



SEYYED HOSSEIN NASR AND THE THEORY OF
EVOLUTION: A CRITICAL VIEW

BY

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ABSTRACT

Seyyed Hossein Nasr is a prominent Muslim scholar with a background in both classical Islam and modern science. However, he views both through the lens of perennial philosophy which he sees as a unifying principle embracing all religions and providing a view of science distinct from the mainstream. Nasr's life experience conditions these views as shown in a discussion of his biography. Nasr's perennial philosophy is assessed and shown to present distinct problems for both religion and science. In particular Nasr is very dismissive of the theory of evolution. His objections to evolution on both scientific and theological cum metaphysical grounds are discussed along with an overview of current evolutionary theory and its history. Other significant objections to evolution from a religious viewpoint are also discussed. The views of other selected Muslim scholars are also mentioned to provide a broader background to the topic. Nasr sees no possibility of reconciliation between religious belief and evolution and is highly critical of attempts to do so. Attempts by others to achieve reconciliation are discussed and evaluated. The approach to resolving such conflicts recommended by Ibn Rushd in his *Kitab fasl al-maqal (The Definitive Discourse on the Harmony of Religion and Philosophy)* is used to show such reconciliation is possible. The phenomenon of convergent evolution implies that evolution is constrained by natural laws inevitably resulting in similar body structures and functions of organisms performing similar roles. This includes the diverse forms of intelligence possessed by many animals. Convergence together with a discussion of Fakr al-Din al-Razi and Mir Damad's concept of time in Islam provides a means to integrate evolution into an Islamic framework. Among Muslim scholars who do accept evolution most draw the line at accepting human evolution. An overview of the evidence for human evolution is presented and discussed in the context of the Islamic view of man and his nature and origins. A fitrah-based approach viewing man as a being with both a material and a spiritual nature provides a potential answer to this problem.

خلاصة البحث

إن سيد حسين نصر عالم إسلامي بارز وله خلفية في كل من العلوم الإسلامية التقليدية والعلوم الحديثة. ومع ذلك كان يرى كليهما من منظور الفلسفة الدائمة التي يراها مبدأً موحداً يشمل جميع الأديان وي طرح رأياً عن العلوم الحديثة ما هو متناقض للرأي السائد المتعارف عليه. وكانت تجربة حياة نصر اشترطت هذه الآراء كما هي متبينة في مناقشة سيرته الذاتية، ومن خلال هذا البحث تم تقييم وعرض الفلسفة الدائمة التي يؤمن بها نصر لتقديم المشاكل الجلية لكل من الدين والعلم الحديث. على وجه الخصوص، كان نصر رافضاً لنظرية التطور، واعتراضه لهذه النظرية مبني على الأساس العلمية واللاهوتية ثم ما وراء الطبيعة (ميتافيزقا). وقد تمت مناقشتها مع تقديم نظرية شاملة وشائعة عنها وكذلك تاريخها. وكما تمت مناقشة اعتراضات هامة أخرى لنظرية التطور من وجهة النظر الديني، وحينئذ قد ذكرت آراء علماء المسلمين الآخرين لتوفير خلفية شاملة لهذا الموضوع. يرى نصر بأنه لا يوجد أية ملائمة ممكنة بين العقيدة الدينية وقضية نظرية التطور إذ أن القيام بذلك أمر خطير للغاية، وكما أنه قام بتقديم وتقييم محاولات الآخرين الذين سعوا لتحقيق التسوية والمقاربات بين الطرفين. ولقد أوصى ابن رشد في كتابه "فصل المقال وتقرير ما بين الشريعة والحكمة من الإتصال" باستخدام المنهج المتبع لحل هذه التناقضات، وليبرهن بأن تلك المقربات والملائمة شيء ممكن. تشير ظاهرة التطور المتقارب إلى أن التطور مقيد بالقوانين الطبيعية مما يؤدي حتماً إلى تكوين هياكل ووظائف مماثلة للكائنات التي تؤدي أدواراً مماثلة. ويشمل ذلك الأشكال المتنوعة من الذكاء التي يمتلكها العديد من الحيوانات. كما أن مناقشة كل من فخر الدين الرازي وميرداماد لمفهوم الوقت من المنظور الإسلامي الذي يوفر وسيلة لدمج نظرية التطور في إطار إسلامي. من بين العلماء المسلمين الذين يقبلون التطور، من يرسمون خطأ في قبول التطور البشري. ويتم تقديم نظرة عامة على أدلة التطور البشري ومناقشتها في سياق النظرة الإسلامية للإنسان وطبيعته وأصوله. النهج القائم على الفطرة الذي ينظر إلى الإنسان ككائن ذو طبيعة مادية وروحية يوفر إجابة محتملة لهذه المشكلة.

