
Chapter 3.1

COSMOLOGY

Seyyed Hossein Nasr

Introduction

THE SIGNIFICANCE OF COSMOLOGY

Cosmology in Islam as in other traditions does not signify a physics of the earth generalized and extrapolated for the whole cosmos as one sees in modern cosmology, but an application of principles of a metaphysical order to the cosmic domain.¹ In the case of Islam these principles derive from the Islamic revelation and concern a cosmos which is 'Islamic' in the sense that it participates in the Islamic revelation for that sector of humanity which has comprised and comprises the Islamic people (*al-umma*). Islamic cosmology deals with the science of the cosmos seen in the light of the revealed truths of Islam and by men whose world-view, mind and even empirical faculties have been nurtured and determined by Islamic revelation and its traditional unfolding.

Islamic cosmology has provided an Islamic understanding of cosmic realities including the physical world but not limited to it. This cosmology has provided, moreover, the framework for the development of the Islamic sciences from astronomy to zoology and has provided the concepts of space, time, matter, energy, form and number which have been of central concern to all the sciences. This cosmology has not, however, provided only one picture of the cosmos according to the Islamic perspective. Rather, on the basis of the Qur'anic revelation and *Ḥadīth*, followed by inspired and traditional commentaries, many schools of cosmology have developed over the centuries, drawing concepts and ideas from not only these twin sources of Islam but also

1. On the traditional meaning of cosmology see T. Burckardt, 'The Cosmological Perspective', in his *Mirror of the Intellect*, ed. W. Stoddart, Albany, State University of New York Press, N.Y., 1987, pp. 13–16.

numerous other sources ranging from Platonism to Hermeticism and Aristotelianism to Indian philosophical schools. These concepts of originally 'foreign' origin were, however, always integrated into the unitarian perspective (*al-tawḥīd*) of the Qur'ān and are thoroughly Islamic in the deepest sense of the term in that they depict a universe originated by God and integrated and inter-related in a hierarchic structure reflecting His oneness, a universe whose phenomena are signs (*āyāt*) of God according to the dictum of the Qur'ān.²

At the same time, these cosmological schemes, whose roots sink deeply into the soil of the Qur'ānic revelation, provide the immediate background for the Islamic sciences, whether it be astronomy or medicine, physics or geography. Islamic cosmology is like the mother of the Islamic sciences while being itself inalienably related to Islamic metaphysics and philosophy on the one hand and to distinctly religious doctrines on the other.

Throughout its long history, Islamic thought produced many schools of cosmology ranging from that of Jābir b. Ḥayyān to the traditional cosmology of Jalāl al-Dīn al-Suyūṭī and Islamic thought is extremely rich in this domain to the extent that it is impossible in a single chapter to provide an exhaustive treatment of all the different forms of Islamic cosmological thought.³ What we hope to accomplish in this chapter is to outline briefly the main schools of cosmology in order to provide first of all an introduction to an important aspect of traditional Islamic thought in general, and secondly a general view of the background on the basis of which activity in the various sciences within Islamic civilization took place over the centuries.

The origins of Islamic cosmology

THE QUR'ĀN AND *HADĪTH*

As already stated, the roots of Islamic cosmology are sunk deeply in the Qur'ān and *Hadīth*. The Qur'ān speaks often of the cosmos and natural phenomena, of the seven heavens and the earth as well as of entities of a non-

2. See S.H. Nasr, *Introduction to Islamic Cosmological Doctrines*, London, Thames & Hudson, 1978, introduction.
3. In our *Introduction to Islamic Cosmological Doctrines*, we sought to provide an in-depth study of at least three major forms of Islamic cosmological doctrines associated with the Ikhwān al-Ṣafā', al-Bīrūnī and Ibn Sīnā. Since then several other studies have followed dealing with other figures and schools, for example, A. Heinen, *Islamic Cosmology*, Beirut/Wiesbaden, Franz Steiner Verlag, 1982, dealing with al-Suyūṭī. There has not yet been, however, a study which would encompass in depth all the schools of Islamic cosmology, even the main ones. See also Nasr, 'Philosophy and Cosmology', in R. H. Frye (ed.), *The Cambridge History of Iran*, Cambridge, Cambridge University Press, 1975, pp. 419–441; and W. Chittick, 'Islamic Cosmology', in *The Encyclopaedia of Cosmology* (forthcoming).

visible character such as the Throne of God (*al-‘Arsh*) or the Pen (*al-Qalam*). It, moreover, considers the phenomena of nature to be the portents or signs (*āyāt*) of God and thereby impregnated with religious significance as stated in the verse, ‘We shall show them our portents upon the horizons and within themselves, until it becomes manifest unto them that it is the Truth’ (XLI.53).⁴

The Qur’ān depicts a universe created and sustained by God, one in which there is a hierarchy and grades of being. It is a universe wherein the wisdom of God is reflected upon every ‘page’ of the cosmic book which, therefore, came to be known as *al-Qur’ān al-takwīnī* (the cosmic Qur’ān) complementing *al-Qur’ān al-tadwīnī* (the composed Qur’ān). And like the Qur’ān revealed to the Prophet, the cosmos is ultimately a revelation from God.⁵

Muslim cosmologists have meditated over the centuries upon the heavens and the earth mentioned in the Qur’ān or upon the ‘Throne Verse’ (*āyat al-kursī*) (II. 255) and the ‘Light Verse’ (*āyat al-nūr*) (XXIV.35) in which a whole cosmology is contained in a symbolic manner. While the former verse speaks of the Throne of God comprising the heavens and the earth, the latter speaks of God as the Light of the heavens and the earth and describes in a sublime language the levels of cosmic reality in terms of light and what is associated with it such as lamp and oil.⁶

Even the letters of certain verses of the Qur’ān have cosmic correspondences and much of Islamic cosmology has, therefore, been based upon meditation upon letters of the Arabic alphabet as they appear in certain words and verses of the Qur’ān as one can see in authors ranging from Jābir b. Ḥayyān to Ibn Sīnā and Shams al-Dīn al-Būnī to Ibn ‘Arabī. Finally, it is necessary to assert here that the doctrine of the Divine Names contained in the Qur’ān contains in itself the basis of all Islamic cosmology; and it is en-

4. We have dealt more fully with specifically Qur’ānic cosmology in our essay ‘The Islamic View of the Universe’, in Vol. I of this series, ed. by Z. Ansari and I.I. Nawwāb. See also Nasr, ‘The Cosmos and the Natural Order’, in S.H. Nasr (ed.), *Islamic Spirituality Foundations*, New York, Crossroad Publications, 1987, pp. 345–357.

5. These ideas have been dealt with in a more extensive manner in our works cited above, and this section should be read especially in conjunction with our essay in the first volume of this series. See also S.H. Nasr, *Science and Civilization in Islam*, Cambridge, Islamic Text Society, 1987, Chapter 13.

6. Some of the most sublime works of Islamic thought dealing with metaphysics and cosmology are commentaries upon the ‘Light Verse’ of which two of the most important are the *Mishkāt al-anwār* of al-Ghazālī, trans. by R. Deladrière, as *La Tabernacle des Lumières* *Mishkāt al-Anwār*, Paris, Editions du Seuil, 1981, which is translated directly from the Arabic and as more exact than the English translation of W.H. Gairdner from Malay; and *Tafsīr-i āya-yi mubāraka-yi nūr* of Mullā Ṣadrā, ed. M. Khwājawi, Tehran, Mawla Press, AH 1403.

ough to study in depth the significance of the meaning of the Divine Names to understand not only the relation of the cosmos to God, but the very structure of the universe as so many interplays of the theophanies and reflections of the Divine Names and Qualities.⁷

The cosmology contained in principle in the Qur'ān is further elucidated in the *Ḥadīth*, much of which is devoted to cosmology. There are numerous *ḥadīths* which speak of the Pen (*al-Qalam*) and the Guarded Tablet (*al-Lawḥ al-Mahfūz*), the Throne (*al-'Arsh*) and Pedestal (*al-Kursī*) or of the precious stones which describe symbolically the nature of the Throne.

Such *ḥadīths* are in reality commentaries upon the Qur'ānic *dicta* concerning cosmology and have provided along with the Qur'ān the foundation of all Islamic cosmology and the soil from which the roots of various schools of Islamic cosmology have drawn their nourishment over the centuries. They have also provided the matrix and framework within which cosmological ideas from other religions, philosophies and civilizations have been studied and evaluated and the principles by means of which these cosmologies have been either accepted and assimilated into the Islamic intellectual universe or criticized and rejected. The various schools of Islamic cosmology from the most mystical to the most 'scientific' have all developed within the Islamic world-view whose parameters and principles have been provided by the Qur'ān and *Ḥadīth* along with the inspired, traditional commentaries written upon them.

COSMOLOGICAL IDEAS OF NON-ISLAMIC ORIGIN — GRAECO-HELLENISTIC, PERSIAN AND INDIAN

As far as the Graeco-Hellenistic heritage is concerned, it is necessary to mention that it was itself heir to the long Babylonian and Egyptian traditions. There developed, nevertheless, among the Greeks of both the Hellenic and Hellenistic periods, several types of cosmology which having become known to Muslims were integrated into the world-view of various schools of Islamic thought. The first among them is the Pythagorean, which Muslims came to know not only throughout the early Pythagorean sources and those of Plato, but also through neo-Pythagorean figures such as Nicomachus. Such cosmological schemes based the levels of existence upon numeral symbols and expounded cosmology in the language of mathematics, especially arithmetic and geometry. As for Plato himself, his *Timaeus* was well-known to

7. The cosmology of Ibn 'Arabī and many other Sufis has its basis in this truth as we shall see later in this essay. See 'Dimensions of the Universe in the Quranic Doctrine of the Divine Names', in F. Schuon, *Dimensions of Islam*, trans. P. Townsend, London, George Allen & Unwin, 1977, pp. 30-45.

Muslims, and his cosmological ideas had considerable influence among certain schools of Islamic thought such as the School of Illumination (*al-ishrāq*).⁸

It was, however, mostly the works of Aristotle and his school that exercised the most extensive influence upon Islamic philosophical cosmology, while the works of the Greek astronomers, particularly Ptolemy, became very influential from the third/ninth century onward not only in astronomy but also in cosmology. As far as Aristotle is concerned, his major works bearing on cosmology such as the *Metaphysica*, *Physica* and *De caelo* were known to Muslims and exercised considerable influence especially among the *mashshā'ūn* or Peripatetics.⁹ But Aristotle was seen most often by Muslims through the eyes of his Neoplatonic commentators. The works of Neoplatonism are, therefore, of the utmost importance for the understanding of certain types of cosmology developed by Muslim thinkers over the ages. Of these works the summary of the *Enneads* known to Muslims as *The Theology of Aristotle* (*al-Uthūlūjīyya*) and the *Book of Causes* (*Kitāb al-Khayr al-maḥd*) based on the *Stoicheiosis* of Proclus are the most important.¹⁰

Finally, among Graeco-Hellenistic sources, one must mention the *Corpus Hermeticum* which was well known to Muslims and much of which reached the West through Arabic sources.¹¹ This corpus was not only important for the introduction of alchemy into the Islamic world, but it was also influential in the domain of cosmology as can be seen in the writings of figures as far apart as Jābir b. Ḥayyān, Ibn Sīnā and Ibn 'Arabī.

As far as pre-Islamic Persian sources are concerned, there are certain cosmological and cosmographical ideas of Mazdaean origin which were integrated into the cosmologies developed in Islamic Persia, including the circular division of the earth into seven regions or *keshvars* to reflect the seven

8. On the influence of Plato and Platonic thought upon Islam see F. Rosenthal, 'On the Knowledge of Plato's Philosophy in the Islamic World', *Islamic Culture*, 14, 1940, pp. 387-422; and Chapter 1 of H. Corbin, *En Islam iranien*, Paris, Editions Gallimard, 1971, II, pp. 9-39. This volume has the subtitle 'Suhrawardi and the Persian Platonists'.
9. See S. H. Nasr, 'The Cosmologies of Aristotle and Ibn Sina', in his *Islamic Life and Thought*, Albany, N.Y., State University of New York Press, 1981, pp. 83-95. On the works of Aristotle known to Muslims see F. E. Peters, *Aristotle and the Arabs*, New York, New York University Press, 1968; *idem*, *Aristotle Arabus*, Leiden, E. J. Brill, 1968.
10. See G. C. Anawati, *Etudes de philosophie musulmane*, Paris, J. Vrin, 1974, especially 'Prolégomènes à une nouvelle édition du De Causis Arabe', pp. 117-154, and 'Le néoplatonisme dans la pensée musulmane: état actuel des recherches', pp. 155-221. Also A. Badawi, *Plotinus apud Arabes*, Cairo, Maktabat al-Nahḍa al-Miṣriyya, 1955.
11. On the Hermetic corpus in Islam, see L. Massignon, 'Inventaire de la littérature hermétique Arabe', in A. J. Festugière and A. D. Nock (eds.), *La révélation d'Hermès Trismégiste*, I, Paris, J. Vrin, 1949, appendix III; F. Sezgin, *Geschichte des Arabischen Schrifttums*, IV, Leiden, E. J. Brill, 1971; and Nasr, 'Hermes and Hermetic Writings in the Islamic World', in his *Islamic Life and Thought*, *op. cit.*, pp. 102-119.

heavens.¹² More particularly, one finds traces of Manichaeism in the *Umm al-Kitāb* (Mother of Books) and Muḥammad b. Zakariyyā' al-Rāzī and extensive influence of Mazdaean cosmology and angelology in the works of Suhrawardī and other figures belonging to the School of Illumination.

Indian cosmological ideas came to the Islamic world along with Indian astronomy and the Hindu doctrine of cosmic cycles as well as certain other cosmological ideas that were known to Muslims although they did not play as great a role in the formulation of cosmological schemes as Persian and Graeco-Hellenistic ideas unless one considers the atomism of Islamic theologians to have had an Indian origin.¹³

Between the second/eighth and fourth/tenth centuries, Muslim thinkers, basing themselves upon the Qur'ān and *Ḥadīth* and within the world-view provided by the Islamic revelation, integrated the diverse cosmological ideas available to them into cosmological doctrines which were of diverse structures but which were all united in their insistence upon *al-tawḥīd* and their being rooted in the Qur'ānic revelation. These schemes played a very significant role in Islamic theology and philosophy, in popular religious literature, in the Islamic arts especially architecture and in the Islamic sciences.

