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The Hand Extending Beyond the Cosmos: Discussions on the *Khalā'* [Void] Between the Baṣran and Baghdād Schools of Mu'tazila

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Abstract: We can find the origins of the notion of void in the Kalām tradition's recognition of atomism. However, the main debates on the subject appeared after the Greek philosophical heritage transitioned to the Islamic world in the 3rd century of Hijra. The literature of Kalām, just as in the metaphysical tradition, has two main types for this void being discussed. The first one is the external void (extracosmic) in which the cosmos floats. In the sources of Kalām, the question of whether such a type of void exists is debated around the questions of whether anyone who might look beyond the cosmos can see anything or whether someone who stretches their hand outside the cosmos can move it. The second type of void, which occupies more of the *mutakallimūn* (Muslim theologians) agenda, is the internal void (intercosmic), assumed to be within the cosmos and between the body-forming atoms. This kind of void is discussed around the question of "Whether separating the two atoms is possible so that a third one can be inserted between them?" An ongoing discussion on the intercosmic void is found between the Baṣran and Baghdād Schools of Mu'tazila. Ibn Mattawayh and al-Nīsābūrī narrated the evidence presented in these discussions in their original form. The current essay discusses the debates between the two Schools and assesses the theoretical and experimental arguments both Schools present to justify their viewpoints, considering their philosophical origins.

Keywords: Kalām, Mu'tazila, Void, the Baṣran School, the Baghdād School.

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Introduction

The question of whether a void exists within or beyond the cosmos has been debated since the ancient Greek philosophers. In the pre-Socratic era, the problem of void was often debated in relation to the concepts of existence, non-existence, unity-multiplicity, and motion. Pythagoras (570-495 BC), who for the first time accepted the void, considered indivisible bodies to be composed of numbers and the void to be the principle of everything. He also argued the void to extend like an everlasting breath unto the whole world. In his framework of integers, a void is defined as a being that separates numbers and bodies and draws their boundaries. For, according to him, unless a gap is present between two numbers or bodies, they cannot be separate entities. Parmenides (~600-500 BC) denied the void, arguing that existence is one and continuous whose unity would be destroyed if disrupted by a void/nothingness. He also rejected the existence of motion, arguing that motion would be impossible without a void.[1] Zenon (490-430 BC), Parmenides' pupil, tried to expose the logical inconsistencies of the conception of void. According to him, if a place exists for all beings, then that place must also be in a place. In other words, if the void is some entity, then it too must be in a place, but this would cause an infinite regression. Furthermore, for a body to move in space, it must first cover half of it, but before that half, it must firstly cover half of that half, a process that would repeat forever. The presence of motion and place thus becomes impossible.[2]

Leukippos (5th century BC) and Democritus (460-370 BC), who embraced the theory of atomism, were the most significant advocates for the idea of void in antiquity. They believed denying motion to be impossible, and maintained the cosmos to consist of an infinite number of indivisible atoms and voids. According to them, because atoms are indivisible, no void or motion exists within them but does exists between them as they merge and form bodies. In other words, entities are a sort of combination of being (atom) and nothingness (void). The void is at least as real as it is, because a continuous motion and change is observed in the cosmos. Because motion is impossible within a being, a void must exist in which the being moves.[3] From the point of view of atomic theory, however, the void is necessary not only for

1 Aristoteles, *Fizik* [Physics], trans. Saffet Babür (Istanbul: Yapı Kredi Publications, 2005), 213b 10–15, 20–28.

2 Frank Thilly, *Felsefenin Öyküsü*, trans. İbrahim Şener, I (Istanbul: İzdüşüm Publications, 2000), 60; Arda Denkel, *İlkçağ'da Doğa Felsefeleri*, 2nd Edition (Doruk Publications, 2011), 47–48.

3 Mary Hesse, "Vacuum and Void", *The Encyclopedia of Philosophy*, ed. Paul Edwards (New York: MacMillan, 1967), 217; Edward Grant, *Much Ado About Nothing: Theories of Space and Vacuum from the Middle Ages to the Scientific Revolution* (London: Cambridge University Press, 1981), 3.

a motion to take place, but also for the idea of atom to be grounded. This is because, independent, distinct, and separate atoms cannot be formed and differentiated from each other unless existence is interrupted by non-existence.[4]

Plato (428-348 BC), who had major influence on the tradition of Islamic thought, considered void as a dimension that would allow the generation and corruption of bodies. According to him the void in the cosmos is air, and air is a body. No void/nothingness is required for the motion of bodies. On the other hand, no void, air, or other sensible-visible entity exists in the cosmos in the sense of nothingness.[5] Similarly, Aristotle (384-322 BC) claimed void to not exist in the sense of nothingness, whether inside the universe and bodies or beyond the universe.[6] According to him, what one calls "empty" is not empty in fact. Just as when a membrane is thrown into water, it carries as much water as the mass of the membrane, so is the same true for air when a membrane is thrown into the air. Yet air cannot be perceived through sensation as it is not seen and felt. However, it is something. Just as a line can be divided infinite times, no limit exists to the possible fineness of matter.[7] Namely, the places assumed to be empty are, according to him, full of thin matter. Thus in Aristotle's philosophy, the void, having been perceived as nothingness in ancient thought, indeed has a spatial quality.[8] According to Aristotle, the existence of motion in the cosmos does not require the existence of a void. On the contrary, the existence of a void makes motion impossible because no concept of direction exists in void, so no direction or cause is present for the natural motion of things. Also, no cause exists for any motion to stop at any point in space. In this case, either motionlessness in the void necessarily exists or what causes movement onto another body must move forever. According to him, motion occurs through bodies' simultaneous exchange of position.[9]

Two of the prominent representatives of atomism, Epicurus (341-270 BC) and Lucretius (95-55 BC), tried to defend the notion of void using stronger arguments and taking Aristotle's critiques into account. Unlike the case with bodies, being

4 Alfred Weber, *Felsefe Tarihi*, trans. H. Vehbi Eralp, 5. Edition (Istanbul: Sosyal Publications, 1998), 36; Mehmet Bulgen, *Kelâm Atomculuğu ve Modern Kozmoloji* (Istanbul: TDV Publications, 2015), 282–283.

5 Platon, *Timaios*, trans. Erol Günel-Lütfi Ay (Istanbul: Cumhuriyet Publications, 2001), 33, 95-96; *Fakhr al-Dīn al-Rāzī, al-Matālib al-āliyā min al-'ilm al-ilāhī*, V (Beirut: Dār al-Kitāb al-'Arabī, 1987), 113.

6 Aristotle, *Fizik* [Physics], 217b 20-28; Aristotle, *Gökyüzü Üzerine* [On the Sky], trans. Saffet Babür (Ankara: Dost Publication House, 1997), 279a 12–14.

7 Aristoteles, *Fizik*, 216a 2732.

8 Aristoteles, *Metafizik [Metaphysics]*, trans. Ahmet Arslan (Istanbul: Sosyal Publications, 1996), 1048b 10–17; Denkel, *İlkçağ'da Doğa Felsefeleri*, 119.

9 Aristoteles, *Fizik*, 214b 5–35, 215a 15–25.

able to perceive the void through the senses is impossible according to Epicurus. The intellect requires the presence of a void within which these motions actually occur, relying on our sensory observation of the existence and motions of bodies.[10] Lucretius meanwhile argued the universe to be made up of bodies and void by putting forward five different arguments.[11] The Stoics, who followed Aristotle in physics and cosmology, adopted a syncretic approach toward the void. Following the Peripatetic doctrine, they denied the existence of a void in the cosmos but acknowledged the possibility of a void outside the cosmos by describing the void as "the place where existence is possible, if not in an actual sense,"[12] for according to them, the universe cannot be constrained unless such a void is acknowledged.[13]

The most profound difference in Islamic philosophy regarding the void is that of the Muslim philosophers, the adherents of the Peripatetic tradition, and the *mutakallimūn* who sought to accommodate the theory of atomism to the Islamic belief. The Baṣran School of Muʿtazilah and the Ashʿarīs accepted the idea of the void as they adopted the doctrine of atomism, while the Muslim philosophers rejected both an internal and external void apart from the two following names:[14] Abū Bakr al-Rāzī (d. 313/925), who followed the Platonic tradition and regarded the void among the five eternal principles, and Abū al-Barakāt al-Baghdādī (d.547/1152), the critic of Aristotle. They regarded the void to be one of the five eternal principles.[15]

In conclusion, debates on the concept of void should be noted to not simply entail justification or denial of the concept, but rather to be about general conceptions of cosmology. Based on these cosmological notions, the concept of the void is either approved or denied.[16] This is the case with *mutakallimūn* as well as the ancient philosophers, Aristotle, and the Islamic philosophers. However, no independent

10 For Epicurus's conception of void see David Sedley, "Two Conceptions of Vacuum", *Phronesis* 27/2 (1982): 183 ff.

11 For Lucretius's arguments on void see A. A. Long & D. N. Sedley, *The Hellenistic Philosophers I: Translations of the Principal Sources, with Philosophical Commentary* (London: Cambridge University Press, 1987), 23–25.

12 Grant, *Much Ado About Nothing*, 107.

13 Richard Sorabji, *Matter, Space, and Motion* (London: Duckworth, 1988), 125.

14 The principles of the finitude of dimensions (*tanāhī al-abʿād*) played an influential role in Muslim philosophers' rejection of the external void. For, according to them, nothing can be infinite, whether it is a body, size, void, or fullness. Thus, the void has also been rejected, since it evokes such an infinity. See Ibn Sīnā, *ʿUyūn al-ḥikma* (Beirut: Dār al-Qalam, 1980), 30-3; For al-Fārābī's rejection of void see Abū *Naṣr* al-Fārābī, *Fī al-khalāʾ* (Ankara: TTK Publication House, 1985).