APPROVAL PAGE

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

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DEDICATION

To my late parents, Terry and Jean for supporting me, advocating for my education, for challenging me and encouraging me to seek out knowledge wherever I may find it.

MEMORIAM

Sadly, while this thesis was under review my original supervisor Professor Syed Mohamed Ajmal Bin Abdul Razak Al-Aidrus passed away.

Professor Ajmal was a supervisor and teacher with such a breadth and depth of knowledge, understanding and attention to detail that he brought out the best in his students. He was equally at home quoting from the classics as he was discussing the intricacies of physics. We shared a mutual love of great literature and his skill at crafting the written word improved my own writing. He supervised with a light touch, offering advice when needed. He encouraged me to broaden my intellectual horizon and thanks to him my research took directions I never would have dreamed of. Prof Ajmal was loved by his students and always made time for them in his extremely busy and productive life. We have lost a great scholar and a wonderful human being.

ACKNOWLEDGEMENTS

This thesis has an unusually long genesis. While studying geology and palaeontology at university in my late twenties I played a peripheral role in the opposition to attempts by Christian creationists to have their anti-evolution pseudoscience taught in secondary school science classes. At the same time as I came to grips with the wonders of geology and biology I realised the need for a well-considered religious response both to evolution and creationism.

The search for a religious understanding led me to Islam in my mid-thirties. One of the attractions of Islam at the time was that there did not seem to be significant opposition to evolution. Even the two Qur'an commentaries I read, by Yusuf Ali and Muhammad Asad, remarked on the meaning of some verses from the perspective of evolution. It was only when the Turkish creationist, Harun Yahya began widely distributing his books and videos attacking evolution that I became concerned about the intrusion of creationism into Islam.

My search for answers to this problem was encouraged by Sheik Nurudeen Lemu and my fellow trainers in the "Train the Trainers" group in Australia. Their enthusiastic response to my early attempts at reconciling evolution within an Islamic framework motivated me to pursue further study. However I realised I needed a much deeper exposure to Islam and Islamic thought.

I chose to pursue this at the International Institute of Islamic Thought and Civilization, (ISTAC) because of its important approach to studying contemporary world issues from within an Islamic framework. It is an institution which will be greatly missed. At ISTAC I benefited from discussions with Professor Osman Bakar whose perspective on Islam and science opened new ways of thinking for me. Professor Cemil Akdogan introduced me to the study of Western philosophy and the philosophy of science, which is missing from the study of science at many western universities. As my first supervisor he also reviewed some of my early writing and assisted with an early version of my thesis proposal.

My current supervisor Professor Sayyid Mohd Ajmal bin Abdul Razak al-Aidrus helped me navigate the thesis committee approval process and improve my writing. He also reminded me that evolution is about more than Darwin and alerted me to the work of Mir Damad on time. He has shown considerable patience with a student whose health problems have meant that at times he was missing in action. The members of the thesis committee also made suggestions which assisted my research. I also thank Dr Abdul Ganiy for his assistance with the Arabic abstract.