The early formulations of cosmology

THE PERIPATETICS

The most elaborate and scientifically and philosophically influential school of early cosmology was that of the Peripatetics (*mashshā'ūn*) whose founder Abū Ya'qūb al-Kindī (d. c. 260/863) already set out to integrate Greek Aristotelian philosophy as interpreted by the Neoplatonists into the Islamic world-view and produced the first works of Islamic Peripatetic philosophy. Among his writings, many of which are lost, there were many that deal with cosmology and the cosmological sciences, although it is not possible to gain full knowledge of his cosmological views.¹⁴ In certain of his surviving treatises, he emphasizes the

12. See S. H. Nasr, 'Cosmographie en Iran pré-islamique et islamique', in G. Makdisi (ed.), *Arabic and Islamic Studies in Honor of Hamilton A. R. Gibb*, Leiden, E. J. Brill, 1965, pp. 507–524.

13. Although this idea has been claimed by S. Pines and several other scholars, it has been refuted by H. Wolfson and a number of other authorities on medieval philosophy. The historic origin of *kalām* atomism, which is definitely not Democritean, at least as Democritus is usually understood, remains in doubt, but the possibility of the adoption of certain Indian cosmological ideas by early Muslim atomists cannot be discounted.

14. On al-Kindī's writings, see M. Abū Rīda (ed.), *Rasā'il al-Kindī al-Falsafīyya*, Cairo, Dār al-Fikr al-'Arabī, 1950–1953; on al-Kindī's metaphysical thought which also bears directly upon his cosmology, see A. L. Ivry, *Al-Kindī's Metaphysics*, New York, State University of New York Press, 1974. See also 'A. Ḥ. Maḥmūd, *al-Taḥkīm al-Falsafī fi-l-Islām*, Cairo, Dār al-Ma'ārif, 1984, pp. 206ff, for the Islamic significance of the philosophical thought of al-Kindī and other Islamic Peripatetic philosophers.

finite nature of the cosmos upon which he bases his argument for the existence of God following the works of John Philoponus, and discusses such basic cosmological notions as space, time and matter. Like Philoponus and in contrast to later Peripatetics such as al-Fārābī and Ibn Sīnā, al-Kindī asserts the doctrine of *creation ex nihilo*, the finite power of the universe and the impossibility of eternal motion.¹⁵

It was left to al-Fārābī (d. 339/950) to take the decisive step on the basis of the earlier works of al-Kindī based primarily on a Proclean interpretation of Aristotle, to integrate Neoplatonism fully into the Islamic perspective, expounding the first full-fledged system of Islamic Neoplatonic-Aristotelian philosophy which characterizes what is called the *mashhāʾī* school in Islam. We find in several of his works including his masterpiece, *Ārāʾ Ahl al-madīna al-fāḍila* (Views of the Inhabitants of the Virtuous City),¹⁶ the explicit metaphysical and cosmological doctrines which were to find their most universally accepted and developed version in the hand of Ibn Sīnā. Al-Fārābī already speaks of the Necessary Being (*wājib al-wujūd*), the Active Intellect (*al-ʿaql al-faʿāl*) and the Emanation (*al-fayḍ*) of each cosmic Intellect, from the one above it until the Tenth Intellect, which governs the sub-lunar region, is reached.¹⁷

This cosmology is, however, integrated into the Islamic perspective despite what a number of Western scholars of Islamic thought have asserted.¹⁸ In certain of his works such as the *Duʿāʾ ʿazīm* (The Exalted Prayer), he in fact prays to God while using both Qurʾānic references and elements of the cosmology of Aristotelian and Neoplatonic sources which he had integrated into his synthesis. He refers to God as the Cause of Causes (*ʿillat al-ʿilal*) as well as the Lord of the Easts and the Wests (*al-mashāriq wa-l-maghārib*). While calling God the Light of the Earth and Heaven (*nūr al-arḍ wa-l-samāʾ*), he asks to be accorded an effusion from the Active Intellect and to be delivered from the substance of the hyle and the imprisonment of the four natures.¹⁹

In his Peripatetic works, especially the *Shifāʾ* (The Healing) and the *Najāt* (Salvation), Abū ʿAlī b. Sīnā (d. 428/1037) developed, on the basis of the works of al-Kindī and al-Fārābī, a cosmology which became a permanent aspect of the Islamic intellectual universe for the next millennium, and in fact

15. See I. R. Netton, *Allāh Transcendent – Studies in the Structure and Semiotics of Islamic Philosophy, Theology and Cosmology*, London, Routledge, 1989, pp. 66ff.; also W. N. Craig, *The Kalam Cosmological Argument*, London, Macmillan Press, 1979, pp. 19ff.

16. See R. Walzer (ed. and trans.), *Al-Fārabi on the Perfect State*, Oxford, Clarendon Press, 1985.

17. See Netton, *op. cit.*, p. 116, fig. 2, where this emanation scheme is summarized.

18. Including Netton in the above-cited work, we have provided the response from the Islamic point of view in our *An Introduction...*, *op. cit.*

19. See M. Mahdi (ed.), *Al-Fārabi's Book of Religion and Related Texts*, Beirut, Dar El-Machreq Publishers, 1968, pp. 89–90 of the Arabic text. See also Netton, *op. cit.*, pp. 102–103.

is still alive in certain schools of Islamic thought.²⁰ Ibn Sīnā's cosmology is related at once to his ontology and angelology. He makes the basic distinction between necessity (*wujūb*), contingency (*imkān*) and impossibility (*imtināʿ*). God is the Necessary Being (*wājib al-wujūd*) whose being (*wujūd*) is none other than His quiddity (*māhiyya*).²¹ As for the universe, it is a contingent being (*mumkin al-wujūd*). Although the universe 'flows' from the Necessary Being and does not have a temporal origin, it relies on the Necessary Being without which it would be literally nothing. Contingency lies in the very nature of the cosmos.

From the contemplation of Itself, the Necessary Being generates the First Intellect which is also the Supreme Archangel. The First Intellect in turn contemplates the Necessary Being itself as a contingent being and itself as a being made necessary by other than itself (*wājib bi-l-ghayr*). From this 'three-dimensional' contemplation (*al-jihāt al-thalātha*), there is generated the Second Intellect, the Soul (or Angel) of the First Sphere (*falak al-aflāk*) which is also the Primum Mobile and the First Sphere itself. The Second Intellect also contemplates in a like manner, generating the Third Intellect, the Soul or Angel of the Second Sphere and the Second Sphere itself which is identified with the Heaven of the Fixed Stars (*falak al-burūj*). The process continues to the Tenth Intellect which generates the Soul or Angel of the moon as well as the body of that Sphere. The Tenth or Active Intellect is also the 'giver of forms' (*wāhib al-ṣuwar*) for the world below which is none other than the world of generation and corruption comprised of the four elements: fire, air, water and earth in an indefinite number of combinations. This scheme can be summarized as follows:²²

20. We have dealt in detail with this cosmology in *An Introduction...*, *op. cit.*, III, pp. 175-247. There is also an extensive bibliography of works on Ibn Sīnā and his cosmological thought which have been included in the bibliographical section of this work. For works after 1977, see Netton, *op. cit.*, pp. 336ff.
21. See Nasr, 'Wujūd and Māhiyyah in Islamic Thought', *International Philosophical Quarterly*, 29/4, 1989, pp. 409-428.
22. From I. R. Netton, *Allāh Transcendent*, *op. cit.*, p. 165.

The Necessary Being

The First Intellect	(<i>Al-'Aql al-Awwal</i>) = Supreme Archangel or Cherub	
Second Intellect/Archangel	Soul/Angel of First Heaven First Heaven (Outermost Sphere)	Body of
Third Intellect/Archangel	Soul/Angel of Second Heaven Second Heaven (Fixed Stars or Zodiacal Signs)	Body of
Fourth Intellect/Archangel	Soul/Angel of Third Heaven Third Heaven (Saturn)	Body of
Fifth Intellect/Archangel	Soul/Angel of Fourth Heaven Fourth Heaven (Jupiter)	Body of
Sixth Intellect/Archangel	Soul/Angel of Fifth Heaven Fifth Heaven (Mars)	Body of
Seventh Intellect/Archangel	Soul/Angel of Sixth Heaven Sixth Heaven (Sun)	Body of
Eighth Intellect/Archangel	Soul/Angel of Seventh Heaven Seventh Heaven (Venus)	Body of
Ninth Intellect/Archangel	Soul/Angel of Eighth Heaven Eighth Heaven (Mercury)	Body of
Tenth Intellect (<i>Wāhib al-Sunna</i>) = Archangel Gabriel	Soul/Angel of Ninth Heaven Ninth Heaven (Moon)	Body of

World of Generation and corruption

3.1 The cosmic hierarchy according to Ibn Sīnā

© From I. R. Netton, *Allāh Transcendent*, London, Routledge, 1989, p. 165

The cosmos is thus divided, as with Aristotle, into the sub-lunar and the heavenly regions. The sub-lunar region, made of the four elements, is the domain of the three kingdoms, namely: minerals, plants and animals, as well as all meteorological phenomena which include all that partakes of non-circular motion, hence the inclusion of meteors as phenomena belonging to the sub-lunar region. All the creatures of the sub-lunar realm are arranged according to a hierarchy leading from prime matter to man who is connected through his intelligence to the cosmic Intellects and ultimately to God.²³ As for the heavenly regions, which are made of ether, they consist of the seven visible heavens of the planets, the heaven of the fixed stars and the invisible heaven of the Primum Mobile making altogether nine heavens each governed by an Intellect and a Soul.²⁴

In his *Risālah fi-l-'Ishq* (Treatise on Love), Ibn Sīnā emphasizes the significance of love as the moving force of the universe²⁵ and it must be said that God for him is not only the Origin of the cosmos but also the Beloved for which everything in the universe yearns through the love that runs through the arteries of the whole of creation. This theme, along with the symbolic nature of the cosmos, are particularly emphasized in the cosmology developed by Ibn Sīnā in certain of his later works and especially the visionary recitals consisting of *Ḥayy ibn Yaqẓān* (Living Son of the Awake), *Risālat al-Ṭayr* (Treatise of the Bird) and *Salāmān wa-Absāl* (Salāmān and Absāl). In these works, the main outline of the cosmos does not change, but the cosmos itself becomes 'interiorized' and cosmology becomes the science enabling man to chart his course through the cosmic labyrinth in order to gain ultimate freedom beyond the bondage of cosmic existence. In this quest, the role of the angel becomes particularly important, and the study of these later works associated with Ibn Sīnā's 'Oriental Philosophy' (*al-ḥikmat al-mashriqiyya*) only helps to delineate the close relationship between cosmology and angelology in the whole of Ibn Sīnā's thought.²⁶

23. What has become known as the 'great chain of being' in Western thought underlies nearly all Islamic cosmological schemes and is especially evident in Ibn Sīnā, who was the first to deal with the mineral, plant and animal kingdoms in a systematic manner. See the 'Natural Philosophy' (*al-Ṭabī'īyyāt*) of his *al-Shifā'* as well as *al-Najāt*. Concerning the hierarchy of existents in Ibn Sīnā, see Nasr, *An Introduction...*, *op. cit.*, pp. 197ff. Ibn Sīnā also wrote a separate treatise entitled *Risālah dar ḥaqīqat wa-Kayfiyyat-i silsala-yi maujūdāt wa-tasalsul-i Asbāb wa-Musabbabāt* (Treatise on the Reality and Nature of the Chain of Existents and the Link of Causes and Effects) dealing specifically with the 'great chain of being'.

24. Among later Muslim Peripatetics, Ibn Rushd was to reject the souls of the spheres, thereby helping in the secularization of the cosmos and all that such a process implied for the astronomical revolution of the sixteenth and seventeenth centuries in the West.

25. See E. L. Fackenheim, 'Risālah fi-l-'ishq', *Medieval Studies*, 7, 1945, pp. 208-229.

26. These treatises have been analysed thoroughly by H. Corbin in his *Avicenna and the Visionary Recital*, trans. W. Trask, New York, Pantheon Books, 1960; see also Nasr, *An Introduction...*, *op. cit.*, Chapter 15 entitled 'Nature and the Visionary Recitals'.

Ibn Sīnā also developed a cosmological scheme based upon the symbolism of the letters of the Arabic alphabet in a manner very similar to certain Sufis.²⁷ His most important legacy in the field of cosmology was, however, the scheme mentioned above in which the visible heavens of Ptolemaic astronomy were made to correspond to the hierarchy of the Intellects and Souls in an organically unified cosmos in which all levels of reality descend in a hierarchic manner from the One God, who alone is Necessity as such, and are inter-related according to their position in the hierarchy of universal existence.

The Ismā'īlīs

From its earliest manifestations in the second/eighth century, Ismā'īlism was concerned with cosmological thought and Ismā'īlī philosophers and theologians developed elaborate cosmologies going back to that mysterious text *Umm al-Kitāb* which is the first written testament of Ismā'īlism associated primarily with the Central Asian school and still venerated by the Ismā'īlīs of the Pamir mountains. The purpose of the cosmology delineated in the *Umm al-Kitāb* is essentially soteriological, although it does not negate the possibility of its usage for 'scientific' activity as one sees so readily in Fatimid Egypt and also in the *Rasā'il Ikhwān al-Ṣafā'* (Epistles of the Brethren of Purity) which was highly valued by Ismā'īlī circles if not directly written by Ismā'īlī authors. Moreover, the *Umm al-Kitāb* is a syncretic work in which elements of Manichaeism, Yoga practices and even Vajrayāna philosophy are discernible not to speak of Graeco-Alexandrian and Sabaeen sources. But the work as a whole bears a clear Ismā'īlī stamp.

The *Umm al-Kitāb* speaks of the creation of the spiritual and physical worlds ('*ālam al-amr* and '*ālam al-khalq*) on very different planes. The first concerns the spiritual archetypes which retain their wholeness and the second the visible cosmos marked by even greater separation from the spiritual world and characterized by the creation of heaven and earth. As far as the creation of the archetypal world is concerned, its complex structure can be summarized as follows:

Five, later seven, Intelligences composing the Pleroma which brings into existence (*ibdā'*) the different worlds, corresponding, as reflections, to the luminous entities imprisoned within the planetary bodies, which, on the physical plane, preside over the seven components of the material body (moon – marrow, Mercury – bones, Venus – fat, sun – veins, Mars – blood, Jupiter – flesh, Saturn – skin...).

27. This theme has been emphasized by Corbin in the above-mentioned work and his other studies devoted to Ibn Sīnā, for example, in *Histoire de la philosophie islamique* (written in collaboration with S. H. Nasr and O. Yahya), Paris, Gallimard, 1986.

