

ETHER IN GREEK THOUGHT. The notion of the ether begins as far back as the pre-Socratic philosopher Empedocles, though it was a subject of disagreement among ancient Greeks and also contemporary scholars what Empedocles meant by *aither*. His most common name for the fourth element (after earth, water, and fire) was not *aer* (from which we get our “air”) but *aither*. Gradually the more common word for air, *aither*, was replaced by the more rare and previously more restricted word *aer*, until *aither* became a special kind of *aer* as opposed to *aer* being a special kind of *aither*, which had been the case previously. Scholars such as Peter Kingsley have pointed out the many confusions that have arisen from this early ambiguity of the meaning of *aither*, for example in its being equating to fire as was done by the Stoics and by Aristotle. The ambiguity of the meaning of *aither* is perhaps significant for the understanding of this term among various schools of Islamic philosophy, as will be seen below.

According to the traditional scheme of elements that are attributed to Empedocles and which became a mainstay of Greek and later Islamic philosophy, the four elements of earth, air, fire, and water make up the world of generation and corruption. In Plato’s *Timaeus*, the *aether* is a kind of fire, and not an independent fifth element; for Plato the elements were still four of Empedocles; the heavens are not ethereal (as they would be by Aristotle), but were fiery. In the *Cratylus* Socrates explains the origin of the word *aether* as that which “always runs” (*aei thei*), which some scholars have seen as a possible prefiguration of Aristotle’s doctrine of ether, in which eternal motion of the celestial spheres of the planets and stars is a key feature of the cosmology of which they are a part. It is reported by a student of Plato (Xenocrates) that his teacher did in fact consider the *aether* to be an element separate from the other four, but it is a matter of dispute whether

Plato believed the *aether* was a fifth element; this disagreement results from doubts over attribution of works to Plato which he may not have written such as the *Epinomis*, an appendix to the *Laws*.

The four elements were mentioned by Plato but they became an important and common feature of Aristotle's cosmology. Earth, air, fire, and water could further be understood in terms of basic qualities of dryness, wetness, heat, and cold. It is the different natures of these elemental bodies that account for the change and motion in the world. According to Aristotle fire is hot and dry, air is hot and moist; and water is cold and moist, while earth is cold and dry. Moreover each of the elements has a natural motion, or the movement of that element to its natural place. Earth, as the heaviest element, moves naturally to the center of the cosmos, that is, the earth; water, the next heaviest, moves naturally to the sphere of water which surrounds the sphere of the earth; the sphere of air, in like fashion, surrounds the spheres of earth and water; and finally fire moves naturally to the sphere of fire which surrounds the three lower spheres. Fire moves up because it is moving to its natural place above the sphere of air, and earth placed in midair will fall down because it is seeking its natural place. Thus in the cosmology of Aristotle the earth is at the center of the universe, which is made up a series of concentric spheres. This terrestrial sphere beneath the moon is the realm of the four elements, and is the domain of generation and corruption. The four elements move and transform in myriad ways, and account for all change in this sublunar realm.

As for the sphere of the moon and all the spheres above it within which the heavenly bodies reside and move, including the sun and the other planets, these were not composed of the four elements at all but of a fifth substance that was not characterized by heat, cold, wetness, or dryness, nor did they possess the qualities of *gravitas* (the

tendency to move down) of water and earth or *levitas* (the tendency to move upward) of air and fire. This substance is the ether. For Aristotle there were dozens of concentric spheres which accounted for the motions of the planets. Unlike the movements of the objects composed of the four elemental bodies in our terrestrial realm, these celestial spheres do not move because they were seeking their natural state, but were moved by love for unmoved movers. These unmoved movers were not in the heavens, but were outside the realm of motion. Each of the ethereal spheres strives to imitate the unmoved movers through circular motion. The unmoved movers do not move the spheres through physical contact or pushing, but as objects of love. Moreover these motions are eternal. In the *Metaphysics* Aristotle entertains the idea that there is a single such unmoved mover accounting for all such motions, but also alludes to the possibility that there is a single unmoved mover that accounts for all of them.

