: "*Others make this Real Thorough Which Creation Occurs (The First Intellect) an existent entity through which God created what is apart from Him. These (Al-Farabi, Ibn Sina) are those who say that "Nothing proceeds from the One save one" and that the procession of this one is the procession of an effect from a cause, a cause that demands that procession. This is an error. As for me, I say, When God's command comes (40:78), the Commander is the command, and this is the tawhid of Him Who possesses the command.*" Ibn al-'Arabi*: The Bezels of Wisdom*, trans. R.W:J. Austin (New Jersey: Paulist Press, 1981), 72
[90] Michael E. Marmura, "Al-Ghazali on Bodily Resur-rection and Causality in Tahafut al-Falasifa and the Iqtisad," *Aligarh Journal of Islamic Thought* 1.2 (1989): 62

divine attribute of power, namely that God alone is the creator of all things, that "*all the acts of His servants are His creation, connected with His power.*"[91] Based on statements al-Ghazali makes in various works we can conclude that al-Ghazali strictly denies a substantial continuation between the essence of God and the cosmos (wahdat al-wujud). However al-Ghazali's cosmic view allows us to see the world as a manifestation of the divine attributes. The world is a dynamic display of the divine attributes of Will, Power, Knowledge, and Life.

Al-Ghazali denies any causal efficacy in created things.[92] Therefore, in sharp contrast to Ibn Sina and al-Farabi, he denies the "horizontal causation", but affirms the "vertical causation." Namely, when the term cause refers to God, it must be understood as true and actual, when it refers to temporal interaction within the world it is being used metaphorically. As I alluded above, God's ordaining things to flow in a uniform course is a basic concept to al-Ghazali's causal doctrine. He asserts that the connection of these things "*is due to the prior decree of God who creates them side by side, not to any inherent necessity of these things that would render their separation from each other impossible.*"[93]

Al-Ghazali, on the other hand, adopts Ibn Sina's demonstrative logic (by reinterpreting causality from an occasionalist perspective) for a different purpose, to bring home the point that scientific inference rests on the conviction of nature's uniformity. For him, one can follow the requirements of the Aristotelian demonstrative method and attain scientific knowledge. This belief he shares with al-Farabi and Ibn Sina.

2.4 Conclusion

In summary, al-Ghazali affirms that the relationship between cause and effect

[91] Al-Ghazali, *Al-Maqs¸ad al-Asna¯ fi sharh Asma¯ ' Allah al-husna* (The ninety-nine beautiful names of God), trans. David B. Burrel and Nazer Daher. (Cambridge: The Islamic Texts Society, 1992), 21.
[92] Al-Ghazali, *Tahafut al-Falasifa*, 166
[93] Al-Ghazali, *Tahafut al-Falasifa*, 169

is not necessary. If God wills, as in the case of Prophetic miracles, otherwise strict casual chain may be broken. Casual necessity is not a logically proven of empirically observable fact, but rather an intra-mental construction to make sense of the extra-mental reality. This is how we demonstrative method is employed and scientific knowledge is produced. However, although the observed lawfulness and regularity in the world encourages us to view cause and effect relation as necessary, a more careful contemplation would expose that we, actually, do not have enough reasons to conclude that the relation between what is habitually believed as cause and what is habitually believed as effect is necessary. We should not confuse the intra-mental depiction of the world with the extra-mental reality of the world. Thus, on a logical ground, a casual doctrine which fundamentally differs from Islamic peripatetics' and which is consistent with empirical observation can be asserted. The strict sequence of events can be interpreted in a way that is in accord with the authentic textual sources of religion. The corner stones of such casual doctrine are: Finite beings are devoid of casual efficacy, God is the real cause of all events and God attaches cause and effect on a self-imposed habitual pattern.

CHAPTER 3

NEEDED: NEW METAPHYSICS FOR NEW SCİENCE

As I alluded in the first chapter the defining questions of the contemporary science and religion discourse revolve around a central core: the questions related *God-and cosmos relationship*. The primary challenge facing the contemporary science and religion discussion is to consider the divine action without doing violence to scientific causal explanations. This calls for *a comprehensive metaphysical framework* which could integrate scientific causality and divine causation into a single account of the world. The required theory must allow one to speak of divine action alongside the network of scientific explanations. It should also escape both *deism* and *interventionism.* Because clearly Deism is in sharp contrast with Jewish, Christian and Muslim claims of divine action in the world; and interventionism reduces the divine to a God of the (few remaining) gaps, although modern science, it appears, leave no gaps in the natural order.

Now I turn to investigate the merits and shortcomings of al-Ghazali's theory of causation in terms of contributing to the construction of a comprehensive metaphysics connecting religious and scientific experiences without doing violence to their explanatory potential; especially, within the context of the contemporary science and religion discussion.