Twelve archetypal and uncreated Lights (*dawāẓdah nūrā-yi qadīm nāmakblūq, nāfarīdih*, which form the so-called 'World of the Mothers' (*ummahāt*) symbolized by the twelve signs of the Zodiac (*barābar-i dawāẓdah burj, dawāẓdah ummahātand...*). These lights, casting their reflection on the material creation, preside over the twelve spatial regions of the human body (from Aries to Pisces in the following order: head, neck, hands, chest, abdomen, navel, organs of generation, thighs, knees, feet...).

As emanations from the five or seven hierarchies and with the essence drawn from the World of the Mothers, nine hierarchies or 'courts of justice' (*dāwānha*) display themselves in descending order, having as upper limit the Pleroma of the Five Powers, and as inferior border the blue vault of the sky..., which the *Umm al-kitāb*, as already mentioned, identifies with the human brainpan. These hierarchies are not conceived as substantially existent, but rather as the descending octaves, or planes of consciousness, upon which the Pleroma of the Five Intelligences enacts its presence...²⁸

Early Ismā'īlī cosmology, using mostly a mythological language, continued into the fourth/tenth century as one can see in the treatise of the Fatimid *dā'ī*, Abū 'Isā al-Murshid, which 'reproduces in substance the original cosmological system of Ismā'īlism.'²⁹ But about the same time, Ismā'īlī cosmology began to be impregnated by Neoplatonism, as seen first of all in the writings of Abū 'Abd Allāh al-Nasafī also known as al-Nakhshabī (d. 331/942-43), known mostly through his critics such as Abū Ḥatīm al-Rāzī and commentators and students such as Abū Ya'qūb al-Sijistānī (d. some time after 360/971), who was himself one of the major figures of early Ismā'īlī thought.³⁰ Later writers, such as Ḥamid al-Dīn al-Kirmānī (d. c. 408/1017), were to try to charter an intermediate course. Al-Kirmānī's *Rāḥat al-'aql* (Repose of the Intellect) is in fact according to many authorities the most systematic exposition of Fatimid Ismā'īlī thought in which the tenets of Ismā'īlism and Neoplatonism became synthesized. But he was far from being the last major figure of this school. Perhaps the greatest among them was Nāṣir-i Khusraw (d. between 465/1072 and 470/1077), author of the *Jāmi' al-ḥikmatayn* (The Sum of Two Wisdoms), which is again

28. P. Filippini-Ronconi, 'Soteriological Cosmology...', *op. cit.*, p. 113.

29. S. M. Stern, 'The Earliest Cosmological Doctrines of Ismā'īlism', in his *Studies in Early Ismā'īlism*, Leiden, Brill, 1983, p. 5. This treatise has been summarized by Netton in his *Allāh Transcendent*, *op. cit.*, pp. 203-209. On early Ismā'īlī cosmology, see also H. Halm, *Kosmologie und Heillehre der frühen Ismā'īliya*, Weisbaden, O. Harrassowitz, 1978.

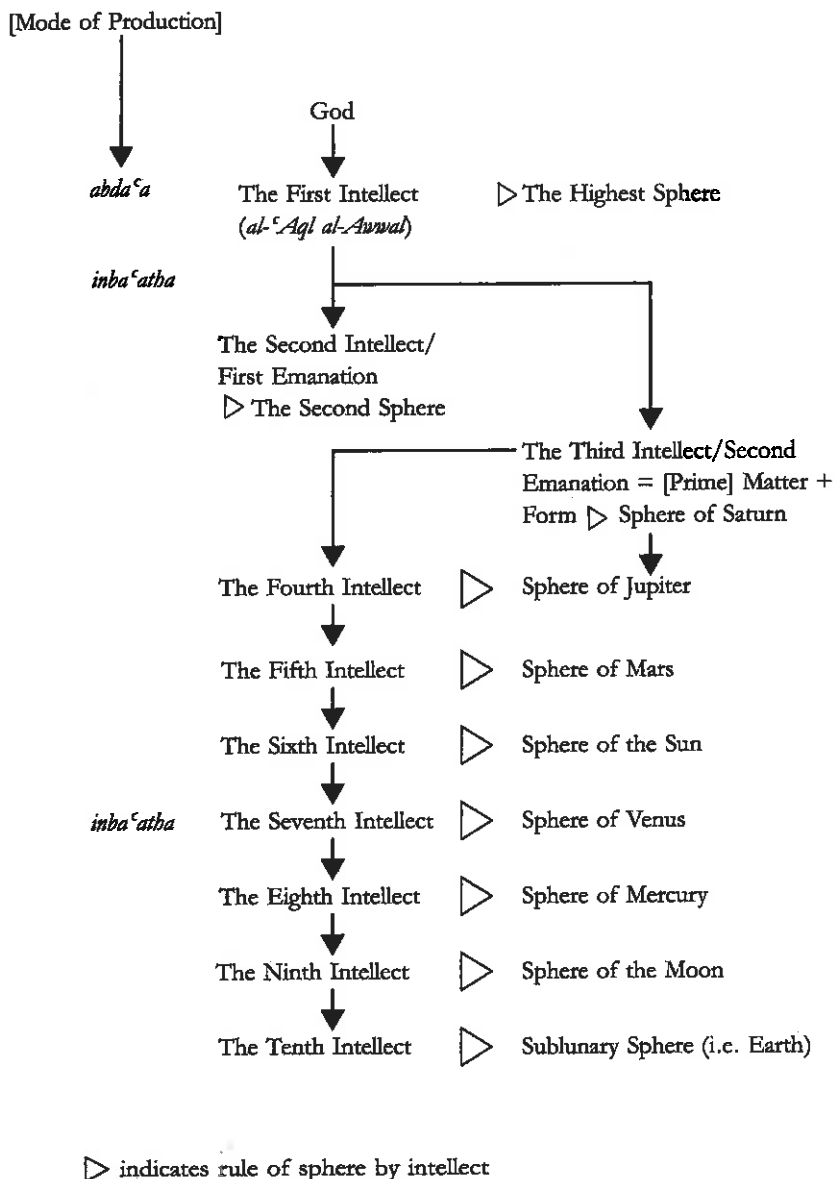
30. On al-Sijistānī's cosmology, see W. E. Walker, 'Cosmic Hierarchies in Early Ismā'īlī Thought: The View of Abu Ya'qūb al-Sijistānī', in: *Muslim World*, 66, 1976, pp. 14-28; see also Corbin's introduction to Sijistānī, *Kitāb Kashf al-mahjūb*, Tehran/Paris, Institut Franco-Iranien and A. Maisonneuve, 1949.

impregnated with cosmological ideas. He in turn was followed by several other major figures such as Qāḍī Nu'mān, Ibrāhīm al-Ḥāmidī, the early Naṣīr al-Dīn al-Ṭūsī (d. 672/1273) who wrote on Ismā'īlī thought and Sayyidnā Idrīs 'Imād al-Dīn of the Yemen who lived in the ninth/fifteenth century.³¹

Neoplatonized Ismā'īlī cosmology is characterized by its emphasis upon the totally transcendent God who creates (*abda'a*) the First Intellect (*al-'aql al-awwal*) while the rest of the Intellects and the Heavens are emanated (*inba'atha*) from the First Intellect. There is, therefore, a distinction to be made between this type of cosmology and that of al-Fārābī and Ibn Sīnā whose use of *ḥayd* can be compared to the Ismā'īlī *inbi'āth* but who do not then speak of the *ibdā'* of the First Intellect. Al-Kirmānī depicts a cosmological scheme based on the Ten Intellects and the nine heavens of astronomy below which stands the sublunar region and his work shows a leaning toward the perspective of al-Fārābī, but the basic distinction between the creation (*ibdā'*) of the First Intellect and the emanation (*inbi'āth*) of the rest of the cosmic hierarchy from the First Intellect remains as can be seen in the following scheme:³²

31. There is a vast literature on Ismā'īlī philosophical and cosmological thought by such figures as W. Ivanow, H. Corbin, S.M. Stern, P.E. Walker and others. See I.K. Poonawala, *Bibliography of Ismā'īlī Literature*, Malibu, Calif., Undena Publications, 1971. Among these works, the writings of Corbin are particularly important for an in-depth understanding of both Ismā'īlī philosophy and cosmology. Among his numerous studies, see *Histoire de la philosophie islamique*, section II B; his introduction to Nāṣir-i Khusraw, *Kitāb-e Jāmi' al-hikmatain*, Tehran/Paris, Institut Franco-Iranian/A. Maisonneuve, 1953; and *Cyclic Time and Ismaili Gnosis*, London, Kegan Paul International, 1983.

32. Netton, *op. cit.*, p. 228.



3.2 The levels of cosmic reality according to Kirmānī

© From I. R. Netton, *Allāh Transcendent*,
London, Routledge, 1989, p. 228

Among the most interesting features of Ismā'īlī cosmology is its insistence upon the cyclic nature of cosmic time. The fall of man himself is related to the number seven which governs the rhythm of cosmic time. The 'Spiritual Adam' was originally the third in the hierarchy of cosmic existence based upon the limit (*ḥadd*) which is so essential to Ismā'īlī cosmology. Each level of being has a limit which itself determines what is limited by that limit (*maḥdūd*). These limits possess a metaphysical and cosmological significance and not a purely anthropological one, so that their translation by 'dignitaries' as suggested by some scholars does not convey their full meaning in Arabic. In any case, it is through knowing one's *ḥadd* that the hierarchy of the cosmos is preserved. The 'Spiritual Adam' (*Adam al-rūḥānī*), who was originally the Third Intellect, having fallen into a 'stupor' was passed by in the process of cosmic generation. When he awakened from this 'stupor', he had fallen to the rank of the Tenth Intellect. Meanwhile the Seven Cherubims or 'The Seven Divine Words' had been brought into being and they helped Adam to regain his original state and become himself. The number seven thereby marks the distance of Adam's fall and time is generated as a result of this 'delay'. It is 'retarded eternity'.³³ This is the origin of the seven cycles of human and cosmic history marked by seven prophets, seven imams and seven inheritors (*waṣī*) punctuated by periods of epiphany and occultation and leading finally to the ultimate Grand Resurrection (*qiyāmat al-qiyāma*). Some Ismā'īlī thinkers have even given a quantitative evaluation for the Great Cycle of the life of the cosmos (*al-kaṣr al-a'ẓam*) as being 369,000 years or according to some 360,000 times 360,000 years.

The Ismā'īlī doctrines of the cyclic nature of history and cosmic cycles is of significance in the history of Islamic cosmology and are more similar to the cosmological ideas of Hinduism than that of the monotheistic religions as usually interpreted by their theologies. It is not, however, negated by the Qur'ān which speaks of 'a new creation' (*kehalq jadīd*) (L.15). Nor is its combining of cosmic history with that of prophets and imams drawn from anything but Islamic sources. What other Islamic thinkers have criticized in Ismā'īlī cosmology is the interpretation of some Ismā'īlī thinkers who claim that there will be a repetition of each cosmic cycle, an interpretation which traditional Islamic thought rejects completely without denying the rhythms within a particular cosmic cycle or the possibility of other cycle than the one known to the present humanity. In any case, this feature of Ismā'īlī cosmology and its emphasis upon the importance of cosmology for man's salvation has played an important historical role not only in Islamic philosophy in general, but also in the cultivation of the sciences of nature.

33. See Corbin, *Histoire...*, *op. cit.*, p. 125. For an analysis of his 'Drama in Heaven and the Birth of Time' and cyclic time, see pp. 124-132 of this work; also Corbin's *Cyclic Time...*, *op. cit.*, pp. 30ff.

Independent thinkers

Although, in Islamic civilization, it was the schools of thought which dominated over individual interpretations, there did appear a number of individual thinkers who did not belong to major schools of thought such as the Peripatetic or Ismā'īlī. Two such individuals are particularly important because they were among the greatest Muslim scientists, these being Muḥammad b. Zakariyyā' al-Rāzī (d. c. 313/925) and Abu-l-Rayḥān al-Bīrūnī (d. 442/1051). The first was known primarily as a philosophical sceptic, while the second was a pious Muslim.

Most of al-Rāzī's philosophical works have been lost, but a few treatises remain along with extensive citations of his writings by such critics as Abū Ḥātim al-Rāzī and Fakhr al-Dīn al-Rāzī to enable us to reconstruct the outline of his cosmological thought.³⁴ Al-Rāzī, well known in the West by the name of Rhazes, developed a cosmology based on five eternal principles: God (*al-Bārī*), the soul, space, time and matter. It is a cosmology which some have considered to have been influenced by Sabaeen or Ḥasranian sources, others by Manichaeism and yet others by Plato's *Timaeus* and in any case probably derived from the teachings of his teacher Abu-l-'Abbās al-Īrānshahrī.³⁵

For al-Rāzī, absolute space is independent of body in contrast to the view of Aristotle. Also, time is not the measure of motion. Although particular time is measurable, absolute time is infinite and immeasurable much like the *aeon* of the Neoplatonists which the Islamic philosophers called *al-dahr*. This absolute time is not determined by the movement of the outermost heaven as one finds in Peripatetic cosmology, but is a reality independent of the material world.

Having defined space and time in this manner, al-Rāzī asserts the existence of the void again in contrast to the Aristotelians and develops an atomism which is of a Democritean nature. While in the history of Islamic thought, for centuries the theologians (*al-mutakallimūn*) defended their interpretation of atomism based on the *juz' lā yatajaḥḥa*, which means an atom without dimension and extension, against the view of the Peripatetics, for whom bodies consisted of form and matter, al-Rāzī developed his own brand of atomism which is much closer to classical Greek atomism. For him, atoms were the indivisible constituents of bodies but possessed dimension and

34. For his writings and their analysis, see M. Mohaghegh, *Fīlsūf-i Rāzī*, Tehran, The Society for the Protection of National Monuments, 1970; P. Kraus (ed.), *Rasā'il Falsafīyah (Opera Philosophica)*, Beirut, Dār al-Āfāq, 1979; and P. Kraus, 'Rāziana', trans. A. J. Arberry, *Asiatic Review*, 1949, pp. 703–713.