15 İlhan Kutluer, *Akıl ve İtikad* (Istanbul: İz Publication, 1998), 206-8; for Muslim philosophers' opinions on the concept of void see Ömer Faruk Erdoğan, "Fârâbî ve İbn Sina Felsefesinde Boşluk/Halâ Kavramı", *İslâmî Araştırmaları* 30/1 (2019): 98–111.

16 Kutluer, *Akıl ve İtikad*, 182.

research exists in Turkey to the best of my knowledge on *mutakallimūn*'s concept of void.[17] I believe dealing with the debate that has taken place between the Baṣran and the Baghdād Schools on the concept of the void to be worthwhile in order to fill this gap to some degree and help undertake some new studies on this topic. Before considering the debates, evaluating *mutakallimūn*'s general approach to the idea of void would be useful.

1. The Concept of Void in Kalām

Determining when the debates on the concept of void first began in the Kalām circles is difficult. However, differentiating between the categorical approval or rejection of the idea of void and the process of constructing arguments for or against it is important in assessing the problem. In this regard and while in pointing out the connection between atomism and the idea of void, Mūsā Ibn Maimūn (d. 601/1204) noted that, after accepting the doctrine of atomism, *mutakallimūn* had to accept the void to account for motion.[18] In this situation, *mutakallimūn*'s recognition of the void becomes a necessary consequence of their acceptance of the theory of atomism, and this began with Abū al-Hudhayl (d. 235/849-50), who brought atomism to Kalām. This claim, though, should be noted to not include all *mutakallimūn* who endorse the doctrine of atomism. This is because al-Ka'bī (d. 319/931) and the Baghdād School, with whom which he associated rejection of the void, despite their atomist views. The key explanation for this is their embracement of a natural-based cosmology. Endorsing the notion of the void's presence between atoms suggests a conception of a cosmos composed of discontinuous bodies without the capacity to affect one another as opposed to embracing the idea of continuity that *mutakallimūn* envisaged of taking nature as their focal point. They both denied the void and formed their understanding of substance, place, and motion in a way that formed the basis for their conception of continuity.[19]

Dhanani, on the other hand, starts his discussions on void with al-Kindī (d. 256/870) by taking into account the development of evidence in favor of and against

17 Dhanani's doctoral dissertation can be regarded as the most comprehensive study on the concept of void prepared in the West. See Alnoor Dhanani, *The Physical Theory of Kalām* (Leiden: E.J. Brill, 1994), 55–90.

18 *Ibn Maimūn*, *Dalālat al-ḥāirīn* (Cairo: Maktabat al-Ṣaqāfat al-Dīniyya, n.d.), 197.

19 See Abū Rashīd Al-Nīsābūrī, *al-Masāil fī al-khilāf bayna al-Baṣriyyīn wa al-Bağdādiyyīn* (Beirut: Ma'had al-Inmā al-Arabī, 1979), 17, 61; al-Shaykh al-Mufīd, *Awā'il al-maqālāt* (Beirut: Dār al-Mufīd, 1993), 96-7; for atomist-naturalist opinions of the Baghdād school see Ahmet Mekin Kandemir, *Mu'tezilî Düşüncede Tabiat ve Nedensellik* (Istanbul: Endülüs Publications, 2019), 113 ff.

the idea of void.[20] According to him, the debate on the void in Kalām began in the 4th/10th century onwards, and Abū Bakr al-Rāzī's endorsement of the idea played an important role in this.[21] Ibn Khaldūn (d. 808/1406) stated the first person to adopt the idea of void in the Ash'arite tradition to be Abū Bakr al-Bāqillānī (d. 403/1013).[22] These determinations, however, do not reflect the case. For while no details are found on the subject, some passages in both al-Ash'arī's (d. 324/935-36) and al-Ka'bī's *al-Maqālāt* indicate both scholars to have been aware of the debates on the idea of void.[23] Moreover, al-Ka'bī concludes his narrative of the two views[24] on whether an external void exists in the cosmos by saying 'Abbād denied both of these views; this provides an important hint as to the starting date of the debates on the void. For, the date of death of one of the two 'Abbāds (Muammar b. 'Abbād) associated with the Mu'tazilite tradition was 215/830 while the other's ('Abbād b. Sulaymān) was 250/864. In this situation, debates on the void should have begun earlier regardless of whichever of the 'Abbāds al-Ka'bī had intended. Ibn Fūrak (d. 406/1015), on the other hand, provides extensive details on al-Ash'arī's endorsement of the idea of the void.[25] Furthermore, in the works of al-Nīsābūrī and Ibn Mattawayh of the Baṣran School, Abu Hāshim and al-Kā'bī's names are mentioned in the Baṣran and Baghdād Schools' discussions on the void, with some evidence referring to them in particular.[26] This indicates *mutakallimūn* to have debated the problem of the void in all its aspects since the beginning of 3rd/9th century.

In Arabic, when a place has nothing in it, it is called *khalā'* in the sense of "being empty or being left empty," and when a body occupies that place, it is called *malā'*

20 Al-Kindī establishes a necessary relationship between space and a thing taking place in space by defining the void as "the space in which nothing takes a place". According to him, if there is a space, there is necessarily a thing taking place in space and vice versa. Therefore, it is impossible to talk about an absolute void. See al-Kindī, "İlk Felsefe Üzerine", *Kindî: Felsefî Risâleler*, Mahmut Kaya (Istanbul: Klasik Publications, 2014), 133; for al-Kindī's rejection of void see also Mehmet Bulgen, *Klasik İslam Düşüncesinde Atomculuk Eleştirileri* (Istanbul: İFAV Publications, 2017), 153.

21 Dhanani, *The Physical Theory of Kalām*, 72; Theologians' understanding of void is completely different from that of *al-Rāzī*. Moreover, the theologians regarded the concept of void, taking as an absolute space within the doctrine of five eternal principles, as a threat to Islamic beliefs. Kutluer, *Akıl ve İtikad*, 202-3; Bulgen, *Kelâm Atomculuğu*, 286.

22 Ibn Khaldūn, *al-Muqaddima* (Damascus, 2004), II, 212–213.

23 For these arguments see *Abū* al-Qāsim *al*-Balkī *al-Kaʿbī*, *Kitāb al-Maqālāt* (Istanbul: KURAMER Publications, 2018), 483; *Abū al*-Ḥasan al-Ash'arī, *Maqālāt al-Islāmīyīn wa-ikhtilāf al-muṣallīn*, II (Cairo: Maktabat al-Mahdiyyat al-Miṣriyya, 1955), 106–108.

24 *al-Kaʿbī*, *Kitāb al-Maqālāt*, 485.

25 *Abū Bakr* Ibn Fūrak, *Mujarrad maqālāt al-Shaykh abī al-Hasan al-Ashʿarī* (Beirut: Dār al-Mashriq, 1986), 206, 271–272, 277.

26 Ibn Mattawayh, *al-Tadhkira fī aḥkām al-jawāhir wa al-aʿrāż* (Cairo: Dār al-Ṣaqāfah, 1975), 119; al-Nīsābūrī, *al-Masāil*, 50–51.

in the sense of "fullness or being full."[27] Following its semantic roots, *mutakallimūn* defined the void as a dimension that is free from any sort of body and contains no part of any substance or entity. According to them, no void actually exists externally that has no entity present within it.[28] This definition from the *mutakallimūn* reveals them, unlike some philosophers, to not think of a void as a physical structure such as air or a dimension or surface within which three-dimensional bodies can reside[29] but rather to consider it equivalent to *al-'adam al-mutlaq* [non-being].[30] Al-Rāzī (d. 606/1210) also supported this inference and noted the void to imply *al-nafy al-ṣirf* [absolute non-existence] for *mutakallimūn*.[31] Defining *khalā'* as an empty place where no *kawn*/generation/creation[32] exists also indicates the state of *al-'adam*. In this case, the void is not something created by God, but a concept that arises from the question of whether or not substances are created. For if substances had never been created, the presence of the void would not have emerged.[33]

This approach suggests that *mutakallimūn* had approached the issue of void in a manner consistent with the Greek understanding of atomism. However, in order to avoid getting into a logical contradiction, such as in the statement "the void/non-existence exists," they claimed the void to be *wahmī* [nominal]. On the other hand, the *mutakallimūn* based their description of the concept of void on the concept of place, particularly on the association a body forms with a place during its motion from one area to another. For, describing what non-existence means (i.e., something that does not exist) is impossible. This only becomes possible with the presence of other things. This condition also reveals that, like ancient Greek philosophers, they used the concept of the void to describe how motion takes place.

According to the *mutakallimūn*, the concept of place has the same meaning as *ḥayyiz* and is a *wahmī* dimension occupied by spatial beings such as a body or non-spatial beings such as particular substances (*jawhar-i fard*).[34] In other words, they say a space occupied by a body is *makān/ḥayyiz*, and when this space is not occupied

27 *Ibn Manẓūr*, *Lisān al-ʿArab* (Cairo: Dār al-Maʿârif, t.y.), "*Khalā'*", II/1254-5; "*Malā*", VI/4252.

28 al-*Sayyid* al-*Sharīf Jurjānī*, *al-Ta'rifāt* (Beirut: Maktabat Lubnān, 1985), "Khalā'", 105; Muḥammad ʿAli al-Tahānawī, *Kashshāf istilāḥāt al-funūn wa al-ʿulūm* (Beirut: Maktabat Lubnān, 1966), II, 756.