3.1 The Merits: Naturalism and Al-Ghazali's Theory of Causation

I think the greatest merit of al-Ghazali's theory of causation is that it appears to secure the organizing principles of modern scientific activity. Namely, that al-Ghazali presupposes that interactions in the world are regular, that physical occurrences are lawful, that casual histories can be traced, and that physical

calculations and predictions are possible.[94] Scientific activity extrapolates from these fundemental assumptions without questioning their validity. These assumptions (regularity, lawfulness, preedictability of the world) help scientists envisage how the world works and, thus, deeply conditions how the questions are formulated and how the answers are sought.

Although al-Ghazali asserts that the ultimate source of any interaction is the divine will and power, there is still a great deal of consonance between the logical conclusions of al-Ghazali's theory of causation and the organizing principles of scientific activity. To use more philosophical terminology, al-Ghazali's theory appears to endorse *methodological naturalism,* the view that the world is to be studied *as if* it is a casually closed, predictable and consistent system.[95] Methodological naturalism that some argue is the basis for modern scientific methodology refrains from the verdict that the world is *all there is*. In this regard, methodological naturalism differs from *metaphysical naturalism* which holds that the world is all there is.[96]

Given that there will never be a break in God's habit, al-Ghazali's universe is predictable, lawful, and regular what is manifested in the physical realm is to be studied in light of these assumptions. God is the real source of generation and corruption. The consistency of the world is a basic concept of al-Ghazali's causal doctrine, i.e., God does not rule over the world in an arbitrary manner. He writes, for example, that the connection of these things "*is due to the prior decree of God who creates them side by side, not to any inherent necessity of these things that would render their separation from each other impossible.*"[97] Here occasionalism diverges from interventionism and "God of the gaps" argument.

[94] On the presumptions of naturalism see Philip Clayton, *God and Contemporary Science* (Edinburgh: Edinburgh University Pres and Grand Rapids: Eerdmans, 1997), 169-167.
[95] The proponents of methodological naturalism seems to benefit from *as if* philosophy of Kant.
[96] Fort he distinction between methodological naturalism and metaphysical naturalism please, among others, see, Alvin Plantiga, "Methodological Naturalism?" *Perspectives on Science and Christian Faith* 49(1997): 143-154.
[97] Al-Ghazali, *Tahafftut al-Falasifa*, 169

Thus al-Ghazali's universe is strictly law governed. To make this point clear al-Ghazali quotes from the Qur'an: "you will not find any change in God's habit." (33:62) Departing from this verse al-Ghazali asserts in the *Revival* several times that God will never change his habit, i.e. the way He interacts with the creation.[98] This is, then a strictly regular or *nomological universe*.

An occasionalist universe remains *indistinguishable* from one governed by secondary causality (natural laws). Although al-Ghazali denies *horizontal causation* –necessary connection- he affirms *vertical causation* –constant conjunction- in a way that can secure the consistency of cause and effect interactions. Al-Ghazali rejects necessary connection between cause and effect, but through the divine assurance he secures the strictness of cause-effect relationship. Thus al-Ghazali's theory accords with *methodological naturalism***.** Both approaches endorse strict cause and effect sequence in the nature. But his theory clearly rejects all forms of *metaphysical or ontological naturalism*, i.e. it rejects the idea that "nature is all there is".

Al-Ghazali asserts that the denial of casual necessity in things does not necessarily lead to chaotic happenings in the world or irregular course of events.[99] God, because of His goodness, ordains an order for the cosmos and sustains it with His power. The order of nature is only interrupted when a prophetic miracle takes place- an event which is also decreed and created by God and extremely rare-. God ordains events to proceed along a uniform, orderly, habitual course and creates in humanity an epistemological trust that this uniformity will continue.[100] He creates in humanity the *trust* and the knowledge that he enacts events in a habitual uniform course. It is precisely this *trust* in God that provides the grounding for scientific inference, for scientific knowledge. Here Al-Ghazali adopts Ibn Sina's demonstrative logic by reinterpreting causality from an occasionalist perspective and for a different purpose. For him, one can follow the requirements of the demonstrative method and

[98] Al Ghazali, *Ihya-u Ulum ad-Din*, trans. Ahmed Serdaroglu (Istanbul: Bedir Yayınları. 2002), 4:12.
[99] Michael E. Marmura, "Al-Ghazali on Bodily Resur-rection and Causality in the Tahafut al-Falasifa and the Iqtisad," *Aligarh Journal of Islamic Thought* 1.2 (1989): 52-53
[100] Marmura, "Al-Ghazali on Bodily Resur-rection and Causality in the Tahafut al-Falasifa and the Iqtisad," 57.

attain scientific knowledge within the framework of occasionalism.