35. For an analysis of this cosmology and a defence of its Platonic origin see M. A. Fakhry, *History of Islamic Philosophy*, New York, Columbia University Press, 1983, pp. 99ff; also Fakhry, 'A Tenth Century Arabic Interpretation of Plato's Cosmology', *Journal of the History of Philosophy*, 6, 1968, pp. 15–22.

moved in a void. His views, therefore, contrasted with the much more widely accepted atomism of the *mutakallimūn*.³⁶

As for al-Bīrūnī, the cosmology outlined in his astronomical works such as *al-Qānūn al-Masʿūdī* (The Masʿūdī Canon) followed the standard scheme of the astronomers of his day. In the first section of the first book where he speaks of the 'configuration of universal beings in the world', he mentions that the cosmos is spherical with the earth at its centre. He distinguishes between the heavens composed of ether and comprising the seven planetary spheres encompassed by the heaven of the fixed stars and the sublunar region composed of the four elements.³⁷

What is perhaps of greater interest in this context is al-Bīrūnī's criticism of Peripatetic cosmology and natural philosophy as contained in the series of questions and answers which he exchanged with Ibn Sīnā and the latter's student Abū Saʿīd al-Maʿšūmī.³⁸ In these exchanges, which mark one of the peaks of Islamic intellectual history as far as natural philosophy is concerned, al-Bīrūnī criticizes many of the most commonly held cosmological ideas, including the necessity of the circular motion of the heavens, held on to so tenaciously by classical astronomers and cosmologists and even by the iconoclastic Galileo. Al-Bīrūnī did not propose a new cosmological scheme in this work but in the domain of cosmology and the philosophy of nature. His ideas, like those of al-Rāzī, played an important role as catalysts for further thought and scrutiny by members of the well-established schools of philosophy and science. It also needs to be added that in their own scientific fields, that is, medicine for al-Rāzī and the mathematical and astronomical sciences for al-Bīrūnī, the thought of these men was very much at the centre of the intellectual arena even if their cosmological ideas or criticism of prevailing cosmological thought did not gain wide adherence among later cosmologists and philosophers.

The astronomers and cosmology

Islamic astronomy began early in the second/eighth century on the basis of the knowledge of the heavens among the pre-Islamic Arabs to which pre-

36. On the atomism of al-Rāzī and the *mutakallimūn*, see the classical and still valuable work of S. Pines, *Beiträge zur Islamischen Atomlehre*, Berlin, A. Heime, 1936; see also Ḥ. M. al-Alūsī, *The Problem of Creation in Islamic Thought: Quran, Hadith, Commentaries and Kalām*, Baghdad, National Printing and Publishing, 1965.

37. See *al-Qānūn al-Masʿūdī*, Hyderabad (Deccan), Dāʾirat al-Maʿārif al-ʿUthmāniyyah, 1954, I, pp. 21 ff. We have dealt extensively with al-Bīrūnī's cosmology in our *An Introduction ...*, *op. cit.*, pt II. There is a vast literature on al-Bīrūnī including his ideas concerning cosmology and the philosophy of nature. See S. H. Nasr, *Al-Bīrūnī - An Annotated Bibliography*, Tehran, High Council of Culture and Art, 1973.

38. See *al-ʿArīla wa-l-ajwibab*, ed. S. H. Nasr and M. Mohaghegh, Tehran, Tehran University Press, 1972.

Islamic Persian astronomy as contained in such treatises as the *Zīj-i Shahrīyār* (The Royal Tables) and elements of Indian astronomy associated with the translations which came to be known as the *Sindhind* came to be added. Finally, all these elements were integrated with Greek astronomy in the framework of the Qur'ānic view of the universe and a major synthesis was created whose first manifestations can be seen as early as the third/ninth century. To these elements one must also add the astronomical ideas which reached the Muslims through the Sabaeans of Ḥarrān, who were themselves heir to both Babylonian and Greek astronomy.³⁹

The cosmological scheme of the early Islamic astronomers from the third/ninth century onward was that of the eight spheres of Ptolemaic astronomy to which the Muslims added a ninth starless heaven to account for diurnal motion and which they often called *falak al-aflāk*. From the earlier schools, Islamic astronomy adopted a few elements which are of cosmological interest such as the significance of the first light of the new moon (*al-naw'*), which was important in the ancient Arabian science known as '*ilm al-anwā'*', and which resulted in the greater significance given to the moon by Muslims than what one finds in Greek astronomy and astrology. This fact is also true of the nodes of the moon which the Muslim astronomers first adopted from Persian and Indian sources and the stations of the moon so much emphasized by Indian astronomy and later by certain Muslim cosmologists.

The domination of Ptolemaic astronomy can already be seen in the work of the third-/ninth-century astronomer Abū 'Abd Allāh al-Battānī (d. 317/929) whose *al-Zīj al-Ṣābi'* (Sabaean Tables) is based on the translation of the *Almagest*.⁴⁰ This work deals with the structure of the heavens and planetary motion which, following Ptolemy, is considered to be composed of a series of circular motions in a spherical universe with the earth at the centre and the seven heavens of the visible planets, namely the moon, Mercury, Venus, sun, Mars, Jupiter and Saturn surrounded by the heaven of the fixed stars moving around the earth. Al-Battānī accepted Ptolemy's kinematics, but did not follow him blindly as far as the practical results of his calculations were concerned.

39. The great mathematician and astronomer of the third/ninth century, Thābit b. Qurra, who hailed from Ḥarrān and was originally a Sabaeans, wrote a treatise entitled *On the Heavenly Orbs, Their Disposition, the Number of Their Movements and the Value of Their Progression*, a treatise which is of obvious importance from the point of view of cosmology. See R. Morelon, *Thābit b. Qurra œuvres d'astronomie*, Paris, Les Belles Lettres, 1981, pp. 17–25.

40. See W. Hartner, 'Al-Battānī', in *Dictionary of Scientific Biography*, New York, Charles Scribner's Sons, 1980, I/II, pp. 507–516; and the monumental work of C. A. Nallino, *Al-Battānī sive Albatēni Opus astronomicum*, 3 vols., Milan, U. Hoeplium, 1899–1907. See also G. Bossong, *Los Canones de Albatēni*, Tübingen, Max Niemeyer Verlag, 1978, containing the text and study of the Alfonsian translation of al-Battānī's *Zīj*.

A more complete description of the cosmos in a non-mathematical language is given by Abu-l-‘Abbās al-Farghānī who lived a few decades before al-Battānī and who died some time after 247/861. In his *Jawāmi‘ ‘ilm al-nujūm* (Elements of Astronomy), he devotes Chapters 2–5 to a discussion of the structure of the universe, the sphericity of the heavens, the central position of the earth in the cosmos as well as the movements of the heavens, and the size of the earth and the planetary spheres.⁴¹ This work, which was translated into Latin and formed the basis of Dante’s astronomical knowledge in the *Vita nuova* and *Convivio*, provides a clear summary of the outlines of the Ptolemaic universe which formed the background for the work of the Islamic astronomers, who nevertheless continued to criticize certain tenets of Ptolemaic astronomy with important consequences for the later history of the subject in the West.⁴²

After further development of classical Islamic astronomy by such figures as al-Bīrūnī, Ibn Yūnus and Ibn al-Haytham, who insisted on the ‘physical’ rather than ‘mathematical’ nature of the heavens, the Ptolemaic model came under attack in Spain. During the sixth/twelfth century, the philosophical criticism of Ptolemy was prevalent among the Muslim Peripatetics such as Ibn Bājjā until Nūr al-Dīn al-Bīṭrūjī (d. c. 601/1204), who was a student of the famous philosopher Ibn Ṭufayl, and who gave astronomical expression to this criticism. The Muslim Peripatetics had often adopted Aristotelian cosmology based on the concentric spheres of Aristotle rather than Ptolemaic epicycles, but they made use of the Aristotelian scheme philosophically rather than astronomically. Al-Bīṭrūjī, however, tried to create a new astronomical scheme with important cosmological implications on the basis of an Aristotelian criticism of Ptolemy. He wanted to ‘reform the principles of astronomy in order to bring them into agreement with the physical principles of Aristotle.’⁴³ His opposition to Ptolemy was in fact based upon the qualitative aspects of planetary motion rather than the parameters which he took from the *Almagest*.

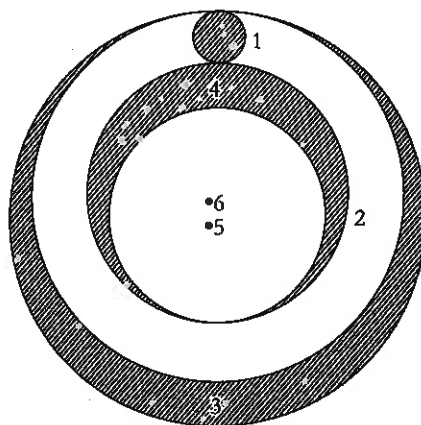
Al-Bīṭrūjī followed three Aristotelian principles: (1) every motion has a mover and a moved object, (2) a single motion has a single mover, and (3) a simple mover causes a simple motion. He developed an elaborate model of the cosmos without epicycles or eccentricities and his object was to describe the universe as it is and not simply to provide geometric and

41. The question of the size of the earth and the heavens is of concern to cosmology, but we have not dealt with it here since it belongs more properly to the chapter on astronomy.

42. On al-Farghānī, see I. A. Sabra, ‘Al-Farghānī’, in *Dictionary of Scientific Biography*, III/IV, pp. 541–545; and F. J. Carmody (ed.), *Al-Farghānī Differentie in qui busdam collectis scientie astrorum*, Berkeley, University of California Press, 1943.

43. B. Goldstein, *Al-Bīṭrūjī: On the Principles of Astronomy*, New Haven, Yale University Press, 1971, p. 3.

mathematical models for the heavens. His model for the sun is as follows:⁴⁴



- 1 The sun.
- 2 Excentric sphere.
- 3 The surrounding sphere.
- 4 The complement of the surrounding sphere.
- 5 Centre of the world.
- 6 Centre of the excentric sphere.

3.3 Al-Bīrūnī's model of the sun

© From J. L. E. Dreyer, *A History of Astronomy from Thales to Kepler*, New York, Dover Publications, 1953, p. 259

Al-Bīrūnī succeeded, in contrast to Ptolemy, in placing the earth actually at the centre of the cosmos and provided a strong criticism of the Ptolemaic model, a criticism which although not accepted by most later astronomers nevertheless played some role in the criticism of the Ptolemaic universe by Galileo and others which finally led to the establishment of modern astronomy. But a more important criticism of the Ptolemaic planetary model, as far as its resemblance to the later development of astronomy in the West is concerned, took place in the seventh/thirteenth century in the Marāgha observatory under the direction of Naṣīr al-Dīn Ṭūsī, a new model was developed

44. From J. L. E. Dreyer, *A History of Astronomy from Thales to Kepler*, New York, Dover Publications, 1953, p. 259. Al-Bīrūnī discusses his model and criticism of Ptolemy in his *Kitāb fi-l-Hay'a* which became well known in the West. His work was translated into Hebrew and Latin and was published in Venice as *Alpetragii Arabi planetarum theoricarum phisicis rationibus probata...*

which its discoverer E. S. Kennedy has named the 'Tusi couple'. This consists of two vectors, one connected to the tip of the other, to describe planetary motion in a manner that is both uniform and circular. This idea was further developed by Qutb al-Dīn Shīrāzī⁴⁵ and Ibn al-Shāṭir⁴⁶ and led to models which somehow found their way to Poland and appeared in Copernicus. Kennedy has superimposed these models as indicated in Fig. 2.7 (p. 225)⁴⁷

These transformations did not alter the main outline of the cosmology of the Islamic astronomers, but did modify it in many ways. There were, however, other figures who questioned the very outlines of the traditional cosmological scheme including the circular movement of the heavens and the geocentricity of the cosmos. Al-Bīrūnī, in his questions and answers exchanged with Ibn Sīnā, asked why the heavens could not have a 'lentil-shaped' motion rather than a circular one, and wrote that he once saw an astrolabe based on the motion of the earth around the sun.⁴⁸ These criticisms did not, however, change the cosmological scheme of the Islamic astronomers which, being based on the way that the cosmos presents itself to man, possesses a profound symbolism and could not be overturned without a philosophical and religious revolution which was destined to take place not in the Islamic world itself but in Europe which had learned so much from Islamic science.

Hermetic cosmology

The Hermetic corpus was translated early into Arabic and became integrated into certain dimensions of Islamic thought especially those associated with the circle of the Sixth Shīʿite Imam, Jaʿfar al-Šādiq.⁴⁹ Many of the works of this corpus were also read by philosophers such as Ibn Sīnā and Suhrawardī and Sufis like Ibn ʿArabī. Works such as the *Ḥayy b. Yaqẓān* and *Salāmān wa-Absāl* of Ibn Sīnā reveal their Hermetic connections upon close examination. It is, however, most of all in the writings of the Islamic alchemists that one must seek the most direct expressions of Islamic Hermeticism, the works of a Jildakī or a Majrīṭī of a Jābir and the Jābirean corpus belonging to the second/

45. See S. H. Nasr, 'Naṣīr al-Dīn Ṭūsī' and 'Qutb al-Dīn Shīrāzī', in *Dictionary of Scientific Biography*, XI, pp. 247–253, and XIII, pp. 508–514.

46. On Ibn al-Shāṭir and the school of Marāgha, see G. Saliba, 'The Role of Marāgha in the Development of Islamic Astronomy: a Scientific Revolution Before the Renaissance', *Revue de synthèse*, 108, 1987, pp. 361–373; and G. Saliba, 'The Development of Astronomy in Medieval Islamic Society', *Arab Studies Quarterly*, 4, 1982, pp. 211–225.

47. E. S. Kennedy, *Studies in the Islamic Exact Sciences*, Beirut, The American University of Beirut, 1983, p. 86; see also 'Planetary Theory in the Medieval Near East and its Transmission to Europe' in the same volume, pp. 98–107.

48. See our *An Introduction ...*, *op. cit.*, pp. 135ff.

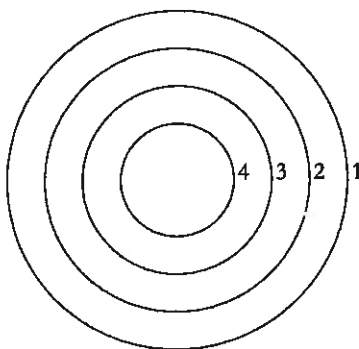
49. On the *Corpus Hermeticum* in the Islamic world, see footnote 11 above.

eighth century, or of the Shaykhī school belonging to the thirteenth/nineteenth century.

JĀBIREAN COSMOLOGY

The most important alchemical writings in Islam belong to the Jābirean corpus whose authenticity has been debated by several generations of Western scholars. Although there are uncertainties regarding the attribution of some works to him, there is no doubt that Jābir was a historical person who lived in the second/eighth century. But, perhaps more to our purpose, he stands as the 'archetype' of a particular conceptual dimension of Islam.⁵⁰ There are many cosmological schemes in the Jābirean corpus revealing Neoplatonic and Aristotelian influences as well as Hermetic ones. P. Kraus has pointed to the special importance of the cosmology contained in *Kutub al-Mawāzīn* (Books of the Balance) which contain Jābir's key cosmological concept of the balance.