29 See *Abū* ʿAli Ibn Sīnā, *Kitāb al-ḥudūd*, ed. A. M. Goichon (De L'institut Français, 1963), 33; al-*Sayyid* al-*Sharīf Jurjānī*, *Sharh al-mawāqif: Mevâkıf Şerhi* trans. Ömer Türker, II (Istanbul: YEK Publications, 2015), 199.

30 According to most of the theologians, the air is a fine and thin body. See al-Kaʿbī, *Kitāb al-maqālāt*, 482–483; al-Ashʿarī, *al-Maqālāt*, II, 106.

31 al-*Rāzī*, *al-Maṭālib al-ʿāliya*, II, 113.

32 Ibn Fūrak, *Mujarrad*, 272.

33 Bulgen, *Kelâm Atomculuğu*, 293.

34 *Jurjānī*, *al-Ta'rifāt*, "*Ḥayyiz*", 99; "*Makān*", 244-5; al-Tahānawī, *Kashshāf*, "*Makān*", 1634–1635.

by any body, they called it *halâ*.[35] Although the concepts of *makān* and *ḥayyiz* are used interchangeably in the sense of an absolute void, *makān* has a more general meaning than *ḥayyiz*. Accordingly, the concept of *ḥayyiz* can only be used when the nominal void is occupied by something spatial. Therefore, the *mutakallimūn* stated *al-jawhar al-fard* to be *mutaḥayyiz*, but not *mutamakkin*.[36] Dhanani further clarified the distinction between these two terms and noted the *mutakallimūn* to have used the concept of *makān* in the sense of an empty place while using the concept of *ḥayyiz* in the sense of an empty space filled with something spatial in nature (*al-makān al-taqdīrī*). As a consequence, while the term *mutaḥayyiz* refers to what is occupying a place at the moment, *ḥayyiz* refers to the occupied place as a spatial thing and *makān* to an empty place that is not occupied.[37]

In accordance with the general concept set out above, the Baṣran School defined place as the thing in which the mass of a body is based and claimed the body's leaning to a place to be what keeps it from falling.[38] They also used the terms *jiha* and *muhāḍāh* to correspond to the concept of *makān*.[39] According to the Baghdād School on the other hand, place is what surrounds and encompasses something from all sides, so the substances can only move within a place.[40] Considering that the Baghdād School does not regard void in the sense of non-existence, they are understood to have used the concept of place in the sense of air or the other presences surrounding matter. According to Ibn Sīnā, place is the inner surface of the surrounding body that contacts the outer surface of the surrounded body. In other words, the surface closest to which a heavy body is located is called place.[41] This definition is compatible with Aristotle's definition of place because he defined place as "the border of the containing body that is in contact with the contained." Accordingly, a thing's place is the first boundary of the motionless body that contains it. While everything in the cosmos occupies a place, the cosmos itself does not.[42] Meanwhile, al-Ash'arī rejected the idea that place has no body, substance, or accident (i.e., rejected it being a nominal concept). According to him, place must have substance and body because it is what

35 *Jurjānī, al-Ta'rifāt, "Khalā'"*, 105; This definition overlaps exactly with the Stoics' definitions of void and space. See Long & Sedley, *The Hellenistic Philosophers I*, 294.

36 al-Tahānawī, *Kashshāf, "Ḥayyiz"*, 725.

37 Dhanani, *The Physical Theory of Kalām*, 66.

38 Ibn Mattawayh, *al-Tadhkira*, 62; al-Nīsābūrī, *al-Masāil*, 188.

39 For the use of the terms *jihat* and *muḥāḍāt* in the sense of *makān* see Ibn Mattawayh, *al-Tadhkira*, 62, 88, 113–114. Also see Dhanani, *The Physical Theory of Kalām*, 69.

40 al-Shaykh al-Mufīd, *Awā'il*, 100.

41 Ibn Sīnā, *Kitāb al-Ḥudūd*, 32.

42 Aristoteles, *Fizik*, 212a 5; David Ross, *Aristoteles, trans. Ahmet Arslan* (Istanbul: Kabalcı Publications, 2011), 143–144.

contains, contacts, and rests upon the outside edge of existence that is within it. The use of terms like outside and within here is completely connected to language.[43]

From what we have covered so far, two kinds of voids now clearly have been the subject of debate since ancient Greek philosophy. The first is the external-void (*extracosmic*) in which universes that are finite yet infinite in number float. The second and more controversial is the internal-void (*intercosmic*) which is considered to be within the universe and between the atoms which make up the bodies.[44] This distinction also applies to the physical and metaphysical aspects of the concept of void that is being considered. The concept of void has therefore been addressed alongside its metaphysical aspects such as creation from nothing, space, time, eternity, and infinity as well as through its physical aspects such as substance, place, motion, direction, and limitedness. Therefore, I believe an accurate understanding of the concept is only be possible by considering these two things together.

1.1. The Metaphysical Aspect of the Void: The Exstracosmic Void

The problem of whether a void exists outside the cosmos is discussed in the sources of Kalām around the questions of whether anyone who might look beyond the cosmos sees anything or whether someone who reaches their hand beyond the cosmos can move it. The oldest theological texts containing these questions and their possible answers are the *Maqālāt* from al-Ashʿarī and the one from al-Kaʿbī. These two sources express some views on the subject without specifying to whom these views belong.[45]

According to the Baghdād School, if one goes to the edge of the cosmos and extends a hand beyond it, they will be unable to move it as the possibility of something moving only exists within space. Because nothing exists outside the cosmos, the hand cannot move. Likewise, seeing beyond the cosmos is impossible because seeing is only possible if something exists and is in contact with light, whereas nothing perceivable exists beyond the cosmos.[46] The Baṣran School also accepts that, if a person goes to the edge of the cosmos and looks beyond, they will see nothing because even if a void is present beyond the cosmos, it is invisible due to its non-existence. Yet according to them, the hand can move, and two different explanations exist as to how this

43 Ibn Fūrak, *Mujarrad*, 273.

44 See H. Austryn Wolfson, *Kelâm Felsefeleri*, trans. Kasım Turhan (Istanbul: Kitabevi Publications, 2001), 377; Grant, *Much Ado About Nothing*, 14.

45 al-Kaʿbī, *Kitāb al-maqālāt*, 485; al-Ashʿarī, *al-Maqālāt*, II, 107–108.

46 al-Kaʿbī, *Kitāb al-maqālāt*, 485; al-Shaykh al-Mufīd, *Awāʾil*, 132–133.

would be possible. According to the first view, the motion of the hand takes place in nothingness (*lā fī shay'*). The second view argues that, if the hand moves, the void beyond the cosmos becomes a space for the hand.[47] Al-Ashʿarī believed nothing to exist beyond the cosmos, and what does not exist cannot be seen. He also stated no space to exist beyond the cosmos.[48] However reading these arguments from al-Ash'arī while remembering that he considered space to be something physical is important. In this case, claiming that he rejected the void beyond the cosmos in the sense of it having no existence is difficult. This conclusion is also supported by the approach used by al-Juwaynī, one of the important representatives of the tradition. He criticized the view that the hand cannot stretch beyond the cosmos, arguing that two substances can diverge from one another, and thus the hand can extend beyond the cosmos on account that each substance has a particular *ḥayyiz* and *kawn*.[49]

The problem of the extracosmic void was first introduced by the Pythagorean philosopher Archytas (410-347 BC). The problem in his mind was as follows:

"If I came to be at the edge, for example at the heaven of the fixed stars, could I stretch my hand or my stick outside, or not? That I should not stretch it out would be absurd (atopon), but if I do stretch it out, what is outside will be either body or place - (it will make no difference, as we shall discover). ... If it is always something different into which the stick is stretched, it will clearly be something infinite."[50]

And the Epicureans and Stoics made the following reasoning:

"If you can stretch out, there will be space outside, while if you cannot, there will be a body outside obstructing you. So either way, you have not reached an edge."[51]

As can be seen from the above-quoted passages, debates on the extracosmic void have occurred since ancient times concerning the question of whether the universe is bounded or not. By pointing out the relationship between void and infinity, Aristotle argued acceptance of a void to lead to a conceptualization of an infinite cosmos. For this reason, he concluded absolute nothingness to exist beyond the cosmos, neither time, place, nor void.[52] The Stoics, on the other hand, had arrived at the idea of a finite and limited cosmos surrounded by an infinite void, claiming that "because

47 al-Kaʿbī, *Kitāb al-maqālāt*, 485; al-Ashʿarī, *al-Maqālāt*, II, 107–108.
48 Ibn Fūrak, *Mujarrad*, 277.
49 I*mām al-Ḥaramayn al-*Juwaynī, *al-Shāmil fī uṣūl al-dīn* (Alexandria, 1969), 508–509.
50 Sorabji, *Matter, Space and Motion*, 125.
51 Sorabji, *Matter, Space and Motion*, 126.
52 Aristoteles, *Metafizik*, 1048b 10–17.

no presence exists beyond the cosmos, nothing exists to limit the void."[53] Similarly, Shahristānī (d. 548/1153) stated that, unless a void beyond the cosmos is accepted, proving the finitude of the cosmos remains impossible.[54]

Debates over the extracosmic void are also linked to the question of whether the cosmos is eternal or not: denial of the void implies the cosmos to be eternal and uncreated, while acceptance of the cosmos being created requires recognizing a void to have been present prior to its creation. Aristotle viewed producing something out of nothingness to be impossible, stating, "Nothing is generated in an absolute sense."[55] Based on a similar principle, Muslim philosophers also denied the cosmos to have been created later in time (*ḥudūth*). Instead, they argued for an eternal cosmos where no previous kind of void, time, or space had existed.[56] The *mutakallimūn*, on the other hand, argued the cosmos to have been created out of nothing and thus a void to have been present beforehand.[57]

Averroes, on the contrary, argued that recognizing a void in which the cosmos was created would make creation of cosmos later in time problematic. According to him, to accept the void's presence prior to anything having come into being means it must be a place. A void must exist in order for the cosmos to be created, as well as another void to be present for the formation of this void if this void is to be considered synonymous with a place. Meanwhile, if space bounds the body, then the creation of other bodies in advance would become necessary to constitute a boundary area for the creation of the cosmos.[58] As a result, both situations lead to a vicious circle where nothing can be created. However, this critique from Averroes is only valid if the void is considered to have "being." The *mutakallimūn*, on the other hand, have always associated *khalā'* with non-existence and the absence of *kawn* (i.e., non-creation) while associating *malā'* with *kawn* (i.e., creation out of nothing). In this way, the concept of the void serves as an ontological principle that enables creation from nothing (i.e., a transition from nothingness to being and from

53 Grant, *Much Ado About Nothing*, 105, 107.

54 *Abū al-*Fatḥ *al-*Shahrastānī, *Nihāyat al-Iqdām fī ʿilm al-kalām* (London: Oxford Press, 1934), 17–18, 23.