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1 INTRODUCTION

1.1 SEYYED HOSSEIN NASR'S PHILOSOPHY AND HIS VIEWS ON SCIENCE, PARTICULARLY EVOLUTION

Surveys of Muslims show a majority reject Darwinian Evolution. Among those accepting it, many reject its application to humans. Although religious reasons dominate, there also seems to be an identity issue among Muslims living in the West.^{1,2,3} While apparently untroubled by modern cosmology and its theories on the origin and evolution of the universe, the theological implications for the evolution of living beings presents a serious challenge to belief which needs addressing. It also creates problems for Muslims involved in the life sciences and medicine because evolution underpins and unites virtually all of these sciences. A significant obstacle to acceptance also comes from Muslim scholars whose writings strongly reject or criticise evolution.

A good example of this is seen in the writings of Seyyed Hossein Nasr, who rejects evolution and regards the entire corpus of modern science as seriously flawed.⁴ His long and distinguished academic career, (he is currently Emeritus Professor of Islamic Studies at George Washington University), and his prodigious writing and speaking on topics ranging through theology, philosophy, comparative religion, the environment and Islamic science means his views demand attention. Nasr's views also

¹ Salman Hameed, "Bracing for Islamic Creationism", *Science*, vol. 322 (December, 2008): 1637 – 1638.

² Graebisch, Almut & Scheirmieir, Quirin, "Anti-evolutionists raise their profile in Europe", *Nature*, vol. 444 (November 2006): 406 – 407.

³ Rana Dajani, (pers. comm.), points out that translation of English terms into Arabic may not give the same meaning to the question. For example when asked in Arabic "Do you believe thst crearures are created?" Answering "yes" is not neccesarily a rejection of evolution.

⁴ Seyyed Hossein Nasr, "On Biological Origins" in *Islam, Science, Muslims and Technology*, (Kuala Lumpur: Islamic Book Trust, 2007), 147 – 174.

merit careful consideration given that he studied physics at M.I.T. and later geology and palaeontology at Harvard. This makes him something of a rarity as a scholar with a background in both science and theology. Nasr's prime objections to modern science are its reductionist methodology and what he views as its Western, secular foundations. Nasr's strongest objections are reserved for the Theory of Evolution. His theological, metaphysical and cosmological objections are to evolution's apparent violation of the Islamic principle of Unity and rejection of the creative actions of God in the material world.⁵ His rejection of evolution as science is mainly based on the views of others. These are reviewed and critiqued in subsequent chapters.

Nasr also distinguishes between reason and intellect. For him modern science uses reason as a process of gathering cold facts from what can be empirically observed and confines intellect to the means of interpreting those facts.⁶ The intellect in his view is much broader and is the means by which mankind can access and interpret a higher order of reality through revelation.⁷

Nasr regards modern Muslim scholars who adopt a theistic Darwinian evolution as "tying the Hands of God" however, he does this himself by claiming that evolution is an even greater miracle than any claimed for God.⁸ He reserves even greater scorn for Muslims who accept human evolution, accusing them of blasphemy and even heresy. Nasr accepts the evolutionary ideas of historical Muslim scholars and regards these as non-Darwinian. This is because in his view they retain the vertical dimensions of the *Chain of Being* thus accepting Divine Causality while

⁵ See chapters 2 to 4 for a fuller discussion of Nasr's philosophy and its origins.

⁶ Ibrahim Kalin, *The Sacred versus the Secular: Nasr on Science* in, *The Library of Living Philosophers: Seyyed Hossein Nasr*, The Library of Living Philosophers vol. XXVIII, Hahn, L. E., Auxier, R.E, and Stone, L. W. (eds.) (Chicago: Open Court Press, 2001), 460

⁷ Seyyed Hossein Nasr, *Knowledge and the Sacred: The Gifford Lectures, 1981*, (Lahore: Suhail Academy, 1988), 2 – 12.