Therefore al-Ghazali's doctrine equalizes natural laws and God's habits (*adatullah*). This is significant with respect to the construction of *parallel linguistic structures* relating to and explaning the same natural phenomena from different perspectives without negating each other's legitimacy or authority. Namely, when the term cause refers to God, it must be understood as true and actual, when it refers to temporal interaction within the world it is being used metaphorically.[101] As such al-Ghazali's doctrine appears to be in accord with the Qur'anic text that attributes the same natural phenomena one time to natural causes and another time to God.

II

Second merit of al-Ghazali's doctrine stems from his keen insight that so-called casual necessity is empirically unobservable and that human perception cannot penetrate the real nature of the physical occurrings in the world. An objective truth about the nature of causality is impossible due to an epistemic barrier between human mind and the natural order—namely, that the structure of human cognition as well as the structures of physical operations preclude us from apprehending the world as it is. Here al-Ghazali is in accord with the Copenhagen interpretation of the Quantum theory.[102]

Particularly Bohr's ideas on the nature of observation and Heisenberg's uncertainity principle point to some acpects of nature where we encounter empirical and rational limit. Namely, that Heisenberg uncertainity principle asserts that the very act of observation disturbs the position or the momentum of a subatomic particle. When a subatomic particle's momentum is observed its position is disturbed, when its position is observed its momentum is disturbed. Here, the

[101] This point is later developed by such thinkers as Said Nursi.
[102] Umit Yoksuloglu Devji, "Al_Ghazali and Quantum Physics: A Compereative Analysis of The Seventeenth Discusion *Tahafut al-Falasifa* and Contemporary Quantum Theory" (MA Diss. McGill University, 2003)

predicament stems from the fact that the act of observation is done by using light, and the world of subatomic particles is extremely sensitive to light. Because light itself is composed of subatomic particles, photons. The act of observation becomes one of the inputs of an experiment conducted to observe subatomic world and affects the outcome of that experiment. It follows that equipments and methodologies we use and the questions we formulate condition (if not determine) how we observe the world of "very small".

Along with these lines Heisenberg writes: "Even in principle we can not know the present in all detail. For that reason everything observed is a selection from plenitude of possibilities."[103] Bohr also makes a similar argument: "Any determination of the energy and the momentum of the particles demands that we renounce their exact co-ordination in space and time. In both case the invocation of classical ideas, necessitated by the very nature of measurement, is, beforehand tantamount to renunciation of a strictly casual description."[104]

Here we see that some prominent interpreters of quantum theory reach a similar conclusion with al-Ghazali. Namely, that establishing the necessity of cause and effect relation, merely, on observation is not scientifically plausible. In other words, *hitherto* empirical attempts do not give enough reasons to believe that cause and effect relationship is necessary. Thus, one can argue that envisaging a necessary relationship between cause and effect reflects prior metaphysical convictions, not solidly grounded scientific data. Therefore al-Ghazali appears to endorse a metaphysical theory which can be stated in accordance with the best available scientific knowledge.

Now the critic may object that al-Ghazali's theory of causation lacks proper rational foundation and empirically not testable—as all other metaphysical statements—by using very persuasive arguments produced by Kant, Hume and

[103] Helge Kargh, *Quantum Generations: A history of Physics in the Twentieth Century* (Princeton: Princeton Unibversity Pres, 1999) 209.
[104] Jennifer Trusted, *The Mystery of Matter* (London: McMillan Press, 1999) 147.

analytical philosophy for that matter. I agree with the critique of metaphysical theories in that they are ultimately not empirically testable. However, although I cannot make the whole case here, I do hold that a metaphysical theory appears to be plausible if it is *consistent* with what we know about the world through rational and emprical endavour. Though perhaps not impossible, it is certainly difficult to develop such metaphysical theories.

Metaphysical theories are usually integrated with a physical ontology. In other words an adequate metaphysical statement is uttered with an eye on the best available data about the world which is usually provided by scientific explanations. However a problem arises here. What physical ontology does modern science suggest? There is a reason to wonder whether this question could be answered on physical-empirical terms alone, because scientific data appears to lend itself to multiple legitimate ontological interpretations. This appears to be the case, for example, in the debate between the various interpretations of quantum theory. The theory itself includes irreducibly philosophical components, and crucial metaphysical assumptions.

The standard view that an explanation given in terms of physical laws and chance eschew metaphysics is so commonplace, so entrenched, so widely promoted that it is taken to be truistic. But for all that, I believe this assumption is challengeable—namely, that the concepts of *necessity and chance* wherever they emerge in scientific explanations bear metaphysical components. It is important to notice the metaphysical leanings of the current scientific language if we want to treat them as such.