55 Grant, *Much Ado About Nothing*, 110.

56 For the philosophers' understanding of the cosmos as eternal see Hüseyin Atay, *Farabi ve İbn Sina'ya Göre Yaratma* (Ankara: Ankara Üniversitesi Publication House, 1974), 133 ff.; Ömer Yıldırım, "İslam Düşüncesindeki Yoktan Yaratma ve Kıdem Tartışmaları: Kelâmcılar ve Ibn Sînâ Merkezli Bir İnceleme", *KADER Kelam Araştırmaları* X/2 (2012): 251–274.

57 For the theologians' understanding of the cosmos as created out of nothing see Cemalettin Erdemci, *Kelam Kozmolojisine Giriş* (Ankara: Araştırma Publications, 2007), 29 ff.

58 *Abū* al-*Walīd* Ibn Rushd, *al-Kashf 'an manāhij al-adillah* (Beirut: Markaz Dirasāt Wahdat al-'Arabiyya, 1998), 108–109.

being to nothingness).[59] The *mutakallimūn* who defended the presence of a void considered rejecting the extracosmic void to prohibit the cosmos from being created out of nothing as well as to make a new act of creation out of nothing impossible as divine creation would already be complete when existence is entirely *malā'* [filled]. In this case, justifying the assumption that God is always in the act of creating and destroying becomes possible.

Another issue connected to the debates over the extracosmic void is *whether other cosmoses exist beyond the cosmos we live in*. In pointing out this connection, Jurjānī (d. 816/1413) mentioned the philosophers who reject the void to regard the cosmos we live in as the only and most perfect cosmos,[60] whereas according to the *mutakallimūn*, other possible cosmoses may exist on the condition that these are finite in number due to infinity only being attributable to God.[61] By referring to the expression *rabb al-'ālamīn* in Surah al-Fātiḥa, Baghdādi (d. 429 /1037-1038) considered the interpretation of the exegetes where 18,000 cosmoses similar to the one we live may possibly exist on the condition that they consist of substances and accidents.[62] Al-Rāzī also established a direct connection between multiple cosmoses and the void while interpreting these Qur'anic verses. According to him, an infinite void may be present beyond the cosmos and God is capable of creating thousands of other cosmoses beyond the one we live in that may be larger than ours, each with their own possible throne, earth, heavens, suns, and moons.[63]

Mutakallimūn had no intense discussions regarding the extracosmic void. By pointing to this situation, Jurjānī noted both those who embrace the void and those who reject it to believe the extracosmic void to be unmeasurable.[64] In other words, those who claim an extracosmic void to exist believe it to be *al-'adam* [non-existence] are defining the same factual situation just as much as those who claim absolutely nothing to be present beyond the cosmos, not even a void. The intercosmic void was the critical topic of debate among *mutakallimūn*.

59 Bulgen, *Kelâm Atomculuğu*, 293, 296.

60 Infinite number of cosmoss do not pose a problem for Greek atomists. See Ahmet Arslan, *İlkçağ Felsefe Tarihi I: Sokrates Öncesi Yunan Felsefesi* (Istanbul: Istanbul Bilgi Üniversitesi Publications, 2006), 330; As for Plato and Aristotle, the existence of other cosmoses are impossible. See Grant, *Much Ado About Nothing*, 105.

61 *Jurjānī*, *Sharh al-Mawāqif*, II, 1203–1205.

62 'Abd al-Qādir al-Baghdādī, *Uṣūl al-dīn* (Beirut: Dār al-Kutub al-'Ilmiyya, 2002), 54.

63 Fakhr al-Dīn al-Rāzī, *Tafsīr al-Fakhr al-Rāzī* I (Beirut: Dār al-Fikr, 1981), 14.

64 *Jurjānī*, *Sharh al-Mawāqif,* II, 173.

1.2. The Physical Aspect of the Void: The Intercosmic Void

The question of whether a void is present within the cosmos and within the atoms that make up matter in theological texts has been debated around the question of the possibility of two substances be distinct from one another without a third substance. In other words, do two substances/bodies exist without touching each other and without a connection between them? A positive response to this question leads one to accept the void while a negative response leads to rejecting the void.

According to the Baghdād School, the universe is full of substances and has no voids. If a void were present in the universe, distinguishing between unified (*mujtami'*) and discreet (*mutafarriq*) substances and bodies would not be possible.[65] The Baṣran School, on the other hand, contends a void to be present within substances. In this regard, al-Nīsābūrī drew attention to the importance of the role the void played in how they comprehended cosmology, stating the Baṣran School to not only view the void's presence as possible but also as necessary.[66] For, like the Greek atomists, *mutakallimūn* also considered motion to be impossible without accepting the presence of a void.

Ibn Fūrak stated the Ash'arites to acknowledge the separate existence of two substances from one another without any connection between them. In other words, he considers the cosmos to have some places that are devoid of any type of body and substance. This is because al-Ash'arī believed motion to be impossible in a cosmos completely occupied by substances and bodies.[67] Al-Juwaynī also participated in the debates on voids, positioning himself among the advocates for a void as he shared similar opinions regarding the inter and extracosmic void.[68] Al-Rāzī, on the other hand, criticized the understanding of void as an abstract dimension (*al-bu'd al-mujarrad*) without an ontological reality and contended voids to be present. After summarizing the evidence for and against the void in his works, he attempted to prove the existence of the void in the context of motion.[69] The Māturīdīs School's attitude toward the void is not as explicit as the other schools of Kalām. In his *Kitāb al-Tawḥīd*, Māturīdī (d. 333/944) stated the cosmos to not exist in a place. Bekir Topaloğlu interpreted his statement to mean a rejection of the void's presence.[70] Pazdawī (d. 482/1089) also

65 Ibn Mattawayh, *al-Tadhkira*, 116; al-Nīsābūrī, *al-Masāil*, 47; al-Shaykh al-Mufīd, *Awā'il*, 100.

66 Ibn Mattawayh, *al-Tadhkira*, 116–117.

67 Ibn Fūrak, *Mujarrad*, 206, 272.

68 *al-*Juwaynī, *al-Shāmil*, 508–509.

69 Fakhr al-Dīn al-Rāzī, *al-Arba'īn fī uṣūl al-dīn*, (Cairo: Maktabat Kulliyyat al-Azhariyya, n.d.), I, 40; II, 32–38; *Muḥaṣṣal afkār al-mutaqaddimīn wa al-muta'akhkhirīn min al-'ulamā' wa al-ḥukamā' wa al-mutakallimīn* (Cairo: Maktabat Kulliyyat al-Azhariyya, n.d.), 134–136.

70 *Abū Manṣūr al-Māturīdī*, *Kitāb al-Tawḥīd*, trans. Bekir Topaloğlu (Ankara: TDV Publications, 2003), 89.

advocated the cosmos to not exist in a place. Furthermore, according to him, no one can extend a hand beyond the cosmos, which gives the impression that he rejected the extracosmic void.[71] Nasafī (d. 508/1115) tried to prove *khalā'* to have been created later in time, like everything else aside from God, in response to Abū Bakr al-Rāzī's claim.[72] However, the statement "The universe was created without being in a place" should be noted to not necessitate rejecting the void because the *mutakallimūn* who accepted the void's presence used similar expressions and used these expressions to express substances' ability to exist without a need for space. Substances needing space to exist would invalidate the principle that substance exists on their own and would lead to the infinite cycle of the place that a substance's existence requires also needing its own place to emerge from, which would also need its own place, and so on. Therefore, *mutakallimūn* believed substances to be created in a *ḥayyiz*.[73] The same situation will come to the fore when defending the necessity of a place for the creation of the cosmos. Despite this, the Māturīdīs quite apparently did not explicitly reveal their attitude toward the presence of void and, unlike other schools of Kalām, did not involve themselves in deep debates on this problem. This situation stems from their adopting the principle of "not taking part in an inquiry into the reality of being in matters that do not help in proving the pillars of faith and the creation of the universe later in time."[74] Therefore, positioning them as anti- or pro-void is not easy.