In the *Kitāb al-Taṣrīf* (The Book of Derivation), Jābir discusses a cosmology based on concentric spheres in which the lower sphere is contained in and derives its principle from the one above.⁵¹ The Scheme of Jābir can be summarized as follows:



1. The First Circle, circle of the Prime Cause
2. The Second Circle, circle of the world of the Intellect
3. The Third Circle, the world of the Soul
4. The world of substance

3.4 Jābir b. Ḥayyān's view of the circles of existence

© From P. Kraus, *Jābir b. Ḥayyān – Contribution à l'histoire des idées scientifiques dans l'Islam*, Paris, Les Belles Lettres, 1986, IV, 'La cosmologie jabirienne', p. 142

50. See P. Lory, *Alchimie et mystique en terre d'Islam*, Paris, Verdier, 1989, pp. 14ff., where he has summarized the views of various scholars such as J. Ruska, P. Kraus and F. Sezgin. See also Nasr, *Science and Civilization in Islam*, *op. cit.*, pp. 258ff.

51. P. Kraus, *Jābir b. Ḥayyān – Contribution à l'histoire des idées scientifiques dans l'Islam*, Paris, Les Belles Lettres, 1986, IV, La cosmologie Jabirienne, pp. 135ff. For the scheme below, see p. 142.

The world of substance is itself the principle of the physical world for the substance is none other than the *quinta essentia* which stands above the four natures and the four elements while the four natures are themselves the principles of the four elements. As for substance, 'all things are in effect in it, all things derive from it, and all things return to it.'⁵² The sphere of substance is the boundary between the corporeal and the incorporeal and is itself subservient to and dependent upon the Soul. The Soul becomes united with substance to form corporeal objects, imparting to substance the form of the sphere which is later deformed by the attachment of substance to the four natures and elements among which heat is primary.

In Jābirean alchemy, the balance is not simply a means for quantitative measurement. Rather, it is the principle of measure of the intensity of the desire of the Soul for matter in its descent into matter. Jābirean cosmology is based upon the principle of the balance of the tendencies of the Soul which determines the qualities of cosmic existence. Jābirean alchemy in fact seeks to bring about transmutation by means of the re-establishment of the correct balance between the outer and inner qualities in metals upon the basis of symbolic numbers understood in their Pythagorean sense.⁵³ The Jābirean cosmos begins with God or the Prime Cause who is above all limitations, then the Intellect, the Soul and finally the substance which is the principle of the natural world from which all physical objects issue and to which they return. Within the natural world there exists a harmony based upon the manner in which the World Soul attaches itself to the physical cosmos, a harmony which is measured by the balance which, although dealing with numbers, is concerned not with ordinary quantities but the archetypal and qualitative Pythagorean numbers which contain the key to the understanding of cosmic harmony.

Pythagorean cosmology

Pythagorean philosophy reached Muslims through many sources, including the *Timaeus* of Plato and *The Introduction to Arithmetic* of Nicomachus. It was integrated readily into the Islamic perspective, which is unitarian, 'abstract' and oriented toward the vision of the mathematical world as the domain of intelligibility in the Platonic sense; hence, the predominance of mathematics in the sacred art of Islam.⁵⁴ Many Muslim authors developed a cosmology

52. *Ibid.*, p. 154.

53. On the Jābirean balance and alchemy, see H. Corbin, *L'alchimie comme art hiératique*, ed. P. Lory, Paris, L'Herc, 1986, pp. 145ff.; Jābir ibn Ḥayyān, *Dix traités d'alchimie*, ed. P. Lory, Paris, Sindbad, 1983; Kraus, *op. cit.*, pp. 187–303; and Nasr, *Science and Civilization in Islam*, *op. cit.*, pp. 262ff.

54. See Nasr, *An Introduction ...*, *op. cit.*, pp. 46ff.

based upon the qualitative significance of numbers, geometric figures and the numerical symbolism of the letters of the Arabic alphabet, the latter being associated with the traditional science of *al-jafr*. We find examples of this type of cosmology among authors as different as Abū Yaʿqūb al-Sijistānī and Ibn al-ʿArabī.⁵⁵ One of the best-known examples of this type of cosmology is Ibn Sīnā's *al-Risālat al-Nayrūzīyya* (The Treatise of Nayruz) in which each letter of the alphabet corresponds to a cosmic reality.

Among the well-known works of Islamic thought, perhaps the most important work which is thoroughly impregnated with the Pythagorean notion of mathematics and which contains an Islamic Pythagorean cosmology is the *Rasāʾil* (The Epistles) of the Ikhwān al-Ṣafāʾ, who lived in Iraq in the fourth/tenth century. The very structure of these works is based on numerical symbolism while certain specific treatises, deal with astronomy and cosmology.⁵⁶ They depict the cosmos as it appears in most other astronomical sources of the day, starting from above with the ninth heaven (*falak al-muḥīṭ*) followed by the heaven of the fixed stars, Saturn and other planets down to the moon. Where they differ from other sources is their emphasis upon the numerical significance of the structure of the cosmos, for according to them each number has its own property and each being is limited to a particular number which corresponds to its nature.⁵⁷

In the cosmos, the sun is like the king who resides in the middle of the heavens while the planets are like its armies and helpers, the spheres like the climates, the signs like countries and the degrees like towns. The Ikhwān also compare the movement of the heavens to the Islamic rite of pilgrimage and assert that the movement of the heavens around the earth is like the movement of the pilgrims (*ḥājjīs*) around the Kaʿba. In the same way that the Kaʿba is in the middle of the Holy Sanctuary or *Masjid al-ḥarām*, and *Masjid al-ḥarām* in the middle of the Holy Precinct or *al-Ḥaram*, the Ḥaram in the middle of the Hejaz, and Hejaz in the middle of the Islamic world, so is the earth located in the middle of the air, the air in the middle of the sphere of the moon, etc. all the way up to the supreme heaven.⁵⁸

55. We have provided cosmological schemes related to the letters of the Arabic alphabet in our *Islamic Science – An Illustrated Study*, pp. 32–34.

56. We have dealt extensively with the Ikhwān al-Ṣafāʾ and their cosmology in our *An Introduction...*, pt I. See also F. Dieterici, *Die Philosophie bei den Arabern im zehnten Jahrhundert n. Chr.* 16 vols., Leipzig/Berlin, J. C. Heinrich'sche, 1858–1891, reprinted Hildesheim, 1969; S. Diwald, *Arabische Philosophie und Wissenschaft in der Enzyklopädie Kitāb Iḥwān al-Ṣafāʾ*, Wiesbaden, O. Harrassowitz, 1975; A. Bausani, *L'enciclopedia dei Fratelli della Purità*, Naples, Istituto Universitario Orientale, 1978; Y. Marquet, *La philosophie des Iḥwān al-Ṣafāʾ, De dieu à l'homme*, Lille, Université de Lille, 1973.

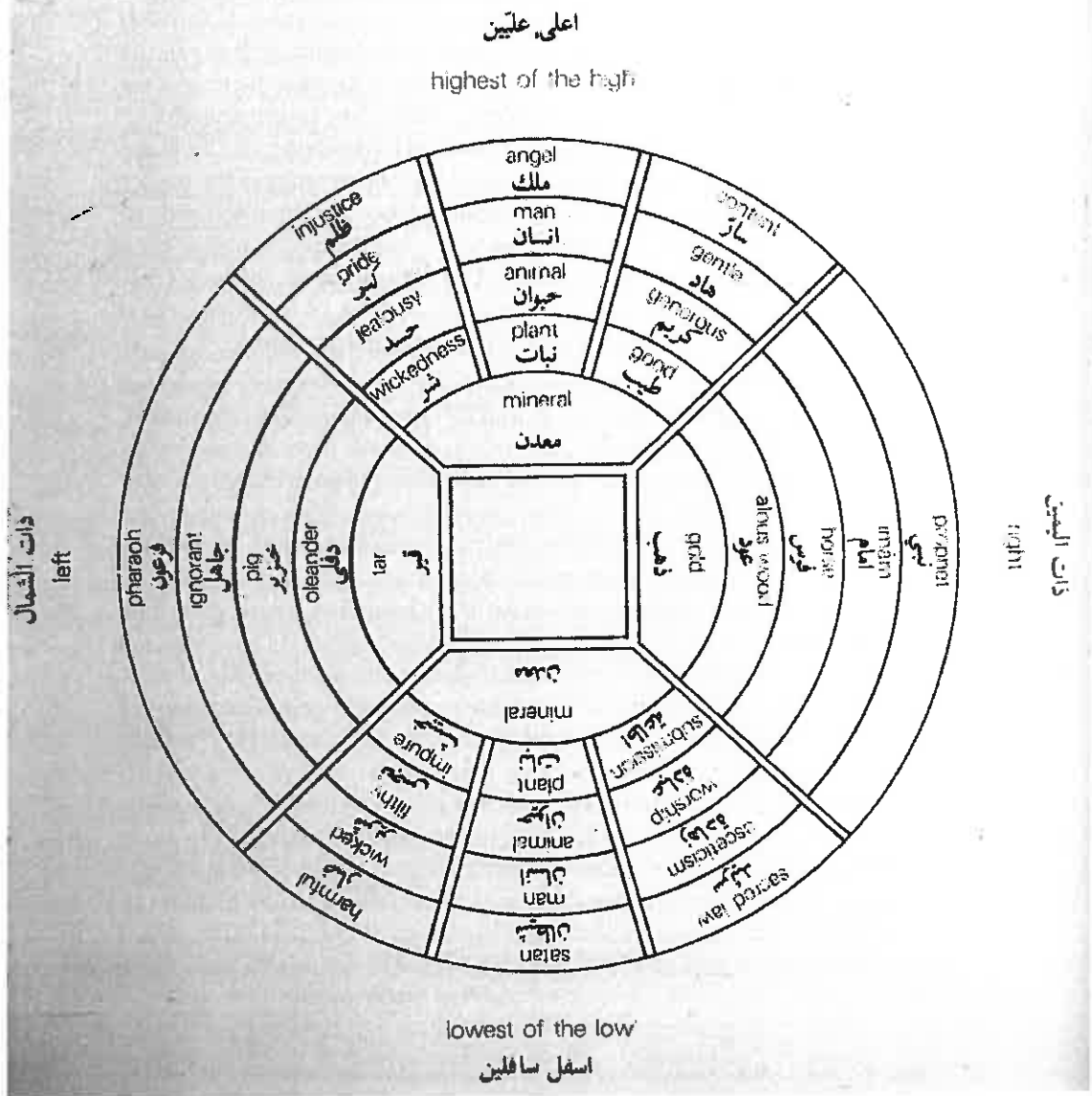
57. See *Rasāʾil*, Beirut, Dār Ṣādir, 1957, I, pp. 140–141.

58. *Rasāʾil*, op. cit., II, p. 30.

The Ikhwān also develop their cosmology on the basis of the descent of all the grades of being from God who is symbolized by the number 1, through the levels of the Intellect 2, Soul 3, Matter (*al-hayūlā*) 4, Nature 5, Body 6, the sphere 7 which also contains the seven planets, the elements 8 possessing eight qualities (consisting of the four qualities, cold, dry, moist and dry in combinations of twos) and the beings of this world consisting of the three kingdoms each having three parts.⁵⁹ The basis of their cosmology is the grades of being or the 'great chain of being' descending from the Intellect and, of course, ultimately God to the pebble on the beach in a hierarchy based upon numerical symbolism and cosmic qualities. The Ikhwān draw analogies between the macrocosm and the microcosm and the realities of the cosmos and those of revelation. Their cosmology can be summarized as follows:⁶⁰

59. This is explained more fully in our *An Introduction...*, *op. cit.*, pp. 51 ff.

60. *An Introduction...*, *op. cit.*, p. 71. The combining of the cosmic, religious and human elements is essential to the cosmology of the Ikhwān whose work is for that very reason of great importance for an understanding of the Islamic philosophy of the environment. It is not accidental that they devote a large section of one of their epistles to the dispute between man and the animals, a discussion which has great pertinence in the light of the environmental crisis today. See L. Goodman, *The Case of the Animals versus Man Before the King of the Jinn*, Boston, Twayne Publishers, 1978; and *Ikhwān as-Safā*, *Mensch und Tier vor dem König der Dschinnen*, trans. A. Giese, Hamburg, Felix Meiner Verlag, 1990.



3.5 The cosmos according to the Ikhwān al-Ṣafāʾ

© Photograph Roland and Sabrina Michaud (From S. H. Nasr, *An Introduction to Islamic Cosmological Doctrines*, Cambridge, Belknap Press of Harvard University Press, 1964, p. 71)

MUSIC AND COSMOLOGY

It is necessary to say a word here about the cosmic dimension of the classical music of the Islamic peoples and a cosmology based upon music which reminds one naturally of the Pythagorean theory of harmony.⁶¹ Many Muslim authors, especially the philosophers and the Sufis, including the Ikhwān themselves, have written on the cosmic dimension of music.⁶² The classical modes of these musical traditions correspond to cosmic qualities and moments and they develop from original silence and return to this silence in a process which mirrors and complements the cosmogonic process. They depict a centred universe of sound and aid the soul to journey through the cosmos to the abode of the Metacosmic Reality. Their treatment belongs to a separate study, but these traditions need at least to be mentioned here. In the same way that Pythagorean and Platonic cosmologies are related to harmony and Pythagorean numbers relate the world of the cosmos to that of music, according to some muslim philosophers there exists a definite relationship between music and cosmology. It was not only a Johannes Kepler who entitled his major astronomical work, *The Harmony of the World*. Many of the greatest Islamic scientists and philosophers such as al-Fārābī, al-Rāzī and Ibn Sīnā, not to speak of numerous Sufis such as al-Ghazālī and Rūzbihān Baqlī, were deeply versed in music and wrote many luminous pages on its cosmological and spiritual dimensions.⁶³

The *ishrāqī* cosmology of Suhrawardī and Quṭb al-Dīn Shīrāzī

With Shaykh al-Ishrāq Shihāb al-Dīn Suhrawardī (d. 587/1191) a new philosophical and theosophical school was inaugurated in Islam which came to be known as the School of Illumination (*al-ishrāq*), a school which was to

61. See J. Godwin, *Harmonies of Heaven and Earth*, Rochester, VT., Inner Traditions International, 1987; Godwin, *Music, Mysticism and Magic – A Sourcebook*, London, Routledge & Kegan Paul, 1986, especially Part II.