An explanation given in terms of physical laws and chances is generally viewed as *scientific*. Here is an example: The theory of evolution. In light of this theory, everything in the nature is perceived as the result of random natural processes (chance) that are governed by physical laws (necessity). Despite the divergences of the opinion on the mechanism and pace of the process, all forms of evolutionary biology explain natural phenomena by referring to *chance* (genetic variation) and

necessity (natural laws). All factors involving in genetic variation (gene flow, mutation, sexual reproduction) are random processes. But evolution as a whole is not a random process. Natural selection necessitates evolution by constantly transforming chance into advantage, and advantage into design. Thus, life, design and even consciousness necessarily emerge out of the continuous interplay of the *natural laws and chance.*[105]

Here is another example from physics: The mathematician/physicist P.C.W. Davies writes: "Subatomic physics is not complete anarchy. Classical physics has rules *governing* the interactions of matter. When relativity is taken into account, we must include mass with energy because of the equivalence $E = mc^2$. There is also a universal *asymmetrical* law which *regulates* the *organization* of the activity."[106]

This is the standart presentation of any subject understood in relation to the physical laws and random processes. Now, this passage envisages that the physical laws are *governing, regulating, disciplining, ruling,* and thus *necessitating* the world. This vision of law and matter relationship is so entrenched that it is taken to be an obvious truth.

It seems that in explanations like this the physical laws assume the role of God in traditional religious construction of God and cosmos relationship.[107] Namely, that the cosmos subdues the dictates of the ineffable transcending power of the omnipresent physical laws. All the metaphorical and anthropomorphic concepts employed to explicate the relation between laws and matter seems to be the

[105] A revealing article on this subject, please see "Chance and Necessity" by Francisco Ayala, retrieved on Jan 14, 2011, http://www.counterbalance.org/evolution/chance-frame.html
[106] Davies, P.C.W. *The Forces of Nature*. (Cambridge: Cambridge University Pres, 1980). 155-157
[107] For example, in the Reform Jewish High Holiday service:
There was a silence; there was chaos; there was a voice. A mind went forth to
form worlds: now order reigns where chaos once held sway.
The law makes evening fall; the law brings on the dawn.
The moon follows accustomed paths, constellations their patterned ways.
Sovereign is the will that orders the stars in their courses in the endless skies:
Sovereign is that will! (Stern, Chaim, ed. 1978. *Gates of Repentance – The New Union Prayerbook for the Days of Awe.* Central Conference of American Rabbis, New *Yor.*, p. 25), found in Norman Swartz, *The concept of Physical Law*, (Siman Frazer University: Canada, 2003)

transmuted residue of a traditional supernatural theory (e.g., "power," "behavior," "governed by," "constrained by," "disciplined", "dictated" etc.)[108]

Questions arise here. What are physical laws? Are they merely descriptions of the orderliness of the natural phenomena, or observed consistencies necessitated by the very fabric of the cosmos? If the perpetual consistency is grounded by the matter itself then are we attributing matter some kind of consciousness? Or are there mystical, sublime, omnipotent, impersonal, immaterial laws imposing (forcing) the material contents of the cosmos to behave in certain ways? [109]

There are several competing theories explaining the origin and nature of the physical laws. I think they fall into three groups: *Materialistic, Idealistic, Anti-Realistic* Theories of the Physical Laws. They all attempt to explicate the concept of *necessity*.[110] Let me briefly explain their arguments and some objections which can be directed towards them.

According to the materialistic accounts, the physical laws[111] are necessitated by matter itself. There is physical necessity in nature itself. It inheres in the woof and warp of the universe. Consistencies are emerging out of some properties of the grounding stuff or structure, or of the primordial *arche*. An immediate question arises here when one talks about the *properties* of the underlying stuff and structure. The interactions at all levels within the universe, especially at sub-atomic and atomic level, present a wonderful orderliness, *lawfulness*. The consistency of the interactions

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[108] Reminds me Feurbachian critic of antrhopomorphic construction of Godhead. We encounter the same antrhopomorphic tendency in the depictions of natural laws.

[109] Explaining the very foundation of the evolutionary mechanism seems to be transcending the scope and limits of the evolutionary theory. Dennett is aware of this difficulty. "*All that is left over in need of explanation at this point is a certain perceived elegance or wonderfulness in the observed laws of physics."* Daniel Dennett, *Atheism and Evolution* in Cambridge Companion to Atheism. (New York: Cambridge University Pres, 2007), 147

[110]And so, alongside the older metaphysical question, "Why is there anything, rather than nothing?", there arises a newer central question is "Why the universe behave in such a way that make it possible for life, design and consciousness to emerge?"