2. The Baṣran and Baghdād Schools' Arguments on the Void

Ibn Mattawayh and al-Nīsābūrī reported in original form all the evidence presented in the debates between the Baghdād and Baṣran Schools, some being theoretical and most being experimental. I should state right off that the distinction I have just made between theoretical and experimental evidence is a rough one. For as will be seen further on, some arguments categorized as intellectual are based on observation and experience while other evidence classified as experimental is not based on experiments. When this evidence is examined, both Schools appear to have been aware of the arguments and evidence in the philosophical tradition regarding the void, using some as they were while developing or modifying others. I will next cover this evidence in detail and then point out their origins in ancient philosophy.

71 Abū al-Yusr al-Pazdawī, *Uṣūl al-dīn* (Cairo: Maktabat al-Azhariyya, 2011), 30.

72 *Abū al-Muīn al-*Nasafī, *Tabṣirat al-adilla fī uṣūl al-dīn*, I (Ankara: DİB Publications, 2004), 104.

73 *Sayf al-Dīn al-Āmidī*, *Abkār al-afkār fī uṣūl al-dīn*, III (Cairo: Dār al-Kutub, 2004), 26; *al-*Juwaynī, *al-Shāmil*, 159; Bulgen, *Atomculuk Eleştirileri*, 43.

74 *al-*Nasafī, *Tabṣirah*, I, 72. For an evaluation of the *Māturīdīs*' approach see Mehmet Bulgen, "al-Māturīdī and Atomism", *Ulum: Journal of Religious Inquiries* II/2 (2019): 238-9.

2.1. Intellectual Arguments

2.1.1. The Argument from Motion

The argument based on motion stands out as the strongest argument advocates of the void offered both in Greek ancient thought and Kalām atomism, for the difficulty in explaining motion without accepting the void had forced many philosophers since ancient philosophy to choose between the two phenomena. Some philosophers had to deny motion due to rejecting the void, while others had to acknowledge the void's presence as they considered denying motion to be impossible. One of the most important pieces of evidence the Baṣran School put forward in favor of the void was also the argument based on motion.

The proposition of this evidence, which was previously used by the Greek atomists Epicurus (341-270 BC) and Lucretius (95-55 BC),[75] is formulated in its simplest form as "If no voids exist in the cosmos, motion (*taṣarruf*) would be impossible."[76] The arguments put forward to prove this proposition generally follow from the assumption that the cosmos is filled. Accordingly, given that the place in which a body moves is full (with air or any other substance), then all bodies in the cosmos must move together for motion to take place[77] because air is found in the (apparent) voids that prevents the moving body from settling there. Unless the air leaves one place and moves to another, the body cannot move to that one place. This movement of air to another place is possible only when the air/substance in that place moves to another. This leads to an infinite series of motion; therefore, no motion would be possible.[78]

In contrast to the Baṣran School, the Baghdād School argues motion to occur when a body simultaneously changes position with the air towards which the body moves; what makes this possible is the expansion and compression of air. In other words, as the body travels in the direction of the place filled with air; therefore, motion occurs when the air gets compressed and extends to the place where the body has just left.[79] The origin of this theory of motion is found in Aristotle. According to him, bodies can move by changing position without creating a space between

75 See Long & Sedley, *The Hellenistic Philosophers I*, 27, 32.

76 Ibn Mattawayh, *al-Tadhkira*, 117; al-Nīsābūrī, *al-Masāil*, 47.

77 Plato, to get rid of this handicap, argued that the moving body takes the place of the air and the air moves to another place, thus, this event continues circularly throughout the cosmos. According to him, all events such as the flow of water, the motion of the thrown body in the air, lightning, breathing, applying cupping-glass on the back for therapeutic purposes occur in this way. Platon, *Timaios*, 95–96.

78 Ibn Mattawayh, *al-Tadhkira*, 117; al-Nīsābūrī, *al-Masāil*, 47.

79 al-Nīsābūrī, *al-Masāil*, 47.

these positions, just as in the vortex motion of liquids. Likewise, substances can be compressed by evacuating what's inside them (e.g., air in water).[80]

The Baṣran School provided some evidence showing mutual displacement to be impossible. According to them, a body travelling toward a place of air applies a repulsive force (*i'timād*) in the direction of motion. However, this force pushes the air in the opposite direction, not in the direction of the place of the body. In this case, the air can neither move in the opposite direction nor take the place of the body.[81] Moreover, even if the air could move in the opposite direction, for a body to fill its place, the place from which the air moves must remain empty until the body settles there so that no other air can fill the space beforehand. In this case, denying the presence of a void would be meaningless. However, even if this is the case, the possibility of providing a justification for such a displacement does not exist. This is because the body can only completely leave its place by replacing the air; and the air can only empty its own place by moving to another. Thus, a vicious circle emerges and motion becomes impossible.[82]

The Baṣran School gives some examples from daily life to explain the logical contradiction created by this situation. According to them, if simultaneous mutual displacement were possible, when we pour one of two jugs filled with water into the other, the water in each should fill the other simultaneously. Similarly, if this were possible, so would two people who meet in a narrow passageway where only one person can pass at a time be able to switch positions simultaneously.[83] From the perspective of the Baṣran School, the main problem in these examples is that two accidents need to be in a single location at the same time because their school of thought views motion to also be an accident of generation (*kawn*) where two motions cannot occur simultaneously in the same place. Otherwise, the two places would become intertwined *(tadākhul)*. However, in the example given by the Baghdād School, the motion of a body in the air is described. As for the examples given in the Baṣran School's response, they are discussing the displacement of two liquids and two solids. In other words, the Baṣran School apparently does not make a distinction between solid, liquid, and gas in terms of expansion and contraction because, according to them, those who reject the void argue bodies to be united in such a way that no void is present between them. Therefore, as in the case of other bodies, talking about

80 Aristoteles, *Fizik*, 214a 5–35; Ross, *Aristoteles*, 145.

81 Ibn Mattawayh, *al-Tadhkira*, 117; al-Nīsābūrī, *al-Masāil*, 48.

82 Al-Nīsābūrī, *al-Masāil*, 48; Dhanani, *The Physical Theory of Kalām*, 83.

83 Ibn Mattawayh, *al-Tadhkira*, 117.

the expansion and compression of air is impossible. Furthermore, even if air does compress, compressed air does not create a void for motion because, by rejecting the presence of a void, the places where the air is evacuated will already be filled with other bodies.

2.1.2. The Argument from Measurement and Cognition

The strongest argument put forward by the Baghdād School on denying the void is based on the problem of measurement and magnitude. According to this argument, if a void were present between two substances, this void could not be less than, greater than, or equal to the void between any two other substances because things that can be measured must be a type of body or substance with actual existence. A void, on the other hand, cannot be measured as it has no actual existence. For this reason, the void between two substances cannot be subject to any unit of measurement.[84] However, as is evident from experience, the void between bodies or substances is measurable.

The origin for this argument can be found in Ancient philosophy in Parmenides' reasoning. According to him, the place or void assumed present between bodies either is or is not a being. If this void has being, then it is filled with existence and therefore its existence would be continuous. On the other hand, if the void has no being, it is non-existent. Because the nonexistence of something in actuality is impossible, neither can such a void like this exist in actuality. Therefore, what does exist is continuous and, hence, one.[85]

The Baṣran School does not require a body or substance as the subject of measurement between two substances to measure the distance between the two. According to them, a substance is assumed to be present between the two, and the distance between them can be estimated. Thus, the void or place between the two substances can be larger or smaller than that of the other two substances and a body of a certain magnitude can be predicted to occupy it.[86] For example, imagine that God created a body and immediately afterward created another one without any interruption, and then a third one, and so on. Even if we accept no time to have passed between the first and second creation, the time between the first and third should be longer than the time between the first and the second by way of

84 Ibn Mattawayh, *al-Tadhkira*, 119; al-Nīsābūrī, *al-Masāil*, 51.

85 Denkel, *İlkçağ'da Doğa Felsefeleri*, 38–40; Weber, *Felsefe Tarihi* [History of Philosophy], 36.

86 Ibn Mattawayh, *al-Tadhkira*, 119-20; al-Nīsābūrī, *al-Masāil*, 51.

comparison. However, if some time had passed between the creation of the first and second, this time would be measurable, and the time between the creation of the third and first would determinable.[87]

In responding to these objections, the Baghdād School argued that a void claimed to supposedly exist between two distinct substances must first be perceived and thus be visible in order to be measured. However, according to them, only existing things can be visible, and the void cannot be seen because it does not exist. Therefore, a third body possibly being present in the space between is inconceivable, even in an assumption. However, because these substances can be perceived separately, the gap between them should not be non-existence but existence and fullness.[88]

Similar criticisms aimed at accepting the void as non-existence were also put forward by later *mutakallimūn* and Muslim philosophers. Accordingly, if the void is accepted as non-existence, it cannot become greater or lesser when between two things. However, the distance between the earth and sky is greater than the distance between two cities. Besides, the measure of these two distances is certain. Therefore, a proportional relationship can be established between them, and talking about fractions of these distances becomes possible. Such descriptions cannot be predicated with regard to something non-existing.[89]

On the other hand, the Baṣran School argued that when two substances are proven to exist separately, seeing the void between them is not necessary to realize one substance is at one location and the other substance at another location at a certain distance.[90] However, this response is not qualified for claiming the void to be imperceptible. How the Baṣrians arrived at the conclusion that one substance to be at a certain distance from the other after being perceived separately with no visual perception of the void between them is unclear.[91] Consequently, the Baṣran School cannot convincingly explain the problem of measuring a void that has no real existence; in other words, the problem is how can something that does not exist become the subject of perception?