⁸ Nasr, "On Biological Origins", op.cit., 167.

Darwinian evolution, in his view, denies Divine Causality by reducing the vertical dimension to the horizontal.^{9,10}

Science and its methodology is responsible for spectacular intellectual and technological achievements. It provides an effective tool to separate fact from fiction and speculation and to understand the workings of the material world. Evolution is a key integrating concept in the biological sciences which are at the cutting edge of modern science with enormous advances in knowledge and understanding being made. A proper understanding of evolution is important for Muslims engaging in biological science and technology.

Some of the evolutionary ideas of historical Muslim scholars had a distinctly Darwinian flavor. According to Bayrakdar, Darwin was influenced by the work of these scholars.¹¹ Bayrakdar's main evidence for this is a claim that Darwin was initiated into Islamic culture by the Cambridge orientalist Samuel Lee. However, the only record of any contact between the two is a dinner conversation mentioned by Darwin in one of his letters.¹² While there is no real evidence of a direct influence on Darwin their work may have indirectly influenced him via his European transformist predecessors.^{13,14}

Contrary to Nasr's views that evolution violates the principle of unity, the noted geneticist and evolutionary biologist, Theodosius Dobzhansky stated: "Nothing

⁹ Nasr, Op. cit., 154

¹⁰ The *Chain of Being* or *scala naturae* places matter and life in a strict hierarchical structure with foundational elements at the bottom and god at the top sustaining all through his actions.

¹¹ Mehmet Bayrakdar, "Al-Jahiz and the Rise of Biological Evolutionism", *Islamic Quarterly*, Third Quarter, London (1983): 307 – 315

¹² Charles Darwin, "Darwin, C. R. to Darwin, S. E.," Darwin Correspondence Project, <<http://www.darwinproject.ac.uk/entry-413>> (accessed 17 August, 2015).

¹³ *Transformism* is the term used by continental European scientists for evolution.

¹⁴ See chapter 7.3 for a fuller discussion of this possibility.

in biology makes sense except in the light of evolution.”¹⁵ In this respect it can be viewed as a unifying principle in accord with the Islamic principle of Unity. Bearing this in mind a critical examination of both Nasr’s views and the Theory of Evolution should produce a resolution to this conflict.

1.2 RESEARCH PROBLEMS

1. Evolution is a firmly established scientific fact.
2. Darwin’s theory albeit more complex than his original offers the best scientifically valid explanation for evolution.
3. Surveys show a majority of Muslims reject evolution and the Darwinian explanation.
4. While some Muslims accept evolution, nearly all reject its application to human origins.
5. Seyyed Hossein Nasr is a key modern day Islamic scholar who is critical of virtually all of modern science. In particular he rejects evolution on theological, philosophical and scientific grounds.
6. Historical Muslim scholars proposed evolutionary ideas, some of them similar to Darwin’s. Nasr considers them acceptable as they do not violate the Islamic principle of Unity.
7. Islam calls on Muslims to use their reason yet this rejection of evidence and reason based science produces an obvious conflict.

¹⁵ Dobzhansky, Theodosius, *Biology, Molecular and Organismic*, *American Zoologist* 4, (4), (Oxford University Press, Nov. 1964), 449.

1.2 LITERATURE REVIEW

Nasr's bibliography up to 1999 comprises 502 books, articles and papers.¹⁶ However only a few key publications cover his philosophy and his views on evolution¹⁷ Many of these have been republished in different languages or with minor revisions and/or title changes. Where possible, the current editions of these will be used except where it is necessary to demonstrate Nasr's historical views.