[111] For an extensive defense of this position please see Mumford, S., *Laws in Nature*, (London: Routledge., 2004)

can be encapsulated in the form of mathematical formulas. These mathematical formulas are usually taught as the laws itself. But a close scrutiny would expose that the problem is more difficult- namely, that "laws" could be either material entities or non-material entities. In both cases explanation of "laws" poses serious challenges to human mind. If they are material entities and if we can trace orderliness and consistency one step further to a material background, then a question arises that why this material background manifest itself on an upper level in the from of consistency and orderliness. This would imply lawfulness on so called material background and we would have to explain lawfulness on that level as well; this goes *ad infinitum.* A number pf philosophers such as von Wright conducted thought experiments –because of the unempricalness of physical laws we are bound only to conduct thought experiment- attempting to justify physical necessity.[112] But as Hue clearly had seen these experiments showed no more than a pervasive regularity in even the underlying stuff and structure of the observed orderliness.[113]

Idealistic theories of the laws of nature[114] -that seem to be the implied view in preferred scientific language- envisage that immaterial, mystical, sublime physical laws govern, regulate, discipline the world and force nature to behave in certain ways. It is implied here that physical necessity is caused by the laws of nature itself. This iconic view is taken for granted without further realization that there is no rational or scientific proof to believe such queer entities as there is no such rational-scientific proof to believe in the existence of supernatural entities.[115] Furthermore, if Kant is right, it is impossible to provide all-convincing proofs for the existence of

[112] Wright, Georg Henrik von, *Causality and Determinism*, (New York: Columbia University Press), 1974

[113] For a extended discussion please see "Laws of Nature" by Norman Swartz, retrieved on Jan 14, 2011, http://www.iep.utm.edu/lawofnat/

[114] I think Mumford takes this position. He maintains that, in order to govern, laws must be external to the properties they govern, but, to be external in this way, the governed properties must lack proper identity conditions. Please see Carroll, John W., "Laws of Nature", *The Stanford Encyclopedia of Philosophy* (Spring 2011 Edition), Edward N. Zalta (ed.), forthcoming URL = <http://plato.stanford.edu/archives/spr2011/entries/laws-of-nature/>.

[115] There is also a semantic difficulty here. As Swartz points out Instead of having propositions taking their truth from the way the world is, the proponents of this view argue that certain propositions – namely the laws of nature – impose truth on the world. For extended discussion of this problem please see Norman Swartz, *The concept of Physical Law*, (Siman Frazer University: Canada, 2003), chapters 4-7

entities which stand beyond natural world as omnipotent and omnipresent principles and allegedly govern every aspect of it. Such a notion is essentially unemprical. Moreover from this point of view laws are *principles* followed by each particle. It is an important question then to ask how something as immaterial principle, without external body, govern and impose itself to a material world. Are we attributing some kind of consciousness to entities that follow these *immaterial principles*? There is more to this. If emergence theories are true then each level of existence is governed by distinct set of laws. Then the very same question can be asked for those levels too, for the laws governing chemical, biological, social interactions. It follows that this is a philosophical and metaphysical interpretation of mathematically formulable regularities in the world and thus should be seen and be praised as such.

Anti-realistic theories[116] affirm that the physical laws are merely "statements of the uniformities or regularities in the world"[117]. They are just descriptions of the way the world is. There are, then, no laws but just *regularities*. Speaking of laws one can say no more or less than that laws correctly describe the world without implying nomological necessity. Laws can be conceived as *mental projections* used to be able to make sense of the observed order of the interactions of the content of the cosmos. From this standpoint one perceives laws as *brute facts* and by doing so refuses to think about the nature of the natural laws. Questions regarding the origin of the physical laws and the nature of the relation between laws and matter do not even arise. This position, I believe, capture more deeply the profundity of the question than the previous accounts. However one can still argue that this seems like an escape from the majesty of the question to the comfort zone of metaphysical idleness. That eventually perceives the universe as *a flying land* which is consistent in itself but flies in emptiness. Moreover, since the natural laws penetrate every

[116] For example Van Fraassen finds support for his view in the perceived failure to describe an adequate epistemology that permits rational belief in laws (van Fraassen, B. *Laws and Symmetry* (Oxford: Clarendon Press.1989), 130 and 180–181). Or Giere contends that the generalizations often described as laws are not in fact true (Giere, R. *Science Without Laws*, (Chicago: University of Chicago Pres, 1999), 90–91. Also see Ward, B., "Humeanism without Humean supervenience: A projectivist account of laws and possibilities", *Philosophical Studies* 107 (2002): 191–218. and Mumford, S., *Laws in Nature*, (London: Routledge., 2004)

[117] Norman Swartz, *The concept of Physical Law*, (Siman Frazer University: Canada, 2003), 3

scientific explanation, the question pertains not only the beginning of the universe but the presence of it as well.