62. See A. Shiloah, 'L'épître sur la musique des Ikhwān al-Ṣafā', *La Revue des Etudes Islamiques*, 32, 1964, pp. 125–162. There is a considerable literature on the theory of classical Arabic and Persian music as well as other forms of the traditional music of the Islamic peoples such as Turkish which cannot be dealt with in this chapter. For further references, see J. During, *Musique et extase*, Paris, Albin Michel, 1988, including the bibliography, pp. 260–72; J.L. Michon, 'Sacred Music and Dance in Islam', in Nasr (ed.), *Islamic Spirituality – Manifestations*, *op. cit.*, pp. 469–505 and p. 539 for bibliography.

63. See S.H. Nasr, *Islamic Art and Spirituality*, London/Albany, N.Y., Golgonooza Press/State University of New York Press, 1987, pp. 151ff.

exercise a profound influence upon later Islamic philosophy, especially in the Eastern lands of Islam.⁶⁴ Suhrawardī developed an elaborate cosmology based upon the symbolism of light, especially in the second part of his masterpiece *Ḥikmat al-ishrāq* (Theosophy of the Orient of Light) upon which Quṭb al-Dīn Shīrāzī was to write the most famous commentary.⁶⁵ The Origin or God is identified as the Light of Lights (*Nūr al-anwār*) from whom emanates the longitudinal (*tūlī*) hierarchy of lights stretching from the archangelic realm to the visible world and also a latitudinal order of (*arḍī*) lights which are identified with the angels of Mazdaean cosmology and which contain the archetypes of all things. This order also includes lights which govern the actions of men and the three kingdoms. The whole universe consists, in fact, solely of grades of light and darkness which is nothing but the absence of light. Suhrawardī and Shīrāzī even developed a physics of light in which bodies are envisaged as *ghasaq*, or shadows of light, and to the extent that they are real are nothing but light.

The School of Illumination begins with Avicennan cosmology which Suhrawardī, however, interiorizes giving it a greater noetic and soteriological significance. Although the outline of the *ishrāqī* cosmos resembles that of Ibn Sīnā, it is described in more symbolic language and is even more closely tied to the reality of the angelic lights than the Avicennan cosmos. Suhrawardian cosmology is inseparable from angelology and angels may be said to permeate the universe of *ishrāq*. Furthermore, Suhrawardī and his commentators, such as Quṭb al-Dīn Shīrāzī, depart from the Avicennan cosmos by removing the boundary of the heavens from the sphere of the moon to that of the fixed stars. In Aristotelian cosmology, followed in this respect by the Muslim Peripatetics, there is a major boundary in the cosmos, and that is the sphere of the moon. Below it is the world of generation and corruption composed of the four elements and above it are the heavens composed of ether. For the *ishrāqī*, however, the cosmos is divided into two major realms, the Orient and the Occident, the first being the domain of light and the second of darkness. But the boundary between these worlds is the boundary of the visible cosmos

64. On Suhrawardī and the School of Illumination or *ishrāq* see S.H. Nasr, *Three Muslim Sages*, Delmar (N.Y.), Caravan Books, 1979; H. Corbin, *En Islam Iranien*, Paris, Gallimard, 1971, Chapter II; Nasr, 'Suhrawardī', in M.M. Sharif (ed.), *A History of Muslim Philosophy*, Wiesbaden, O. Harrassowitz, I, pp. 372-398; Netton, *Allāh Transcendent*, op. cit., pp. 256-258; and H. Ziai, *Knowledge and Illumination*, Atlanta, Scholars Press, 1990.

65. See H. Corbin, *Suhrawardī, Le livre de la sagesse orientale*, Paris, Verdier, 1986. We have included Shīrāzī in this section primarily because of his commentary upon this work. As for his other writings, some are Peripatetic and others belong to the tradition of Islamic mathematical astronomy.

itself. The Orient lies beyond the visible heavens and all the visible heavens belong, along with the sublunar region, to the cosmic Occident.⁶⁶

Suhrawardī develops an elaborate symbolic geography on the basis of the particular *ishrāqī* understanding of Orient and Occident. The role of cosmology for him is to orient man in the Occident of cosmic existence in which he is located during this terrestrial life and to enable him to journey to the Orient which is his original abode. Man lives in what Suhrawardī calls 'The Occident Exile' (*al-ghurba al-gharbiyya*)⁶⁷ and the function of the incredibly rich symbolic cosmology described by Suhrawardī, especially in his visionary recitals,⁶⁸ is to enable man to leave this exile and return to that Orient which he also carries in the depth of his being. This return is only possible if he becomes aware not only of his original home but also of the hierarchy of lights and veils which separate him from that Orient that is also his origin.

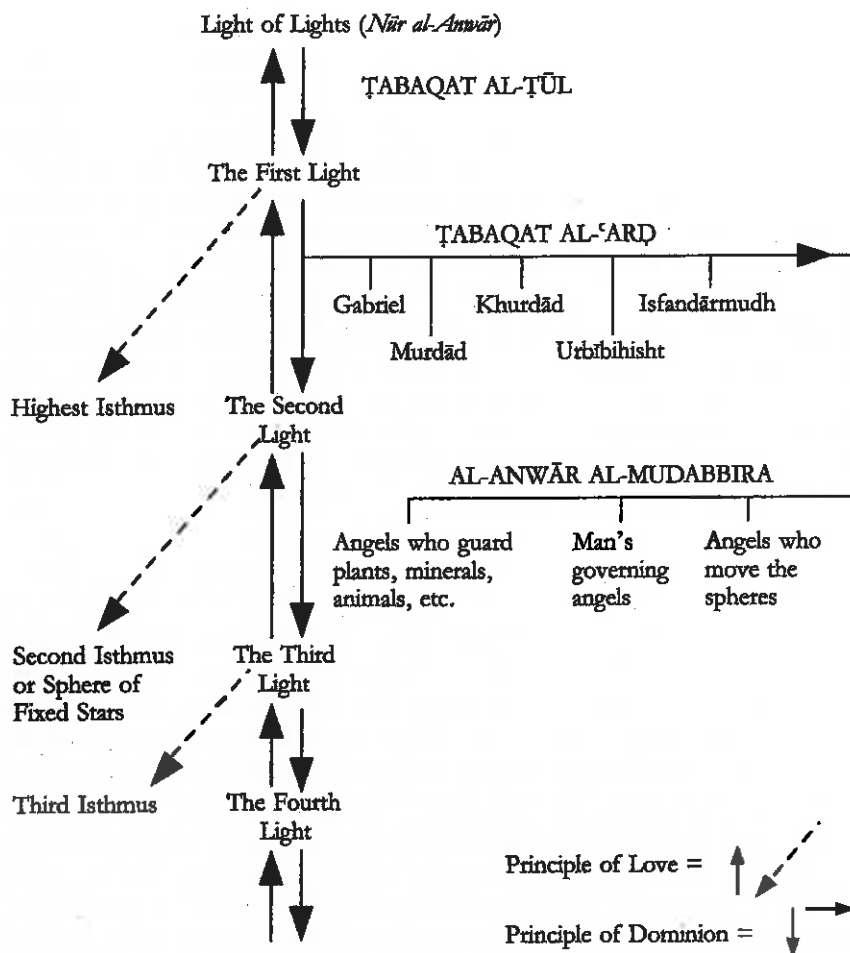
The Suhrawardian cosmic and angelic hierarchies can be summarized schematically as follows:⁶⁹

66. It is important to add that Suhrawardī also departs from the cosmology of al-Fārābī and Ibn Sīnā in that he does not limit the longitudinal or vertical hierarchy of the intellects to ten as they do.

67. See particularly the visionary recital under this title in Suhrawardī, *Oeuvres philosophiques et mystiques*, ed. H. Corbin, Tehran, Imperial Iranian Academy of Philosophy, 1977, II, pp. 274–297.

68. See Suhrawardī, *Oeuvres philosophiques*, *op. cit.*, III. These recitals have been translated beautifully by Corbin in his *L'Archange empourpré*, Paris, Fayard, 1976, and more prosaically and less successfully by W. Thanckston, *The Mystical and Visionary Treatises of Suhrawardī*, London, The Octagon Press, 1982.

69. Netton, *op. cit.*, p. 267.



3.6 The hierarchies and orders of light according to Suhrawardi

© From I. R. Netton, *Allāh Transcendent*,
London, Routledge, 1989, p. 267

The cosmology of Ibn al-ʿArabī and his school

No single figure in the history of Islam has written as much about cosmology as Ibn al-ʿArabī (d. 638/1240). In his many voluminous writings there are numerous pages devoted to cosmology while he also devoted separate treatises to the subject.⁷⁰ Ibn al-ʿArabī is like an ocean into which many rivers of cosmological thought flowed including Hermeticism, neopythagoreanism and Neoplatonism. But the substance of this ocean is composed of the cosmology which emanates directly from the Qurʾān and Ibn al-ʿArabī's cosmology remains profoundly Qurʾānic even when he employs neo-Empedoclean or Neoplatonic concepts. Ibn al-ʿArabī's vast cosmological writings were further elaborated upon by his disciples and members of his school ranging from Ṣadr al-Dīn al-Qūnawī to Muʾayyid al-Dīn al-Jandī, from ʿAbd al-Razzāq al-Kāshānī to ʿAbd al-Karīm al-Jīlī and numerous later commentators such as ʿAbd al-Raḥmān Jāmī, Ismāʿīl Ḥaqqī and ʿAbd al-Salām al-Nābulusī.⁷¹ It even included Shīʿite commentators such as Sayyid Ḥaydar Āmulī, who developed a Shīʿite version of Ibn al-ʿArabī's cosmological schemes wherein the imams play a particularly important role.⁷²

Ibn al-ʿArabī's cosmos is dominated by the Divine Names and Qualities and the interplay of their theophanies (*tajalliyāt*) and reflections upon that 'mirror of nothingness' which constitutes what appears to us as the material of this world. To create the world, God breathes upon the archetypes (*al-aʿyān al-thābita*) through the 'Breath of the Compassionate' (*nafas al-raḥmān*), the archetypes being themselves latent in God's knowledge and in a sense further determinations of the Divine Names and Qualities. The very substance of the universe is, therefore, constituted of the 'Breath of the Compassionate' while all existents are determinations (*taʿayyunāt*) of the principal realities contained in the archetypal realm. In fact, there is a

70. As for example *Inshāʾ al-dawāʾir* and *ʿUqlab...* in H. Nyberg, *Kleinere Schriften des Ibn al-ʿArabī*, Leiden, E. J. Brill, 1919. The masterpiece of Ibn al-ʿArabī, the *Futūḥāt al-makkiyya*, is itself a vast source for various cosmological ideas and schemes. See W. C. Chittick, *The Sufi Path of Knowledge*, Albany, N. Y., State University of New York Press, 1989, especially pts 1 and 3. On Ibn al-ʿArabī's cosmology, see the penetrating analyses of T. Burckhardt, in his translation of Ibn al-ʿArabī's *The Wisdom of the Prophets*, trans. from the French by A. C. Seymour, Gloucestershire, Beshara Publications, 1975; and his *Mystical Astrology According to Ibn al-ʿArabī*, trans. B. Rauf, Gloucestershire, Beshara Publications, 1977, which deals in an unparalleled fashion with the cosmology of the Andalusian master.

71. On Ibn al-ʿArabī's school, see W. C. Chittick, 'Ibn al-ʿArabī and His School', in Nasr (ed.), *Islamic Spirituality - Manifestations*, op. cit., pp. 49ff.

72. For Āmulī's cosmology, see Sayyid Ḥaydar Āmulī, *Le Texte des Textes*, ed. H. Corbin and O. Yahya, Tehran/Paris, Institut Franco-Iranien/A. Maisonneuve, 1975, I, especially pp. 32ff. of Corbin's French introduction; H. Corbin, *En Islam iranien*, op. cit., III, Book 4, Chapter 1, especially pp. 200ff.; Nasr, *Islamic Science - An Illustrated Study*, op. cit., p. 33.

hierarchy of determination or limitation which constitutes the ever-descending levels of existence until one reaches the limit of cosmic manifestation.⁷³

In the same way that the human breath is inhaled and exhaled constantly, the whole of the cosmos undergoes a constant process of expansion (*baṣṭ*) and contraction (*qabḍ*). In fact, the cosmos is annihilated and re-created at every instant although because of the rapidity of the process, man remains unaware of it and only regards the outward horizontal nexus between things. It is this constant renewal which is called the renewal of creation (*tajdīd al-khalq*) and which resembles the views of the Ash'arites to some extent with which it must not, however, be identified. The Ibn al-ʿArabī cosmos is thus a constantly renewed one, where the vertical cause is ever present and where the freshness of creation and the ecstasy of return to the Source accompany every moment of existence which is none other than the Eternal Now.⁷⁴

As already mentioned, the cosmos depicted by Ibn al-ʿArabī is dominated by the Divine Names of which nine are particularly significant in the ordering and running of the cosmos. These names are as follows:⁷⁵

The Living (<i>al-Ḥayy</i>)	
The Knowing (<i>al-ʿAlīm</i>)	The Powerful (<i>al-Qadīr</i>)
The Willing (<i>al-Murīd</i>)	The Speaking (<i>al-Qāʾil</i>)
He Who Governs (<i>al-Mudabbir</i>)	
He Who Deploys (<i>al-Mufaṣṣil</i>)	
The Generous (<i>al-Jawād</i>)	The Just (<i>al-Muqīṭ</i>)

The name *al-Ḥayy* is sometimes referred to as the 'Lord of Lords' while the four names which follow, namely *al-ʿAlīm*, *al-Qadīr*, *al-Murīd* and *al-Qāʾil*, are called 'the Four Pillars'. They are the principles of all quaternary manifestations which are so prevalent in the cosmos such as the four elements,

73. For a summary of this view, see Nasr, *Science and Civilization in Islam*, *op. cit.*, pp. 344ff.

74. This theme of the renewal of creation has been treated also by many other Sufis. See the penetrating study of T. Izutsu, 'The Concept of Perpetual Creation in Islamic Mysticism and Zen Buddhism', in S. H. Nasr (ed.), *Mélanges offerts à Henry Corbin*, Tehran, McGill University Institute of Islamic Studies and the Imperial Iranian Academy of Philosophy, 1977, pp. 115-148.

75. See Chittick, *Ibn al-ʿArabī and His School*, *op. cit.*, pp. 72-75. On pp. 70ff. of this essay Chittick analyses one of Ibn al-ʿArabī's cosmological schemes in a section entitled 'An Islamic Creation Myth' where the central significance of the Divine Names is brought out clearly.

the four natures and the four directions of space and which are also so important in traditional Islamic architecture.⁷⁶ The existence of all cosmic realities presupposed these nine Names the interplay of whose reflections upon the 'mirror of non-being' in fact constitutes cosmic reality.