His views on Islam and the modern world were first set out in *The Encounter of Man and Nature: The spiritual crisis in Modern Man* published in 1968 by Allen and Unwin.¹⁸ The text was based on the Rockefeller Lecture Series he delivered at the University of Chicago in the 1960's. In his opening preface Nasr sets the theme for all of his subsequent writing on Islam and science.¹⁹

Nasr blames the current environmental crisis and the state of humanity on the destitution of the human soul and loss of spirituality caused by modernism. He cites the loss of this spiritual dimension as due to the "scientism" and "totalitarian philosophy" of modern science to the exclusion of other non-scientific world views. He further accuses this of leading to attempts at "resacralization" of nature leading to the rise of ;

a strange wedding in many instances between ecological movements and all kinds of pseudo-religious sects or the development of such heterodox and in fact dangerous so-called "synthese" as "the new religion" of Teilhardism²⁰

¹⁶ Mehdi Amrinazavi, Kailan Moris and Ibrahim Kalin, Bibliography of the Writings of Seyyed Hossein Nasr in , *The Philosophy of Seyyed Hossein Nasr*, The Library of Living Philosophers vol. XXVIII, Hahn, L. E., Auxier, R.E, and Stone, L. W. (eds.) (Chicago: Open Court Press, 2001), 831 – 964.

¹⁷ Other relevant comments by Nasr are scattered through his other publications and are discussed and referenced in the relevant ensuing chapters of this thesis.

¹⁸ Seyyed Hossein Nasr, *The Encounter of Man and Nature: The spiritual crisis in Modern Man*, (London: Unwin Paperbacks, 1990).

¹⁹ Ibid., 5 – 10.

²⁰ Ibid., 6

Nasr does more than blame science for the problem. He sees it as destroying the spiritual well-being of man and his place in the cosmic order;

Nothing is more dangerous in the current ecological debate than that scientific view of man and nature which cuts man from his spiritual roots and takes a desacralized nature for granted while expanding its physical boundaries by billions of light years. This view destroys the reality of the spiritual world while speaking of awe before the grandeur of the cosmos. It destroys man's centrality in the cosmic order and his access to the spiritual world while speaking of the incredible science-fiction of the evolution of man from the original soup of molecules which supposedly contained the whole of cosmic reality at the beginning following the big bang.²¹

Not only does this statement blame science for the problems of the world it also challenges the validity of key areas of modern science such as the great age and size of the universe and the origin and evolution of life. However, Nasr claims he is not so much challenging science as he is seeking a return to a view of nature sanctified by a revival of metaphysical knowledge;

The thesis presented in this book is simply this: that although science is legitimate in itself, the role and function of science and its application have become illegitimate and even dangerous because of the lack of a higher form of knowledge into which science could be integrated and the destruction of the sacred and spiritual value of nature. To remedy this situation the metaphysical knowledge pertaining to nature must be revived and the sacred quality of nature given back to it once again.²²

The problem here is that modern science does not incorporate metaphysics because it is outside the boundaries of science. A good example of the problem is in this statement of Nasr's;

What is desperately needed in biology, as in physics, is a philosophy of nature which again cannot be abstracted from biology itself and even less from physics.²³

²¹ Nasr, *op. cit.*, 7

²² *Ibid.*, 14

²³ *Ibid.*, 127 – 128.

If a philosophy of nature cannot be abstracted from biology or physics, both of which study nature, what can it be extracted from? Nasr's answer of course is metaphysics but not just any metaphysics. Nasr seeks a return to a pre-Enlightenment worldview;

In order to accomplish this end the history and philosophy of science must be reinvestigated in relation to Christian theology and the traditional philosophy of nature which existed during most of European history. Christian doctrine itself should be enlarged to include a doctrine concerning the spiritual significance of nature and this with the aid of Oriental metaphysical and religious traditions where such doctrines are still alive.^{24,25}

Nasr does not seek a new metaphysics to accompany post-Enlightenment science rather he seeks an immutable metaphysics which is tied to these philosophies and doctrines;

These traditions would not be so much a source of new knowledge as an aid to *anamnesis*, to the remembrance of teachings within Christianity now mostly forgotten.²⁶

Nasr's *anamnesis*²⁷ is not a strict remembrance of Christian teachings. It is more ancient than that. When talking of the achievements of Muslim and later medieval Christian mathematicians he describes them as applying:

... the realism of Aristotelian biology and physics to the domain of the most exact mathematical science of the day, namely astronomy, and converted the epicyclic system of Ptolemy from mathematical configurations to crystalline spheres which formed a part of the real texture of the Universe.²⁸

Of course Ptolemy's epicycles were a complex mathematical model to explain the measurements of planetary movement and were far from an exact description of

²⁴ Op. cit., 14.