For the reasons I stated above al-Ghazali (and Hume's for that matter) scepticism of casual necessity appears to be a scientifically viable position, a positon which is further bolstered by the insights suggested by the quantum theory as it pertains to the nature of observation and the nature of the physical interactions. When al-Ghazali rejects the principle belief that the world is "governed" by casual necessity or physical laws utters a metaphysical statement that is consistent with what we currently know about the world.[118] Although the current vocabulary used to express the nature of physical laws and the nature of the relation between the laws and the matter (that laws govern, regulate, force, necessitate) imposes a materialist metaphysics, our utmost knowledge about the physical laws and chance does not allow us to say more than that they are merely very successful descriptions of what occurs in the world.[119] Thus, al-Ghazali's casual doctrine is neither verifiable nor falsifiable by the scientific observation, but it can be stated in accordance with it. This is a merit too.

3.2 The Shortcomings: The New Sciences and Al-Ghazali's Theory of Causation

Although al-Ghazali's theory asserts that casual necessity is not empirically observable and logically provable, it still envisages the world as a lawful, regular, and consistent domain of existence. As I alluded above given that there will be no

[118] In the first edition (1952) of *A History of Western Philosophy*, we find W.T. Jones offering a reconstruction of Hume's theory**:** "Like identity [through time], necessary connection is something in us, not something in the object; like identity, it is grounded in a custom or habit of the imagination rather than in a rationale in the universe" (Jones, W.T. *A History of Western Philosophy*. (New York: Harcourt, Brace and Company, 1952), 780) along the same lines "All philosophers, of every school, imagine that causation is one of the fundamental axioms or postulates of science, yet, oddly enough, in advanced sciences such as gravitational astronomy, the word "cause" never occurs… The reason why physics has ceased to look for causes is that, in fact, there are no such things. (Bertrand Russell 1965. "On the Notion of Cause." In *On the Philosophy of Science*, ed. C. A. Fritz Jr., pp. 163-86.)" or "Belief in the causal nexus is *superstition*. (Ludwig Wittgenstein. *Tractatus Logico-Philosophicus.* Trans. D. F. Pears and B. F. McGuinness. Routledge & Kegan Paul, (London. Orig. pub. as *Logisch philosophische Abhandlung*, 1921, (1961)), section 5.1361 1961)"

[119] Still we should be in favor of using the same language. Any other concepts that are offered to replace these terms will inavoidably be loaded with other philosophical implications.

change in God's habit, i.e., natural laws, an occasionalist universe remains *deterministic*—except rare occasions of Prophetic miracles—. As al-Ghazali puts, the self-imposed habits of God would render the separation of cause and effect from each other "impossible."[120] This assertion holds that the same initial conditions always result in the same outcomes. As such occasionalism appears to be in accord with the assumptions of Newtonian mechanics; and one can regard this as an advantage for al-Ghazali's occasionalism as it pertains to its consonance with modern science.

However, a problem arises here. As such, al-Ghazali's theory of causation, as our investigation showed, agrees with the premises of Newtonian mechanics and, thus, leads to its logical conclusions, determinism and reductionism, as well. Namely, that if al-Ghazali envisages strict nomology and lawfulness in the natural world (again, except extremely rare prophetic miracles), then this clearly implies determinism. Secondly, al-Ghazali employs Asharian physical ontology, Ashari atomism, to ground his metaphysics. Together with the strict lawfulness envisaged by his theory of causality, this atomistic ontology compells us to formulate scientific explanations in a reductionist manner.

Determinism is the idea that casual context not only conditions but also determines the future. Reductionism is a logical conclusion of determinism and the dominant physical ontology of billiard-ball universe. Non-teleological movements of the atomic constituents of physical universe are in conformity with the physical laws that generate and corrupt the existents. Such a worldview dictates that scientific explanations are to be given in terms of the interactions of atoms and physical laws and always in a bottom-up manner. This is the definition of reductionism. What happens in an organic or inorganic system can be only understood in terms of the interactions of the smallest constituent of that organic or inorganic system. Al-Ghazali's theory of causality and physical ontology do not escape these deterministic

[120] Al-Ghazali, *Tahaffut al-Falasifa*, 169

and reductionist conclusions of Newtonian mechanics.