87 Ibn Mattawayh, *al-Tadhkira*, 120; al-Nīsābūrī, *al-Masāil*, 52.

88 Ibn Mattawayh, *al-Tadhkira*, 120; al-Nīsābūrī, *al-Masāil*, 52.

89 *Abū* ʻAli Ibn Sīnā, *Kitāb al-Shifā: Fizik*, trans. Muhittin Macit ve Ferruh Özpilavcı, I (Istanbul: Litera Publications, 2004), 156; Râzî, *al-Maṭālib al-āliya*, V, 115.

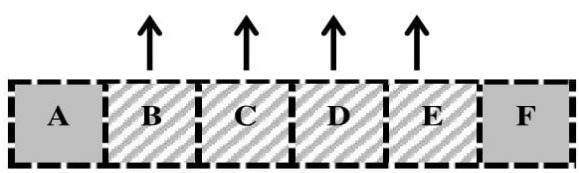
90 Ibn Mattawayh, *al-Tadhkira*, 120; al-Nīsābūrī, *al-Masāil*, 52; For discussions on whether generations such as motion, rest, *ijtimaʻ* and *iftirāq* in Kalām can be subject to sight. See Hasan Cansız, "Rü'yetullah Meselesi Çerçevesinde Kelam-Bilim İlişkisi" (Doktora tezi, Necmettin Erbakan Üniversitesi, 2019), 243 ff.

91 Dhanani, *The Physical Theory of Kalām*, 75–76.

2.1.3. The Thought Experiments

The Baṣran School produced two different thought experiments based on bodies' *fanā'* [annihilation] and *baqā'* [subsistence]. In the first thought experiment, the anti-void Baghdād School argued bodies to gain permanency through an accidental subsistence attached to them and bodies' subsistence to be based only on the existence of this accident. From this point of view, the Baṣran School makes the following assumption: God has the ability to create a single substance and make it self-subsistent and also to annihilate some of the beings he has created while making others subsistent. For instance, God may create a subsistence for the earth and sky, but not for any entity between the two. If the Baghdād School considers this to be possible, then they are asked the question "If God annihilates all beings between the earth and the sky leaving only the earth and the sky subsistent, would they move towards each other and unite, or would they continue to stand apart? If they accept the earth and the sky to remain separate, then they should accept the presence of a void between the two. If they say the two will unite, then they will have to accept the idea of *ṭafra* (leap) as non-existence is impossible to cross over.[92]

The second thought experiment is based on a simpler example. According to this one, a straight line consisting of six parts (i.e., $\overleftrightarrow{ABCDEF}$) is assumed. When the four parts $\overline{BCDE}$ in the middle of this line are suddenly lifted, the two remaining parts $\overleftarrow{A}$ and $\overrightarrow{F}$ move toward each other to merge as the single line $\overleftrightarrow{AF}$, joining right in the middle where the $\overline{C}$ and $\overline{D}$ atoms originally were. However, if these two parts move rapidly to unite, they must move in by way of *ṭafra* without passing parts $\overline{B}$ and $\overline{E}$, which is impossible. Another option is they remain separated where they are with no other substance between them, even if only for a moment. This proves the existence of the void.[93]



Şekil 1: Düşünce Deneyi

Figure 1: Thought Experiment

92 Ibn Mattawayh, *al-Tadhkira*, 118–119; a-Nīsābūrī, *al-Masāil*, 50–51.

93 Ibn Mattawayh, *al-Tadhkira*, 118–119; al-Nīsābūrī, *al-Masāil*, 50; Dhanani, *The Physical Theory of Kalām*, 86-7; This evidence was also used by the later theologians (*al-muta'akhkhūr*). See *Jurjānī*, *Sharh al-Mawāqif*, II, 175–177.

In these experiments, the Başran School tries to bind the opponents of the void by revealing that, if the presence of a void is not accepted, motion would only be possible through *ṭafra* (leap); otherwise, the motion is impossible. How the Baghdād School responded to these experiments is unclear; however, based on their general assumptions, they might have thought that, once the four parts in the middle are removed, air replaces them and the parts on the edges remain unconnected or eventually join by collapsing the air that replaced $\overline{\mathbf{BCDE}}$.[94]

2.2. The Experimental Arguments

The anti-void experimental arguments used by the Baghdād School were largely based on the principle that "Nature abhors a vacuum." Although the origin of the principle is not known exactly,[95] one of the first experiments on this subject is generally accepted to have been made by Philo of Byzantium (220-280 BC). Moreover, although constituting the early phase of the theory, some of his experiments contain a more complex set-up than those used by the *mutakallimūn*.[96]

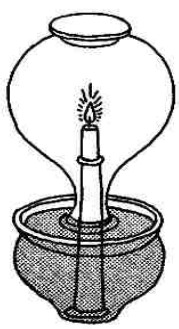


Figure 2: The Experiment by Philo

This experiment has a burning candle, the bottom part of which is placed in a bowl filled with water. Shortly after a glass vessel with a narrow, bottlenecked orifice is placed inverted over the upper portion of the burning candle and in contact with the surface of the water so that the burning candle is prevented from contacting the outside air. After the candle burns in this way for a while, the water in the bowl rises into the orifice of the inverted glass vessel. According to Philo, this is because the burning candle destroyed the air in the bowl. To prevent the formation of a vacuum in place of the destroyed air, water ascended and replaced the destroyed air. (Grant, *Much Ado About Nothing*, pp. 77–78)

One of the experiments made on this subject was by Hero of Alexandria (10-70 AD), who rejected the continuous vacuum but accepted the existence of discontinuous and very small vacuums spread into bodies.[97] In arriving at this idea, he based his experiment on the functioning of some devices consisting of pumps and siphons and

94 See Al-Ashʿarī, *al-Maqālāt*, II, 106.

95 For an evaluation of the matter see Grant, *Much Ado About Nothing*, 67.

96 Grant, *Much Ado About Nothing*, 77–78.

97 Hero of Alexandria, *The Pneumatics*, trans. B. Woodcroft (London, 1951), 1–2.

the principle that nature hates a vacuum. According to him, these devices apply an attractive force to the bodies to prevent the formation of large vacuums during their operations.[98] These views of Philo and Hero constituted one of the starting points of the debates on the void in the Islamic world. Another source that the *mutakallimūn* made use of were Aristotelian commentators such as Simplicius (490-560 AD) and Philoponus (490-570 AD).[99] The debates on their commentaries translated into Arabic about the acceptance or rejection of the void influenced *mutakallimūn*.[100] I will point out these links by giving examples where appropriate.

2.2.1. The Glass Vessel Experiments

Experiments with glass vessels are carried out by immersing a deflated glass vessel with a narrow orifice into water. According to al-Nīsābūrī's statement, the Baṣran School first put forward this experiment, and then al-Ka'bī used it to defend his views. However, the history of experiments with glass vessels goes back to Empedocles (495-435 BC). He gave the following example to prove that air is a body: If one closes the orifice of a glass vessel filled with air with a finger and then turns it upside down, immerses it in water, and then removes the finger, the glass vessel will not fill with water. But when one immerses the glass vessel straight into the water, water does fill the glass vessel. Empedocles deduced from this that the air in the glass vessel is a body as in the first case it prevents the water from filling the glass vessel.[101] In *On the Sky*, Aristotle refers to this experiment while discussing whether the ground is at rest or not.[102]

The Başran School tried to prove the existence of the void using a similar idea. According to their experiment, if one closes the orifice of a deflated glass vessel with a finger, then turns it upside down, immerses it in water, and then removes the finger, the glass vessel will fill with water. If the air in the glass vessel had not been evacuated, water would not have filled the glass vessel. Therefore, evacuating the air in the glass vessel created a void in it that could thus be filled with water. Another version of the experiment is attributed to Abū Isḥāq b. Ayyāsh (d. 360/970). According to this version of the experiment, which we will call *Evidence from a Bubble*, if one closes the orifice of a deflated glass vessel with a finger, then turns it upside down, immerses it in water, and then removes the finger, the glass vessel will fill with water but make no bubbling sound. If air were left in the glass vessel, a bubbling sound would be heard

98 Hesse, "Vacuum and Void", 217.
99 It is known as Yaḥyā al-Naḥwī in the Islamic world.
100 Kutluer, *Akıl ve İtikad*, 190.
101 Arslan, *İlkçağ Felsefe Tarihi I*, 278.
102 Bkz. Aristoteles, *Gökyüzü Üzerine*, 294b 17–21.

when water filled it. Therefore, after evacuating the air in the glass vessel, an empty space has been created in its place that water can fill. According to al-Nīsābūrī, this experiment is the strongest evidence proving the presence of a void.[103]

Al-Kaʿbī, on the other hand, used this experiment to deny the void. According to him, if one closes the orifice of a deflated glass vessel with a finger, then turns it upside down, immerses it in water, and then removes the finger, water that would normally move downward moves upwards and fills the glass vessel. According to him, the reason being no void is present in the cosmos. As such, the air in the glass vessel cannot be fully evacuated: warm air replaces the cold air leaving the vessel during the sucking process. The feature of hot air is that it facilitates and accelerates motion. Therefore, when the glass vessel is immersed in water, the hot air in it quickly absorbs the water into the glass vessel. This explains why the water moves upwards and fills the glass vessel contrary to its nature.[104]

Abū Hāshim considered this evidence to be inconsistent with the evidence from *hijāma* [cupping device therapy].[105] According to Al-Kaʿbī, evacuating the air inside the cupping glass and placing it on the two veins on the neck pulls the skin inside, as the skin replaces the air evacuated from the glass. According to Abū Hāshim, if hot air replaces the cold air in the glass cup during the evacuation process as al-Kāʿbī states, the skin being drawn inside the glass cup would not be possible. Moreover, the evacuation process empties the glass cup, while the hot air can only enter the cup by being blown into. According to what al-Kāʿbī advocated, evacuation and blowing should produce the same result. This is obviously wrong. Abū Hāshim gives the following example for this contradictory situation:

When we turn the cupping glass upside down and immerse it in water after heating the air inside with a fire, the water will not fill the cup. This refutes al-Kaʿbī's thesis. This is because the reason why water fills the cup is not hot air but the empty place inside it. If what al-Kaʿbī said were true, water would have filled the cup in this experiment too.[106]

103 Ibn Mattawayh, *al-Tadhkira*, 118; al-Nīsābūrī, *al-Masāil*, 49.

104 Ibn Mattawayh, *al-Tadhkira*, 120–121; al-Nīsābūrī, *al-Masāil*, 49. *al-Ījī* attributes one more glass vessel experiment to the opponents of the void. In this experiment, a pipe with closed orifice and a portion of it remaining outside is placed in a glass vessel, and its mouth is tightly closed so that air cannot enter and escape. The gaps between the neck of the glass vessel and the pipe are also well sealed. Then when the pipe is inserted towards the glass vessel, the glass vessel breaks outward; and when the pipe is pulled out of the glass vessel, this time the glass vessel breaks inward. According to the opponents of void, if the glass vessel was not filled with air and the pipe in a way of accepting nothing else inside, it would not have broken. This shows that both *tadākhul* and void are impossible. See ʿAḍuḍ *al-Dīn al-Ījī*, *al-Mawāqif fī ʿilm al-kalām* (Beirut: ʿAlam al-Qulūb, n.d.); *Jurjānī*, *Sharh al-mawāqif*, II, 197–199.

105 It is explained in the next section.

106 al-Nīsābūrī, *al-Masāil*, 49.

However, when conducting this experiment Abū Hāshim provides, he is proved wrong because even if the air inside is heated, water still fills the cup. This situation shows some of the evidence put forward by the Baṣran School to have not been based on experience.[107]

Ibn Mattawayh saw no possibility for hot air to enter the cup during the evacuation of the air inside. According to him, the evacuation process draws the air out of the cup and lets none inside. For air to fill the cup, it would need to be blown. If air were left in the cup, as in the example mentioned earlier, the pressure applied during the water filling would cause a bubbling sound. However, Ibn Mattawayh admits that, when the air inside of a glass cup is evacuated and the cup heated, it will fill with water when turned upside down and immersed in water. According to him, the reason for this is that, when the cup is turned upside down, the hot particles at its bottom move upwards and therefore draw the water into it. Similarly, the vapor in soil hit by sunrays goes upward toward the sky. However, even when heated by fire, water does not fill the cup unless the air inside is evacuated.[108]

The discussions among Mu'tazilī scholars on the experiments with glass vessel also attracted the attention of al-Fārābī (d. 339/950), a contemporary of al-Ka'bī and Abū Hāshim, and caused him to write a separate treatise on the subject. The facts that he narrated the experiments with glass vessel conducted by the Baṣran School in the same way as they articulated them and that the treatise continues with a response to the Baṣran School in the introduction[109] shows the reason for writing this treatise to have been a defense for void's presence of the void based on these experiments from the Baṣran School. In his treatise, al-Fārābī argued the facts observed through the experiments with glass vessels to be true, but establishing the idea of void based on these facts to be wrong. According to him, the air in the glass vessel is not completely evacuated in these experiments, and thus the vessel is not completely emptied. On the contrary, the air evacuated is one-third of that in the vessel. The remaining air expands and fills the vessel again, taking the shape of the bodies surrounding it. However, when the cup is immersed in water before allowing this natural motion of air to occur, the space of the evacuated air can fill with water because air and water can change places.[110]

107 Dhanani, *The Physical Theory of Kalām*, 86.

108 Ibn Mattawayh, *al-Tadhkira*, 121.

109 al-Fārābī, *Fī al-khalā'*, 2–3.

110 al-Fārābī, *Fī al-khalā'*, 4–5, 14–15. al-Fārābī, similar to the Baghdād school, rejects void, since a deaerated vessel still has a magnitude, distance and volume. See al-Fārābī, *Fī al-khalā'*, 5–6, 9–10.

2.2.2. The Cupping Glass Experiment

This experiment, formulated by the Baghdād School, intends to show as in the experiments with the glass vessel that an empty space is rapidly filled by other bodies, and thus a void is cannot possibly exist in nature. According to this experiment, when a cupping glass placed over two neck veins has the air inside it evacuated, the skin gets pulled inside it. The reason for this is impossibility of a void's existence in the cosmos.[111] This experiment is essentially based on the same idea as experiments with glass vessels. The only differences are that the glass vessel with a narrow orifice has been replaced by a cupping glass and water replaced by skin.

According to the Baṣran School, the reason why the skin is drawn into the cup is that the air in it mixes between the particles of the skin: a vacuum pump sucking out the air causes the air between the particles of the skin to be drawn into the cup together with the skin. According to the Baṣran School, a similar phenomenon occurs when the air of a pipe immersed in water is sucked out. The air mixed with the particles of the water will draw it through the pipe. The evidence for this is that, if the cupping process is performed on a stone, the stone would not swell towards the cup. This is because the stone has a hard and tight structure where air is unable to enter between its particles. Thus, in the absence of any air to displace the air in the cup, the stone does not swell. The reason that skin is sucked into the cupping glass and water fills the pipe is that air mixes between the atoms of these two items (i.e., skin and water). If the claim of the Baghdād School were correct, no difference should exist among skin, water, and stone.[112]

Aristotle was the first to point out the phenomena that the water gets pulled upward as air gets drawn from a pipe: "Drawing up water is possible only by having the surface of the water be in contact with the air and applying a force from above."[113] However, almost this same exact experiment was first mentioned by Philo of Byzantine. According to him, if a reed used to test wine is dipped in from one end and the air is sucked from the other, the reed would bring the wine upwards by sucking due to the air adhering to the wine surface. Simplicius and Philoponus emphasized the power of air to draw water in this way in their comments on Aristotle's related passages.[114] The fact that al-Ījī also mentioned

111 Ibn Mattawayh, *al-Tadhkira*, 121; al-Nīsābūrī, *al-Masāil*, 52.

112 Ibn Mattawayh, *al-Tadhkira*, 121; al-Nīsābūrī, *al-Masāil*, 52–53.

113 Aristoteles, *Gökyüzü Üzerine*, 312b 5–15.

114 John Philoponus, *Corollary on Void*, trans. D. Furley & C. Wildberg (London: Bloomsbury, 1991), 570, 14; cf. Dhanani, *The Physical Theory of Kalām*, 76.

this experiment with reference to the philosophers shows that he was aware of its origins in ancient thought.[115]

Al-Nīsābūrī proposed another clever experiment in this regard. In his experiment, two cupping glass cups are placed on both sides of a plain paper and the air inside of both is evacuated. This case has three possible outcomes for the paper between the two cupping glasses. The paper either stays as is or is drawn into one or the other of the glass cups. It cannot be drawn into both glasses at the same time. As a void occurs in the glasses in all three possible cases, this demonstrates the presence of voids in the cosmos.[116]

2.2.3. The Bone-Setting Experiment

The experiment with a bonesetter put forward by the Baghdād School against voids was designed based on the treatment method bonesetters apply. This experiment is based on the assumption that nature prevents the formation of a void, as in the glass vessel and cupping glass experiments. According to the experiment, a bonesetter puts some dough (*'ajīn*) on the bone then a piece of burning coal on the dough and covers the coal with a cup to reset the broken bone. The air in the cup heated by the burning coal then goes out through the gaps on the sides of the cup. After the air leaves the cup, the fire from the burning coal takes the place of the air, the dough takes the place of the fire, and finally the broken bone rises to the place of the dough. In this way, the broken bone finds its place. The reason for all this is that the presence of a void is impossible in the cosmos.[117]

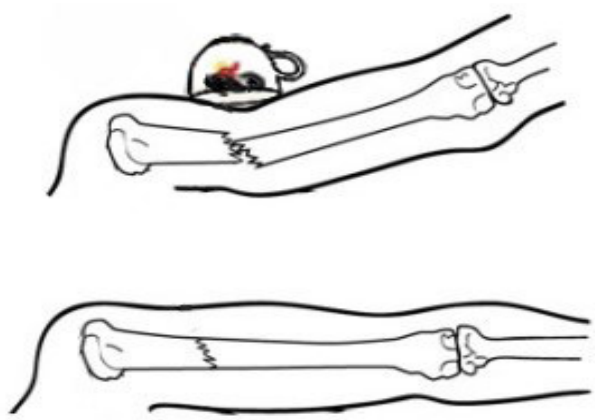


Figure 3: Replacing the broken bone

115 al-Ījī, *al-Mawāqif* 120; *Jurjānī*, *Sharh al-Mawāqif*, II, 197.