²⁵ Interestingly despite Nasr's rejection of his views this is exactly what Teilhard de Chardin attempted.

²⁶ Ibid., 14.

²⁷ *Anamnesis* is a recollection, in particular the remembering of things from a supposed previous existence. The term is often used with reference to Platonic philosophy.

²⁸ Ibid., 25.

reality. Likewise crystalline spheres are no longer part of the real texture of the universe. Nasr views alchemy in a similar light, comparing it to the “celebration of a cosmic mass” and observing that substances lost their “sacramental character” when it was reduced to chemistry.²⁹

Nasr sees metaphysics today as restricted to being the handmaiden of science rather than providing a sacred vision;

Metaphysics is similarly reduced to rationalistic philosophy, and this philosophy itself has become gradually the ancillary of the natural and mathematical sciences, to the extent that some modern schools consider the only role of philosophy to be to elucidate the methods and clarify the logical consistencies of the sciences.³⁰

For Nasr, metaphysics is;

a theoria of reality whose realization means sanctity and spiritual perfection, and therefore can only be achieved within the cadre of a revealed tradition.³¹

Furthermore Nasr sees metaphysics as universal to all revealed traditions;

Metaphysical intuition can occur anywhere-for the 'spirit bloweth where it listeth' - but the effective realization of metaphysical truth and its application to human life can only be achieved within a revealed tradition which gives efficacy to certain symbols and rites upon which metaphysics must rely for its realization.³²

It would be reasonable to expect Nasr to approve of revisiting metaphysics in order to resanctify nature however he rejects attempts by others to do so. He is most critical of Pierre Teilhard de Chardin and his attempts to revive Christian spirituality by integrating evolutionary theory into a Christian mystical view.³³ Although de

²⁹ Op. cit., 21.

³⁰ Ibid., 23.

³¹ Ibid., 81.

³² Ibid., 81.

³³ De Chardin also sought inspiration from oriental religious traditions. He spent considerable time among Muslims but was apparently not influenced by Islamic ideas. Further research in this area might prove interesting

Chardin's metaphysics operates within the framework of the Christian tradition, Nasr rejects it;

The case of Teilhard de Chardin, the most recent adventure of this kind, is a perfect example of pseudo-metaphysics tied to the theory of evolution, and stands at the very antipodes and is the antithesis of the spiritual vision of nature we have discussed in our earlier chapters.³⁴

Nasr clearly views de Chardin's metaphysics as false but he holds this view because he regards evolution as false;

Taken as a dogma, evolution is presented without considering biological cases which cannot be explained by it. Likewise, the opposition of the evolutionary hypothesis to the law of entropy, and the implications it has in the light of the belief held by other sciences of the gradual running down of the whole corporeal universe, is rarely emphasized in general presentations of evolution which is made to appear as most logical and scientific. Most important of all, few bother to mention that in the world in which we live there is no evolution observed at all. Nor have the experiments made to provide a laboratory case of the transformation of one species into another been successful.³⁵

Nasr states other reasons why he regards evolution as false but the key thing here is he rejects de Chardin's metaphysics because he rejects the science of evolutionary biology. However, the same can also be said of Nasr's metaphysics which he ties to long discarded theories of epicycles and crystalline spheres.