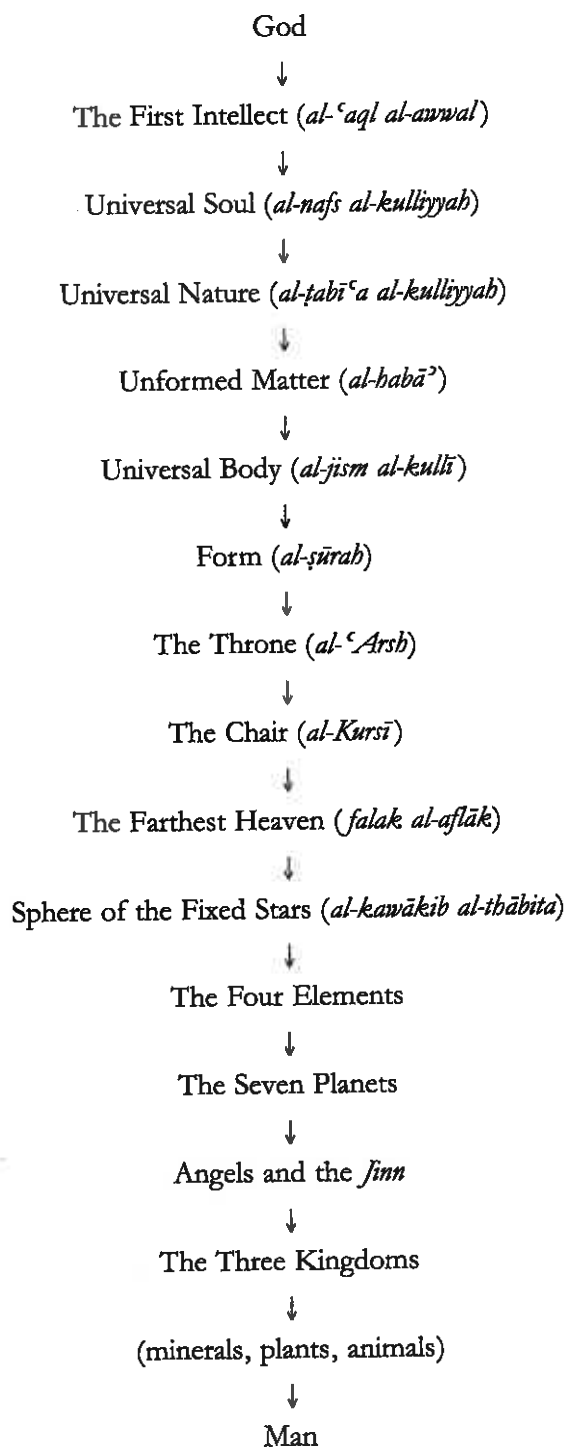
The cosmos of Ibn al-ʿArabī is of course hierarchical, following the traditional pattern which extends from the Divine Essence and the Divine Names and Qualities to the archangelic, angelic, psychic and physical realms. Sometimes Ibn al-ʿArabī speaks of all these realms as 'Divine Presence' (*al-ḥaḍrāt al-ilāhiyya*) because every level of reality is nothing but a Divine Presence. Hence, the famous five 'Divine Presences' consisting of *hābūt*, *lāhūt*, *jabarūt*, *malakūt* and *nāsūt* which have come to characterize the cosmology of the School of Ibn al-ʿArabī.⁷⁷ At other times, he outlines a more detailed hierarchy which begins from God and reaches man, this being called the arc of descent (*qaws al-nuzūl*) and then returns from man to God in the arc of ascent (*qaws al-ʿuṣūd*). The arc of descent includes not only the First Intellect and the Universal Soul but also Universal Nature, the unformed Matter or *al-Habāʾ*, the Universal Body and Form as well as the Throne and the Chair followed by the manifested and visible cosmos. It can be summarized as follows:⁷⁸

76. There is a profound relationship between Islamic cosmology and Islamic architecture.

See T. Burckhardt, *The Art of Islam*, trans. P. Hobson, London, World of Islam Festival Trust, 1976; W. Sanhoury, *Sacred Dimensions in the Architecture of the Islamic City*, Ph.D. Dissertation, London, Royal College of Arts, 1990; M. Akkach, *The Sacred Pattern of Traditional Islamic Architecture According to Sufi Doctrine*, Ph.D. Dissertation, Sydney, The University of Sydney, 1991, especially pp. 127ff, where he deals with the architectural significance of the quaternary manifestations of the Divine Names.

77. On the five 'Divine Presences' see F. Schuon, *Dimensions of Islam*, Chapter 11, pp. 142ff. These 'Presences' correspond respectively to the Divine Essence, the Divine Names and Qualities, the archangelic and angelic worlds, the imaginal and subtle worlds, and finally the corporeal world, although other interpretations have also been given by various commentators.

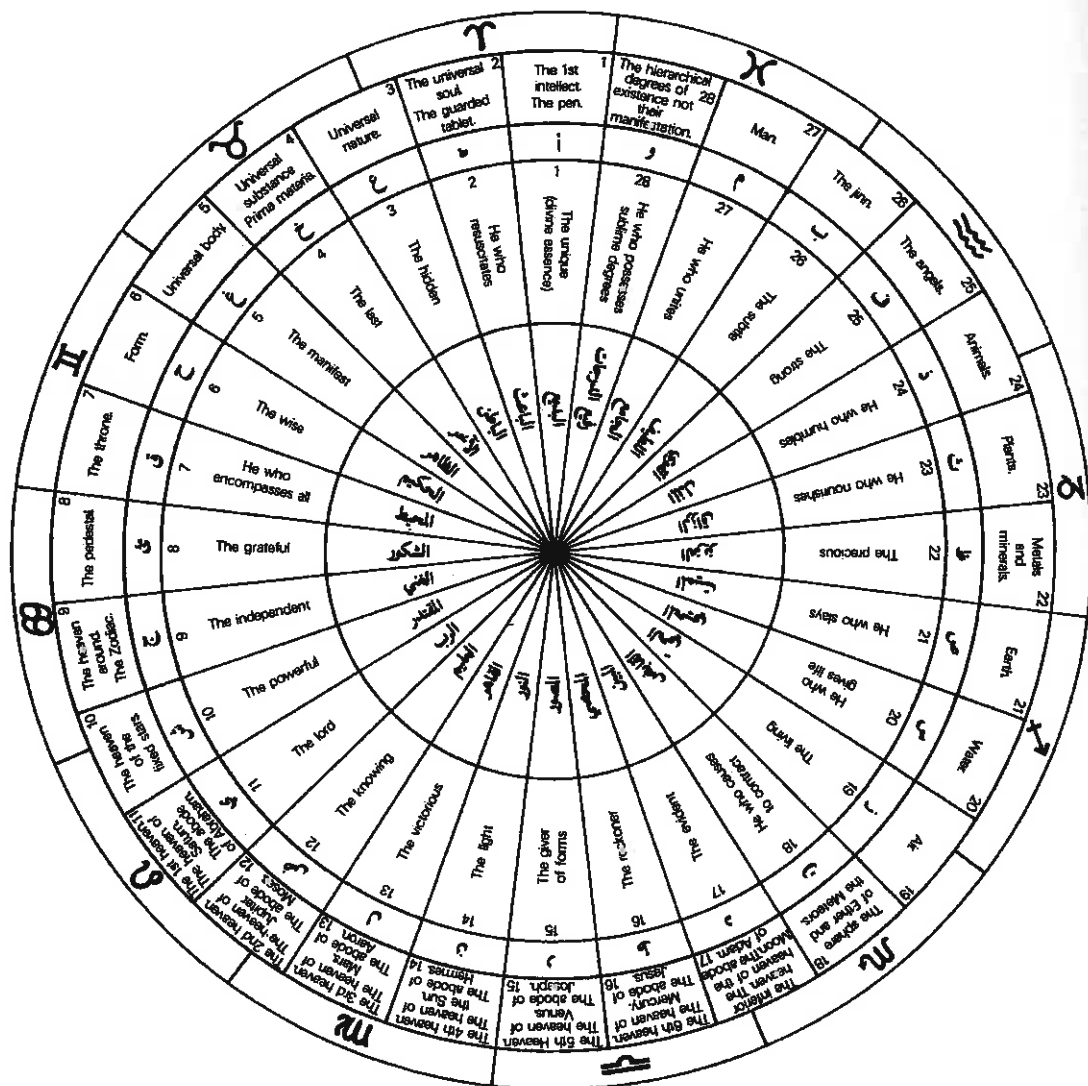
78. This scheme, based mostly upon the *ʿuqlah al-mustawfiya*, is summarized by Netton in his *Allāh Transcendent*, *op. cit.*, p. 284.



With man the ascent toward God begins in an active manner. Externally, man, being the microcosm, resembles the whole of the cosmos, while inwardly he is the theophany of all of God's Names and Qualities and is related to God vertically and directly. As for the cosmos, it too is ultimately a theophany.

Ibn al-ʿArabī's cosmology emphasizes the relationship between the revelation of the Word of God in the form of the Qurʾān and that primordial revelation which is the cosmos. To bring out this correspondence, Ibn al-ʿArabī not only draws attention to the interplay of the theophanies of the Divine Names and Qualities in both the cosmos and the religious universe of Islam, but also emphasizes the correspondence existing between the letters of the Arabic alphabet and the stations of the moon. In the same way that the Word of God reaches man through the twenty-eight letters of the alphabet of the sacred language chosen by God for His last revelation, the cosmic qualities descending from on high reach man through the twenty-eight stations which the moon traverses in its monthly journey on the basis of the lunar month. The following pattern summarizes these correspondences and the significance of the Divine Names in the cosmic order. It provides an intelligible view of the cosmos as an icon to be contemplated as well as to be understood according to its principles and the interplay of forces and energies which constitute the cosmos.⁷⁹

79. See Nasr, *Islamic Science*, *op. cit.*, p. 32. This scheme is taken from the study of T. Burckhardt of the astrological symbolism contained in Ibn al-ʿArabī's *al-Futūḥāt al-Makkiyya*. See Burckhardt, *Mystical Astrology According to Ibn ʿArabī*, *op. cit.*, pp. 32–33.



3.7 The macrocosmic development of the Divine Names in their correspondence with cosmic realities according to Ibn al-ʿArabi

© Adapted from T. Burckhardt,

Clé spirituelle de l'astrologie musulmane d'après Mohyiddin b. Arabi,

Éditions Traditionnelles, 1950, Fig. 8, pp. 32-33 by

Gloucestershire, Beshara Publications, 1977

The cosmographers from al-Qazwīnī to al-Suyūṭī

Following the very active period of the formulation and development of various forms of Islamic cosmology culminating in the sixth/thirteenth century with Ibn al-ʿArabī, Quṭb al-Dīn Shīrāzī and others, there began a period when knowledge contained in earlier treatises of cosmology and natural history were compiled in fairly popular compendia of cosmography. One of the most widely read of these works is the *ʿAjāʾib al-makhlūqāt* (The Wonders of Creation) of Zakariyyā al-Qazwīnī, a work composed in the seventh/thirteenth century. This work is typical of this genre of literature but was perhaps more popular than any other treatise of its kind.

The first part of the work, which is devoted to the 'higher realities' (*al-ʿulwīyyāt*), discusses the structure of the heavens from the level of the moon to *falak al-aflāk* and concludes with two chapters 'on the inhabitants of the heavens who are the angels' and 'on time'.⁸⁰ The author mentions the number of movements of each planet, the distance between the outer and inner surfaces of the spheres and the astrological properties of each planet. He then turns to the 'lower realities' (*al-sufīyyāt*) where he describes the spheres of fire, air, water and earth and then the three kingdoms generated by the four elements, namely minerals, plants and animals. It is particularly in this last chapter that he deals with not only men and *jinn* but also strange creatures, a domain where mythology and natural history become intermingled.

What is of special interest in this work from the point of view of both cosmography and Islamic art is the description of the angels.⁸¹ After discussing the nature of angels as being made of 'sacred substances' (*jawāhir muqaddasa*), Qazwīnī emphasizes that everything has its angel down to a drop of rain and that the functioning of the Islamic cosmos is inseparable from the activity of the angels. Qazwīnī then deals with the order of the angels beginning with the four which carry the Divine Throne and *al-Rūḥ al-Amīn*, the supreme archangel who administers the heavens and all that is below them. He speaks of the four archangels, Israfil, who breathes spirits into bodies, Jibrāʾīl, who brings revelation, Mikāʾīl who controls the bounty meant for each creature, and ʿIzrāʾīl who is the angel of death and who brings motion to rest. Then there is the order of the Cherubin, *al-Karrūbiyyūn*, who only worship God and attend to Him, being indifferent to anything else. Below them stand the angels who govern the heavens and those who carry out special functions in the human and cosmic worlds according to God's Will. Qazwīnī not only mentions the hierarchy of the angels but also describes them according to

80. See the *ʿAjāʾib al-Makhlūqāt wa-Gharāʾib al-Manjūdāt* of Qazwīnī, ed. F. Saʿd, Beirut, Dār al-Āfāq al-Jadīda, 1973. On Qazwīnī himself and his work see T. Lewicki, 'al-Kazwīnī, Zakariyyā', in the new *Encyclopaedia of Islam*, Leiden, E. J. Brill, IV, pp. 865–867.

81. *Ibid.*, pp. 88ff.



3.8 A page from *'Ajā'ib al-makhlūqāt* of al-Qazwīnī, illustrating Centaur ('Qanturas'), part-horse and part-man
 © Roland and Sabrina Michaud (Mameluke manuscript from Syria, fifteenth century, Ashmolean Museum, Oxford)

traditional Islamic sources. It is for this reason that his work has had much influence upon Persian, Turkish and Indian miniaturists who sought to paint angels in connection with various texts which they were illustrating.

Despite its popular nature, Qazwīnī's cosmography serves as a good source for knowledge concerning the view of the cosmos held by the general Muslim public before modern times. It is also important in bringing out the fundamental relation between angelology and cosmology in Islamic thought, a relation which was discussed on a more metaphysical and philosophical level by numerous Islamic thinkers such as Ibn Sīnā and Suhrawardī.