In his *On the Eternity of the World against Aristotle*, John Philoponus (d. 570) argues strongly against the doctrine of the ether (especially its eternity) as a violation of the necessity of Divine creation. He argued essentially that a temporally infinite universe is impossible. Even Aristotle argued that a finite body cannot possess an infinite potential or power, and so objects such as the celestial spheres, which are finite objects, cannot have the potential to move for an infinite amount of time. Moreover if these motions have gone on for all eternity, that would mean that infinity can be increased, which is also a point Aristotle rejected. If a potentiality for motion had to precede every motion, as Aristotle maintained (in an argument against creation out of nothing), that would mean that the motion of the spheres had to be preceded by this potentiality and therefore would have had a beginning. Several Muslim philosophers would engage Philoponus on the side

of Aristotle. Al-Fārābī defended Aristotle against Philoponus, to the point of asserting that the true opinion of Philoponus was one of agreement with Aristotle. Avicenna and Averroës also defended Aristotle, as did the Jewish philosopher Sa'adia.

The Etherial Spheres in Islamic Philosophy.

Al-Fārābī and Avicenna adopted the idea that the concentric spheres were ethereal and eternal, but unlike Aristotle explained them in terms of emanations from God, in keeping with the general tendency of early Islamic philosophy to combine elements of Aristotle with Neoplatonic emanationism. According to the scheme described by Avicenna, the First Cause—God—is One, and hence its effect is one. This unitary effect of the First Cause is the First Intellect. The First Intellect contemplates its cause, contemplates itself as contingent upon its own cause, and contemplates itself as being necessary through its own cause. These three aspects of contemplation give rise, respectively, to an intellect, a soul, and a body: the second intellect, the soul of the outermost celestial sphere, and the body of the outermost celestial sphere of the Ptolemaic universe. Then the second intellect contemplates its cause (the first intellect), giving rise to another intellect (the third intellect); it contemplates itself as contingent, giving rise to another soul (the soul of the second sphere); and contemplates itself as necessary through another to give rise to another body (the body of the next sphere). This cosmological process continues until one reaches the sphere of the moon and the tenth intellect. These spheres are all made up of the invisible substance ether, as are the planets that travel within them, though the planets are visible. Each of the spheres is governed by an intellect and a soul. Avicenna's emanation differed from that of al-Fārābī, who conceived of only two contemplations at each level: the contemplation of an intellect of its source and of itself to give rise to the next intellect and sphere.

Philosophers like Avicenna and al-Fārābī generally argued that the sphere is the most noble shape, being limited by a single surface, that moves within its own limits by rotation without changing its shape. Ether is not a composite material like the objects of the earth. It is changeless and not subject to generation and corruption like the object of the earth that are describable in terms of the transmutations of the four sublunar elements. Ether does not move like earth, air, fire, and water out of a tendency to find its natural resting place, and moreover being circular (and not upward or downward, being neither heavy nor light) has no contrary. Moreover the celestial spheres are not composed of form and matter, unlike the objects of the sublunar realm. Because the motion of the spheres is circular and does not aim toward some natural state of rest, it can be eternal.

Suhrawardī criticized the Avicennan conception of emanation on the grounds that even three aspects of intellection were insufficient to account for the multiplicity of the universe. He does not name these spheres as ether, but as being different lights, though he still retains the basic idea that they are spheres that move according to some inner impulse and are capable of knowledge. Interestingly Suhrawardī does have a sphere named Ether: he names the spheres of *ether* and *zamharīr* as belonging to the sublunar realm, the latter referring to extreme cold and the former evidently being connected with fire or heat.