This raises the question of what is an acceptable metaphysics and if evolution is correct is de Chardin's metaphysics acceptable? A more pertinent question would be: Is de Chardin's metaphysics developed in a Christian framework acceptable in an Islamic framework?

Nasr's other major objection to evolution is one which makes even Muslims predisposed to accept evolution uncomfortable;

³⁴ Nasr, *op. cit.*, 127.

³⁵ *Ibid.*, 126.

A more objective assessment of the findings of biology would insist that as long as man has been living on earth he has not evolved at all; nor has his natural environment changed in any way.³⁶

The so-called progressive evolution of mankind, far from being the inevitable consequence of cosmic and natural processes, is completely opposed to the immediate and contemporary life of the natural environment in which man lives, an environment whose movement is cyclic rather than evolutionary and which through cyclic change reproduces the same permanent forms.³⁷

Nowhere does Nasr attempt to confront the evidence for human evolution which by the time he produced this work was already abundant. Instead for this and other objections to evolution he refers to but does not elucidate the work of others.

Nasr's earliest work on science in Islam is his 1958 PhD thesis published as *An Introduction to Islamic Cosmological Doctrines*.³⁸ This work analyses the viewpoints and methods of early Muslims, the Ikhwān al-Safā', al-Bīrūnī and Ibn Sīnā on nature and cosmology. Their views as set out by Nasr had a hierarchical universe based on a Ptolemaic cosmology of concentric spheres combined with Aristotle's elements of fire, water, earth and air with Plotinian emanations of pure intelligences or souls blended with the angels of monotheism with One Necessary Supreme Being at its head giving rise to all below.³⁹

Much of this viewpoint is shared by Nasr who, in the introduction, bemoans the loss of spiritual footing of Muslim students and their alienation from Islam on their first contact with modern science.⁴⁰ He further decries what he sees as the poverty of modern philosophy and science and hopes for a return not just to the cosmology and science of these predecessors, but to a syncretic blend of monotheistic and other

³⁶ Op. cit., 128.

³⁷ Ibid., 128 – 129.

³⁸ Syed Hossein Nasr, *An Introduction to Islamic Cosmological Doctrines*, (New York: State University of New York Press, 1993).

³⁹ H. A. R. Gibb, in Nasr, *ibid.*, xv – xvi.

⁴⁰ Ibid., xxiii – xxiv.

religious traditions including Hinduism, Buddhism, and native American and other indigenous traditions.⁴¹ Nasr seeks no less than a *scientia sacra*, which he views as a supreme knowledge lying at the heart of all religions.

While Nasr sees some divine principle guiding early Muslim scientists he does admit that they applied observations of the natural world. Nasr acknowledges that classical Muslim scientists used observation and experiment to understand the world around them. Because of Ibn Sīnā's experimental work on dyes and minerals Nasr classifies him as more of a predecessor to modern chemists than someone who subscribes to the alchemical tradition in its esoteric or symbolic aspect. Contrary to this Nasr still insists that he accepted the "cosmological principles" of alchemy.⁴² Nasr mentions Ibn Sīnā's observations of river deposits, mountains and fossils and his conclusion that fossils are the petrified remains of animals and plants.⁴³ He also mentions Ibn Sīnā's analysis of meteorites in order to compare them to terrestrial rocks. Ibn Sīnā also attempted to explain these in terms of natural processes operating on and in the earth.

Another Muslim scientist well known for using observation and reason was Al-Bīrūnī who Nasr describes as:

... a master of observation not only in astronomy but also in geology, geography and the study of organic phenomena.⁴⁴

With perhaps one exception, Nasr credits Al-Bīrūnī with a surprisingly modern view of geological changes:

Aside from such specifically modern concepts as the Darwinian theory of evolution, there are many modern geological ideas such as the change

⁴¹ Ibid., xi – xx.

⁴² Nasr, *Cosmological Doctrines*, 247 – 248.

⁴³ Ibid., 244 – 245.

⁴⁴ Ibid., 125