In addition to the genre of literature to which the '*Ajā'ib al-makhlūqāt* of Qazwīnī belongs, there exists another body of works which dealt with cosmology on a purely Qur'ānic and Sunni basis, i.e. grounded upon the *Sunna* of the Prophet, of which the *al-Hay'a al-saniyya fi-l-hay'a al-sunniyya* (The Brilliant Form Concerning Traditional Cosmology) of the well-known polymath Jalāl al-Dīn al-Suyūṭī (d. 911/1505) is a prime example.⁸² This work follows a long tradition going back to al-Khaṭīb al-Baghdādī's *Risālah fī 'ilm al-nujūm* (Treatise on the Science of Astronomy) written in the fourth/eleventh century which is opposed to Greek philosophical learning and relies solely upon Islamic teachings concerning the stars. The sources of al-Suyūṭī go back even further to the *Kitāb al-ʿAẓama* (The Book of Highness) which is rich in information concerning traditional Islamic cosmological teachings derived from *Hadīth*.⁸³

The pious author of the *Kitāb al-ʿAẓama* bases everything in his work on the Qur'ān and *Hadīth* and insists that there is a science of the cosmos rooted in these twin sources of the Islamic revelation, a science whose goal is to depict the cosmos as a gate to the invisible world. According to Abū-l-Shaykh and following him al-Suyūṭī, the study of the cosmos should be based on meditation (*tafakkur*) upon the signs of God rather than simply seeing things and theorizing about them (*naẓar*).

In this work on traditional cosmology al-Suyūṭī begins with the Throne (*al-ʿArsh*) and Footstool or Chair (*al-Kursī*) made of light and the upper ocean which resides below the Chair, then the Pen (*al-Qalam*) and the Guarded Tablet (*al-Lawḥ al-Mahfūz*) which are kept below the Throne and above the constellations of the Zodiac. He then turns to the seven heavens and the seven earths, cosmic dimensions, the sun, moon and the stars whose light derive, from God, meteorological phenomena and the like.⁸⁴ Most of this material is drawn from early Qur'ānic commentaries which have been largely over-

82. This work is the first of its kind to have been thoroughly analysed and translated into a Western language. See A. M. Heinen, *Islamic Cosmology – A Study of al-Suyūṭī's al-Hay'a al-saniyya fi-l-hay'a al-sunniyya*. Concerning the author and his significance in Islamic thought, see E. M. Sartain, *Jalāl al-Dīn al-Suyūṭī*, 2 vols., Cambridge, Cambridge University Press, 1975.

83. The content of this work is outlined by Heinen in *op. cit.*, pp. 40–42.

84. The cosmological thought of al-Suyūṭī is summarized by Heinen in *op. cit.*, pp. 76ff.

looked in the study of the genesis and early development of Islamic science. Al-Suyūṭī's work, in fact, represents a late and widely known example of a type of cosmology drawn completely from revealed sources and the transmitted sciences (*al-ʿulūm al-naqliyya*) rather than from the synthesis created by various schools of Islamic thought between the Qur'ānic world-view and elements of cosmology drawn from non-Islamic sources, especially Greek.

In any case, works such as those of al-Suyūṭī or of Ibrāhīm al-Qaramānī (d. 1000/1591–1592), especially his *al-Hay'a al-Islāmiyya* (Islamic Cosmology), which remained popular until the spread of modern astronomy into the Islamic world in the thirteenth/nineteenth century, must be taken into consideration for a full understanding of Islamic cosmological teachings. Although this type of work did not influence greatly the Islamic scientists, it did remain an important source of knowledge of the cosmos for many sectors of the Islamic community and it made available in a systematic fashion the extensive teachings of the Qur'ān and *Ḥadīth* and their inspired and traditional commentaries for generations of Muslims, even if the highest meaning of these teachings, which are usually expressed in a symbolic language, remained for the possessors of 'divine knowledge' (*al-ma'rifa*) to expound over the centuries.

Cosmology in later Islamic thought – the case of Ṣadr al-Dīn Shīrāzī

Parallel with the works of cosmographers and compilers of earlier traditional teachings concerning the cosmos with whom we have been concerned in the previous section and who have been widely read during the last few centuries of Islamic history, other important intellectual currents became evident which have much significance for later Islamic cosmology. These usually have to do with the grand syntheses of earlier schools of Islamic thought by such figures as Mīr Dāmād, Mullā Ṣadrā, Shaykh Aḥmad Sirhindī and Shāh Walī Allāh of Delhi. As far as cosmology and natural philosophy are concerned, the most important of these figures is Ṣadr al-Dīn Shīrāzī, usually known as Mullā Ṣadrā (d. 150/1640), who himself exercised a deep influence on Shāh Walī Allāh and most other later intellectual figures of Muslim India as well as of Persia itself.

Although a great deal of attention has been paid to Mullā Ṣadrā in Persia and even in the West during the past few decades,⁸⁵ few studies have been

85. Concerning Mullā Ṣadrā's life, works and ideas see H. Corbin, *En Islam iranien*, op. cit., IV, pp. 54–122; H. Corbin, *La philosophie iranienne islamique aux XVII^e et XVIII^e siècles*, Paris, Buchet/Chastel, 1981, pp. 49–83; S. H. Nasr, 'Ṣadr al-Dīn Shīrāzī (Mullā Ṣadrā)', in M. M. Sharif (ed.), *A History of Muslim Philosophy*, Wiesbaden, O. Harrassowitz, 1966, II, pp. 932–961; S. H. Nasr, *Ṣadr al-Dīn Shīrāzī and His Transcendent Theosophy*, Tehran, Imperial Iranian Academy of Philosophy, 1978; F. Rahman, *The Philosophy of Mullā Ṣadrā*,

made of his cosmology and natural philosophy in comparison to his metaphysics, psychology, eschatology and logic.⁸⁶ Although Mullā Ṣadrā was essentially a metaphysician, he did write on cosmology and natural philosophy and in fact developed several ideas of great importance for Islamic cosmological thought and its later and even contemporary developments.⁸⁷ Three elements of Mullā Ṣadrā's teachings stand out especially and need to be stated explicitly even in this brief reference to this major intellectual figure: the first is severing the bond between the metaphysical significance of the hierarchic cosmos from Ptolemaic astronomy, the second the central importance of the imaginal world and the third transubstantial motion.

For centuries in both East and West the hierarchic universe, whose reality remains independent of any particular astronomical system, was correlated with the geocentric cosmos of Ptolemaic and Aristotelian astronomy. The most important religious and philosophical result in the West of the destruction of this system through the introduction of the heliocentric system by Copernicus and the subsequent discoveries of Galileo was, therefore, the destruction of the hierarchic universe itself for many who identified the symbolic meaning of the visible cosmos as conceived by traditional cosmologists with mere astronomical facts.⁸⁸ These profound transformations took place in Europe mostly during the lifetime of Mullā Ṣadrā; yet not only he but Muslims up to the early thirteenth/nineteenth century remained by and large totally unaffected by the new astronomy. It seems, however, that it was in the destiny of Mullā Ṣadrā to be called upon to safeguard the traditional Islamic universe for later Muslim generations and prevent it from falling apart as a result of the introduction of the new astronomy which would finally reach the Islamic world almost three centuries after him.

Albany, N.Y., State University of New York Press, 1977; and J. Morris, *The Wisdom of the Throne – An Introduction to the Philosophy of Mulla Sadra*, Princeton, Princeton University Press, 1981.

86. This is particularly true of works written by traditional masters of Islamic philosophy in Persian and Arabic, such figures as S. M. Ḥ. Ṭabāṭabā'ī, S. J. Āshtiyānī, A. 'A. Zanjānī and J. Āl-i Yāsīn, although nearly all of these authorities have dealt with 'transubstantial motion' which forms a major pillar of Mullā Ṣadrā's cosmology. As a fine example of these contemporary traditional works of Mullā Ṣadrā, see Sayyid Jalāl al-Dīn Āshtiyānī, *Sharḥ-i Ḥāl wa-Ārā'-i Falsafī-yi Mullā Ṣadrā*, Mashhad, Kurasan Press, AH 1381; where on pp. 22–60 he deals with 'transubstantial motion' but does not devote a separate section to either his natural philosophy or his cosmology.
87. In fact, one of the four books of his masterpiece, *al-'Asfār al-'Arba'a* (The Four Journeys), which is like the bible of the new intellectual perspective inaugurated by him and named *al-Fikmat al-Muta'aliyah* (the transcendent theosophy) by Mullā Ṣadrā himself, is devoted to natural philosophy and cosmology while the first book of the *Asfār* also contains many cosmological sections.
88. For discussion of the significance of this transformation, see T. Burckhardt, *Mirror of the Intellect*, *op. cit.*, pp. 17–26.

What Mullā Ṣadrā did was to sever the nexus between the hierarchic Islamic cosmos with its angelic, imaginal and physical realms from the Ptolemaic system without denying on a purely astronomical level that system with the modifications which were made upon it by later Islamic astronomers. Mullā Ṣadrā stated explicitly that movement in the cosmos did not come from the motion of the outermost heaven, as claimed by the astronomers, but from the power of *al-ṭabīʿa*, or nature, which resides within the physical cosmos itself.⁸⁹

He also distinguished clearly in many of his works between the visible heavens of astronomy and the invisible ones while insisting that there are not only the two worlds of the physical and the intelligible but an intermediate third world of *al-ḥayāl*, the imaginal world.⁹⁰ The exposition of the macro-cosmic significance of this world constitutes the second element in the teachings of Mullā Ṣadrā which needs to be mentioned separately here. This world which possesses form but not physical matter is an essential part of the cosmos depicted by later Islamic thinkers from Suhrawardī and Ibn al-ʿArabī onward, but finds its most systematic elaboration in Mullā Ṣadrā and also some of the later Muslim thinkers of India such as Shāh Walī Allāh of Delhi who followed Mullā Ṣadrā especially on this point.⁹¹

The third doctrine of Mullā Ṣadrā which needs to be mentioned in this context is transubstantial motion (*al-ḥaraka al-jawhariyya*), which is a cornerstone of his philosophy and is treated in almost all of his works.⁹² According

89. "The directly immediate agent that causes motion, in all types of motion, is nothing but Nature (*al-ṭabīʿa*). Nature is the essential principle of every motion, whether it be employed by the soul, as in voluntary motion, or when it is constrained by an (external) force, such as the motion by constraint when a rock is thrown upwards, or in some other form, as for example in what is called "natural" motion. For (all) motion is like a person whose spirit is Nature.' From Mullā Ṣadrā's *al-Hikmat al-ʿArshiyya*, trans. by J. Morris, *op. cit.*, p. 126. See also 'A. Mishkāt al-Dīnī, *Nazarī bi-Falsafa-yi Ṣadr al-Dīn Shīrāzī*, Tehran, Bunyād-i Farhang-i Īrān, AH 1345, pp. 63ff.
90. H. Corbin, who more than any other Western scholar has dealt with the doctrine of the imaginal world among Muslim thinkers including Mullā Ṣadrā, refers to this world as *mundus imaginalis* to distinguish it from the merely imaginary as this term is currently understood in European languages. See for example H. Corbin, *Spiritual Body and Celestial Earth*, trans. N. Pearson, Princeton, Princeton University Press, 1977; especially section VI, pp. 164-170.
91. The significance of the imaginal world for the understanding of later Islamic cosmology is immense but cannot be dealt with in any detail in this general survey of Islamic cosmology. Ibn al-ʿArabī's treatment of the imaginal world has been treated extensively by Chittick in his *The Sufi Path of Knowledge* and by Corbin in *The Creative Imagination in the Sufism of Ibn ʿArabī*. As for Mullā Ṣadrā himself, see his *Wisdom of the Throne*, *op. cit.*, pp. 149ff.; and S. J. Āshtiyānī, *op. cit.*, pp. 70ff.
92. Especially in *al-Asfār al-Arbaʿa*, III, Pt 3 of the First Journey, ed. 'A. S. M. H. Ṭabāṭabāʾī, Tehran, Ḥaydarī Press, AH 1383, pp. 59ff. See also Nasr, 'Ṣadr al-Dīn Shīrāzī', *op. cit.*, pp. 948-951.

to Mullā Ṣadrā, and in contrast to the views of Ibn Sīnā and other Muslim Peripatetics, motion does not occur only in the categories of accident such as quantity (*kam*) and quality (*kayf*), but in the very substance (*jawhar*) of corporeal objects. The very fact of physical existence implies motion and there is an 'inquietude of corporeal existence' which causes the physical part of the cosmos to be in constant motion in an ascending movement which finally results in the return of all things to God. Mullā Ṣadrā thus depicts a dynamic universe without destroying the vision of immutable realities which are reflected in the visible cosmos and thereby adds an important chapter to Islamic cosmological doctrines.

CONCLUSION

During fourteen centuries of its history, Islamic thought has developed many schools of cosmology ranging from the mathematical to the poetical, yet all rooted in the unitary perspective of the Qur'ān and often using the very language and symbols of the Sacred Text along with those of *Ḥadīth*. Within all these cosmologies, despite their outward differences, one can see the principle of hierarchy issuing from the One who alone is the Source of all cosmic reality, the interrelation of all things and the profound nexus between the intelligible or spiritual, the psychic and the physical realms of existence. These cosmologies have been able to depict a universe in which both scientists and philosophers, mystics and common believers have been able to find meaning and orientation in a life guided by the Qur'ānic revelation.

It is not possible to gain deeper knowledge of many other aspects of Islamic thought from the works of Peripatetic philosophers to the poems of Gnostics (*al-ʿurafāʾ*) and lovers of God without some awareness of Islamic cosmology. The same holds true for Islamic art, especially architecture, but also music and certain types of poetry such as the romances of Niẓāmī, all of which are closely related in one way or another to some of the cosmologies briefly outlined above.

Finally, it needs to be remembered that despite the development of modern science and its spread into the Islamic world during the past century and a half, the significance of Islamic cosmology remains undiminished, for this cosmology deals with a knowledge of sectors of cosmic reality which lie beyond the scrutiny of a purely material science no matter how much that science seeks to extend itself to the outer reaches of space and the deep recesses of time. Moreover, traditional Islamic cosmology is of crucial importance if there is to be an in-depth criticism and then integration of alien forms of science into the Islamic intellectual universe without causing a destruction of that universe whose confines are threatened today precisely because of the neglect of traditional Islamic metaphysics and cosmology by so

many modernized Muslims. Islamic cosmology is the nexus between the sciences of nature and Islamic metaphysical teachings and a key for the understanding of the cosmos and man's position in it. Its study cannot but make clearer not only various aspects of the Islamic sciences and philosophy, but also the attitude that a veritable Muslim intellectual rooted in his own tradition must have *vis-à-vis* any science which claims to provide a knowledge of cosmic reality.