However, in the first half of the 20th century revolutionary developments in physics shattered the confidence to many assumptions of Newtonian mechanics. The independent works of Werner Heisenberg (1901-1976) and Erwin Schrodinger (1887-1961), Albert Einstein (1879-1955) showed the shortcomings of Newtonian mechanism when applied to very massive or very small and very fast objects. After the verifications of the predictions of quantum mechanics, classical mechanics was modified to incorporate quantum mechanics. The current logic of correspondence principle is that all objects obey the laws of quantum mechanics, and classical mechanics is just a statistical quantum mechanics of large collection of particles. The explanatory success of quantum physics ended the three hundred years of dominance of classical mechanics, reducing it to a subset of quantum mechanics. Namely classical mechanics deals only with large systems, patterns or large quantum numbers and, therefore is, to a certain degree, statistical.

Reductionism and determinism have been challenged by other branches of the new science as well: Emergence theories, systems biology, relativity theories, informatics etc. The philosophical implications of the developments in these new fields suggest a fundamentally different physical ontology that is indeterministic, interconnected, luminous, and extremely dynamic. If physical ontologies and metaphysical assertions are inseparably intertwined then this radical transformation in our understanding of the nature of the physical world exhorts for reformulation of classical doctrines that model God-cosmos relationship.

In light of these groundbreaking discoveries the universe reveals itself as a more open, subtle, numinous, interconnected system than we have assumed for centuries. From quantum physics we learn that the same initial conditions in a sub-atomic system can produce different outcomes. This is in sharp contrast with the vision of the world provided by classical mechanistic determinism. This poses

serious challenges to the most basic assumption of al-Ghazali's occasionalism too.

The strict nomological nature of the universe is questionable. The term "chance" or "randomness" refers to (essential or apparent) *uncertainty* or *impenetrability* of a system where we encounter the gray zones appearing at the microcosmic and macrocosmic boundaries of the universe.[121] According to the Copenhagen interpretation of quantum mechanics "the probability of an event is related to the square of the amplitude of the wave function related to it" (Born Rule) and therefore the nature is *essentially* probabilistic. This implies *inherent (absolute) randomness.* If probability is fundamental, individual events are indeterminate and class of events is statistical then there is certain degree of *non-nomology* in the world. The relation between cause and effect or in other words past and future appears not to be as strict as al-Ghazali's theory asserts.

II

As I alluded above al-Ghazali's causal doctrine is closely linked to the ontological implications of Ashari atomism. Al-Ghazali first presupposes a physical ontology (fragmented, divided universe) suggested by Ashari atomism then integrates it together with metaphysics of causation. Recall that Ashari atomism holds that the universe is composed of discrete atoms and emptiness in which they move. These atoms are different from the atoms of Democritus in that their number is limited, they are not eternal, and they are continuously created in time. However there is also something of a fit between Asharism and Democritus, i.e., they both envision physical occurrences and attributes of entities in the world as results of association and dissociation of these atoms. Different configurations of atoms bring about different properties (shape, color, smell…) in entities. Although Asharism diverges considerably in many respects from Democritus and materialism, this particular aspect of Ashari atomism -which it shares with Democritus- appears to endorse the idea that the complex systems is understood by reducing them to the interactions of their parts.

[121] Einstein's famous maxim "God does not play dice" refers the 'random' nature of quantum mechanics

The world is viewed as a collection of atomistic fragments that are continuously created and manipulated by the divine power and will. The divine power and will associate and dissociate the atomistic fragments to bring about physical occurences. But the scientific evidence at the moment point to a different physical ontology. The world appears to be not as fragmented as it is assumed by al-Ghazali and Ashari atomism. It is much more complex, relational and multi-layered than the framework of Ashari atomism could convey. The world of subatomic physics revealed by quantum theory (for example quantum entanglement) and particle physics point to a different physical ontology in which the world is not a collection of atomistic fragments which can be separated from each other with no loss. Rather it is an "inseparable web of relations" where relationships between these fragments is as crucial as their separate existence in understanding their totality.

There is more to this. Put together with the idea that an occasionalist universe is indistinguishable from a universe governed by efficient (secondary-horizontal) causation because of the strict lawfulness in both cases, this ontology leads to a kind of methodological reductionism. By methodological reductionism I mean to trace casual explanations to the most fundamental level. An explanation based on interactions of the smallest particles (quarks, lepton, gravitons…) is the best explanation. Within the framework of al-Ghazali's theory too a scientific explanation will be given in terms of the interactions of atomistic fragments. But abstracted from religious terminology this is clearly a reductionist approach.

One might see this as an advantage on behalf of al-Ghazali's theory. Reductionism, after all, is the basis for many of the well developed areas of modern science. One can also perceive this as a problem in the light of the most recent developments in such fields as system biology, information theory, emergence theory, systems theory that point beyond classical notions of physical causality. These theories encourage us to endorse the idea that for many systems found in nature—the physiological systems of our body, local and global ecosystems, and

climate—it is almost impossible to predict the outcome of the system by merely understanding the components of the systems and their interactions.