In the schema of the Brethren of Purity (*Ikhwān al-Ṣafā'*) the Creator gives rise to the Intellect, which emanates the Soul, which emanates Prime Matter, which emanates Nature, which emanates the Absolute Body, from which the spheres and the world of generation and corruption (four elements, the three kingdoms) is made. However for them the ether is a division of the air beneath the lunar sphere. The air consists of the ether, which is heated by contact with the lunar sphere, the

middle layer of *zamharīr* which is extremely cold, and the lower level of moderate temperature. Also the Brethren do not, like al-Fārābī and Avicenna, make a sharp division between the realm of the spheres and the realm of the four elements, because if that were so there would be sense in which the planets of the Zodiac and the beings of the world could have any relationship with each other (although they agree with the Peripatetics that the celestial bodies are beyond heaviness and lightness). Thus the celestial substance also has the qualities that are normally assigned to the objects of the sublunar realm, although they would possess these in a perfect and incorruptible way.

The Brethren also connect the ether to the symbolism of the number five, being the first “circular” number and corresponding to the number of human faculties of sense perception. Ismāʿīlī thinkers such as Abū Bakr al-Rāzī used the symbolism of the fifth body as a way of signifying a fifth group of people who are better than other Muslims, namely, the Ismāʿīlīs. The other four fail in their improper recognition of the roles of the Prophet and Imam ʿAlī. The element of ether was also a part of Islamic alchemy. In the system of Jābir it was one of the seven elements: earth, air, fire, water, and ether, in addition to sulfur and mercury.

While Mullā Ṣaḍrā continued and adopted some aspects of the traditional cosmology, including that of the ethereal spheres, his doctrine of change-in-substance (*al-ḥarakatal-jawharīyah*) affects his view of the nature of the ether just as much as it does the nature of all substances. Being possessed of intellects and souls, they move toward the purpose of goodness and bliss in the cosmos.

Because latter-day Islamic philosophers have largely followed Western science as the basis for their own cosmological doctrines, it is worth noting that the Ptolemaic theory of celestial spheres was abandoned in the Christian world after the Copernican revolution, the Galilean

discovery of the moons orbiting Jupiter (thus violating the integrity of the spheres), and finally the Newtonian theory of celestial mechanics. The concept of ether did not disappear, however, but continued in various forms as a placeholder concept for an invisible but undetectable substance meant to account for various phenomena (such as the propagation of light), until it was abandoned altogether in the West when experiments disproved the existence of the kind of physical ether assumed to be the medium for electromagnetic radiation.

BIBLIOGRAPHY

- Dales, Richard C. “The De-Animation of the Heavens in the Middle Ages.” *Journal of the History of Ideas* 41, no. 4 (October–December 1980): 531–550.
- Kingsley, Peter. *Ancient Philosophy, Mystery, and Magic: Empedocles and Pythagorean Tradition*. New York: Oxford University Press, 1995.
- Montada, Josep Puig. “Aristotle and Averroes on ‘Coming-to-Be and Passing-Away.’” *Oriens* 35 (1996): 1–34.
- Nasr, Seyyed Hossein. *An Introduction to Islamic Cosmological Doctrines: Conceptions of Nature and Methods Used for Its Study by the Ikhwān al-Ṣafāʾ, Al-Bīrūnī, and Ibn Sīnā*. Rev. ed. Albany: State University of New York Press, 1993.
- Nomoto, Shin. “An Early Ismaili View of Other Religions.” In *Reason and Inspiration in Islam: Theology, Philosophy and Mysticism in Muslim Thought: Essays in Honour of Hermann Landolt*, edited by Todd Lawson. New York: I. B. Tauris in Association with the Institute of Ismaili Studies, 2005.
- Rosen, Edward. “The Dissolution of the Solid Celestial Spheres.” *Journal of the History of Ideas* 46, no. 1 (January–March 1985): 13–31.
- Saliba, George. *A History of Arabic Astronomy: Planetary Theories During the Golden Age of Islam*. New York University Studies in Near Eastern Civilization. New York: New York University Press, 1994.
- Wildberg, Christian. “John Philoponus.” In *The Stanford Encyclopedia of Philosophy*, Fall 2008 ed., edited by Edward N. Zalta. <http://plato.stanford.edu/archives/fall2008/entries/philoponus/>.