The emergent properties appear to be more than the sum of the processes from which they emerge. That is to say consciousness, for example, is dependent on but not reducible to, or predictable from, or identical to the processes taking place in brain. Moreover it is suggested that these emergent properties exert top-down influence on the systems from which they emerged. Therefore to analyze such systems requires references to *top-down causation*, together with *bottom-up causation.*

Employing both top-down and bottom-up causation in scientific explanations clearly undermines single-minded versions of reductionism. If this is true then it is, I think, fair to say that there is certain degree of *incongruity* between "Islamic occasionalism" and philosophical implications of contemporary scientific developments.

CONCLUSION

Al-Ghazali's philosophy in general and his theory of causation in particular present a number of possibilities for approaching the contemporary discussion of religion and science. In this study, I focused on some of those possibilities, particularly on those that pertain to God's causative influence in the world. Through well-articulated ontology of Ashari Atomism, al-Ghazali addresses this question. The success of his endavour and tenability of his casual theory today can be measured only by looking at the specific problems he deals with and solutions that he proposes.

Al-Ghazali is neither a rationalist philosopher in the modern sense of the term nor a mystic in the sense of seeking knowledge through, only, spiritual contemplative acts. He employs philosophical argumentation based on logic and the concepts produced by Islamic peripatetics as well as the mystical language based on unveiling, taste (*dhawq*). He appears to view these two levels of exposition as complementary, not contradictory. In accordance with his general methodology, Al-Ghazali's theory of causation attempts two integrate philosophical-demonstrative and mystical-intuitive arguments in a comprehensive metaphysics.

My first goal has been to look at the relevance of al-Ghazali's theory of causation to some current issues in contemporary philosophy to provide a bridge between traditional philosophy and modern discussions. I also attempted to show the possible bearings of al-Ghazali's thought to what we may call the heart of contemporary religion and science discussion, the nature of causality. Namely, that the most defining premise of modern scientific enterprise is to perceive world as a casually closed system. Thus it attempts to provide all explanations in terms of the interactions of the constituents of physical world, and of matter and motion. But Abrahamic concept of God is active in the world and history, sustains the natural order, and changes the lawful course of events in case of miraculous events.

How to reconcile these two positions, without doing violence to scientific or religious modes of thinking, remains as a controversy. In my analysis, I tried to indicate some venues in which al-Ghazali's theory of causation can be read to address to this challenge. Our investigation points to some strengths and weaknesses of al-Ghazali's theory that can be grouped under following general headings:

Merits:

1- Al-Ghazali's theory of causation can be construed in way that can secure the organizing principles of scientific activity that interactions in the world are regular, that physical occurrences are lawful, that casual histories can be traced, and that physical calculations and predictions are possible.
2- Al-Ghazali's scepticism of casual necessity appears to be bolstered by the insights suggested by the quantum theory as it pertains to the impossibility of observing the world as it is due to the nature of observation and the nature of the physical interactions.

Shortcomings:

1- Although al-Ghazali diverges from many assumptions of Islamic peripatetism, he appears to endorse the idea that there will be no change in God's habit, i.e., natural laws. Therefore his occasionalist universe remains *deterministic*—except rare occasions of Prophetic miracles—. Bu the idea of determinism has been challenged by the quantum physics from which we learn that the same initial conditions in a sub-atomic system do not necessarily produce same outcomes. New science naturally points to a direction where the world reveals itself as a more open, subtle, numinous, interconnected system than al-Ghazali assumed.
2- Ashari atomism provides the physical ontology needed for al-Ghazali's *deterministic occasionalism*. However this atomistic and deterministic world view appears to end in scientific reductionism. Namely, that al-Ghazali's idea of strictly law governed universe and Ashari atomism's view of fragmented

> universe appears to force us to formulate scientific explanations in a reductionist framework, in terms of lawful interactions of the smallest particles and always bottom-up. But the most recent developments in such fields as system biology, information theory, emergence theory, systems theory that point beyond classical notions of reductionism. Some systems found in nature require references to *top-down causation*, together with *bottom-up causation.*

Al-Ghazali's theory is compatible with the most basic premises of Newtonian mechanics; and one can see this as a merit. It presupposes that the natural occurrences are lawful, regular, predictable and consistent. However the most recent scientific developments (quantum mechanics, relativity, systems/complexity theory) which appear to challenge the ontological presuppositions of Islamic occasionalism call for some fundamental re-thinking on the topic of divine action. Classical formulations of Islamic occasionalism appear to be no longer adequate in the light of new science. A new theory of causation which could convey the complex and multi-layered nature of interactions in the natural world is needed.

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