116 Al-Nīsābūrī, *al-Masāil*, 53.

117 Ibn Mattawayh, *al-Tadhkira*, 121–22; al-Nīsābūrī, *al-Masāil*, 52.

The Başran School explains this event in terms of the *i'timād* [reliance/dependence][118] of the fire. According to them, when the burning coal is put on the dough and covered by the cup, fire's natural upward motion is blocked; and necessarily then moves downward (*al-i'timād al-mujtalib al-suflī*). Thus, the fire of the burning coal reaches the bone by passing through the dough and flesh. However, when its downstream motion ends, it returns to its natural upward motion (*al-i'timād al-lāzim al-'ulwī*), returning to its place. Meanwhile, the flesh and bone return with it. This situation resembles sunrays hitting wet soil. After the sun rays penetrate the depths of the earth for a long time, the steam in the soil rises with them, as the intention of the rays is upwards. Aside from this, the Başran School argued the evidence expressed through the cupping glass process to also be the case for this experiment because, if the dough, burning coal, and cup were placed on a rock, they could not possibly have the same effect on the rock as the air cannot travel through the rock's particles. Therefore, the rock getting pulled up is impossible.[119]

2.2.4. The Water Clock Experiments

Water clocks, which are used both to measure time and carry liquids, are characterized by a wide body with a small hole at the bottom and a narrow, open neck that can be closed with the thumb. When filled with water and the narrow orifice is covered with a thumb, water gets trapped inside and does not flow. When the orifice is opened, water starts to flow from the lower hole. Because of this feature, water clocks were called *clepsydra* in Greek and *sarrākāt al-mā'* in Arabic, both meaning liquid thief.[120] The water clock was first mentioned by Aristotle as an example used by ancient philosophers to explain the stability of the earth, but he does not give detailed information about it.[121] Simplicius, on the other hand, describes the structure of the water clocks (*hudrarpax*) and gives the details of the experiment. According to him, if the water clock is immersed in water without sucking its air out, the water would not fill it. Only when the air inside is sucked, the water can fill it. Upon the water filling the water clock, one observes that the water cannot fall unless the thumb is pulled from the upper hole and letting the air to enter.[122] Philoponus also mentions

118 For the concept of *i'timād* see Kandemir, *Tabiat ve Nedensellik*, 145 ff.

119 Ibn Mattawayh, *al-Tadhkira*, 122; al-Nīsābūrī, *al-Masāil*, 52.

120 Grant, *Much Ado About Nothing*, 83.

121 Aristoteles, *Gökyüzü Üzerine*, 294b 17–21.

122 These two phenomena mentioned by Simplicius are given as examples to prove that the earth is at rest due to the air under it. See Simplicius, *On Aristotle on the Void*, trans. P. Lettinck & J.O. Urmson (London: Bloomsbury, 2013), 647, 1/24–30.

this experiment. According to him, contrary to its nature, the water does not come out of the hole due to the resistance of the air outside. Since the hole of the water clock is so narrow, the nature of the water and the resistance of the air stay equal, and thus the water and air cannot replace each other. Therefore, the water stays still in the device.[123]

Figure 4: A reconstruction of the water clock used in ancient Greece (Museum of Ancient Agora/Athens)

Figure 5: Water Clock/Clepsydra

According to the Baghdād School, when the water clock is filled with water and its orifice is covered with a thumb, no water flows out even though a small hole is at the bottom. The fact that water does not flow through the hole despite its fluidity and pouring feature is due to the lack of air to replace the water. However, when the thumb is withdrawn from the orifice, water begins to flow out of the container and is displaced with air.[124] Al-Ka'bī mentioned the same experiment in his *al-Maqālāt*, using a cone-shaped vessel instead of a water clock.[125] Ibn Ḥazm also mentioned the same experiment and added another experiment conducted with a device used

123 Philoponus, *Corollary on Void*, 569, 18.

124 Ibn Mattawayh, *al-Tadhkira*, 122; Al-Nīsābūrī, *al-Masāil*, 54.

125 al-Kaʿbī, *Kitāb al-Maqālāt*, 483.

to treat those with urinary tract obstructions.[126] Jurjānī stated opponents of the void to have mentioned another experiment conducted using a tool called a *zurrāka* to describe the same phenomenon. A *zurrāka* is a pipe made of copper. Half of this pipe is thin and extremely narrow inside. The other half is thick with a wide inside. A wooden bar is ready to cover the large section of the pipe. Then, when the inside of the pipe is filled with water and the entrance of the wide half is covered with a wooden rod, no water comes out of the pipe even though the mouth of the narrow half is open. However, when the wooden rod is inserted into the pipe, an amount of water equal to the amount of the rod entering the pipe comes out with pressure from the thin part. If any void were present in the pipe, the water would fill these empty places first as the rod enters the pipe. However, the volume of water coming out equaling the volume of the rod entering the pipe indicates no void to be present in the pipe. If the wooden rod goes inside as far as the mouth of the thin part and then retracts, this time the water in the thin part would be drawn towards the wide part. This is again due to the presence of a void being impossible.[127]

According to the Başran School, the reason why water does not flow from the small hole at the bottom of the water clock is that the air outside prevents it from flowing because the upper part of the water clock is covered, not enough air mixes into the water. Because the hole at the bottom is very narrow, not enough air can mix into the water from there. However, when the thumb is pulled from the top orifice, a sufficient volume of air enters, and what prevents the water's flow gets removed when the air can mix with the water. Thus, the water starts to flow. Likewise, if the lower hole is enlarged so that a sufficient volume of air can enter, water will start to flow. If the Baghdād School were right, water should not flow even if with an enlarged lower hole. On the other hand, when mercury is placed in the device instead of water, the mercury doesn't need to be replaced by air or anything else and will flow through the lower hole even when the top orifice is covered by a thumb.[128]

In these experiments the non-flowing of water clearly has nothing to do with the existence or non-existence of a void, the main reason being atmospheric pressure.[129] No information at that time existed regarding atmospheric pressure. However, the

126 See Abū Muḥammad Ibn *Ḥazm*, *al-Faṣl fī al-milal wa al-ahwā' wa al-niḥal* (Istanbul: YEK Publications, 2017), III, 818.

127 *al-Ījī*, *al-Mawāqif*, 120; *Jurjānī*, *Sharh al-mawāqif*, II, 195–197; Pines also deals with this experiment. See Shlomo Pines, *İslam Atomculuğu*, trans. Osman Demir (Istanbul: Klasik Publications, 2018), 131–132.

128 Ibn Mattawayh, *al-Tadhkira*, 123; al-Nīsābūrī, *al-Masāil*, 54.

129 See "Atmospheric Pressure," *Encyclopedia Britannica*, https://www.britannica.com/science/atmospheric-pressure (May 9, 2020).

Baṣran School's clear statement that air prevents the water from flowing out of the narrow hole indicates that their idea was about the air present in the water having less pressure than the outside air to be what prevents water from flowing. If the orifice of the device is opened or the hole at the bottom is enlarged, the amount of air entering increases and allows it to overcome the air pressure that prevents water from flowing.[130] The interesting thing about their way of thinking is that they consider water to be unable to overcome the pressure of the air outside by itself, only when air is mixed into it.

2.2.5. The Jug Experiment

The Baghdād School based its experiment with a jug on a simple observation in daily life. According to this experiment, if the water in a jug freezes, the jug cracks and breaks. According to the School, the reason for this is that when water freezes, its particles gather together and shrink. In this case, something is needed to get between the jug and the frozen water. If the jug doesn't break, a void would have to be present between the water and the jug. However, because the presence of a void is impossible in the cosmos, the jug cracks to allow the air to enter.[131]

The Baṣran School argued that the hypothesis of water shrinking while freezing to be undefendable in this experiment because those who reject the void do not accept the presence of a void between water particles, whether water be liquid or solid. Therefore, water shrinking is undefendable. According to the Baṣran School, the reason for the jug breaking in this case is not the shrinking of the frozen water but the increase in the pressure (*i'timād*) applied to the walls of the jug upon the freezing of the water. When this pressure reaches a certain level, it results in the jug breaking. However, this applies to bodies such as those made of glass and clay, not bodies made of hard or thicker materials such as iron because frozen water cannot apply enough pressure to crack them. If one placed water in a jug made of iron instead of a clay or glass jug and froze the water in it, it would not cause a break or crack in the surface.[132]

The Baghdād School was obviously mistaken in this experiment, because the reason frozen water causes the jug to crack is not its decrease in volume but its increase. The hypothesis from the Baṣran School where frozen water applies increased pressure

130 Dhanani, *The Physical Theory of Kalām*, 79.
131 Ibn Mattawayh, *al-Tadhkira*, 123; al-Nīsābūrī, *al-Masāil*, 55.
132 Ibn Mattawayh, *al-Tadhkira*, 123; al-Nīsābūrī, *al-Masāil*, 55.

to the jug is correct. However, unlike all other fluids, water is the only substance whose volume increases while becoming a solid (starting at +4° C).[133] In other words, if the same experiment were conducted with another liquid or using a container with a larger expansion coefficient, the container would not burst. Therefore, arriving at a universal result by generalizing a specific case peculiar to water is not feasible.[134]

2.2.6. The Waterskin Experiment

This experiment has two versions, both of which were put forth by the Başran School in favor of the void. The first version of the experiment is carried out by sticking a needle into a waterskin filled with air. The piercing of the waterskin shows a void present in it, even if it is filled with air. Even if filled with air, the needle would not be able to enter if no void were present in the waterskin. The denial of this requires either the air and needle to occupy the same place together (i.e., accepting the idea of *tadākhul*, which the Baghdād School also rejected), or some air must be admitted to escape from the waterskin when the needle is inserted. In this case, however, the criticisms from the Başran School against the idea of mutual simultaneous displacement should be valid.[135]

The aim of the Başran School here is to refute the thesis that motion takes place through mutual simultaneous displacement. According to them, the fact that no air comes out of the waterskin despite the needle entering it proves the invalidity of the thesis. If those who reject the void claim otherwise, they have to accept the idea of *tadākhul*. However, no theologian other than al-Nazzām and al-Jāḥiẓ, both of whom accepted the theory of *kumūn-ẓuhūr*, had adopted the idea of *tadākhul*. In addition, this experiment does not allow those who reject the void to provide an answer to the argument for air being elastic and able to compress when another body enters it. Instead, they suggest the expansion or contraction of other bodies such as air to be due to the presence of a void inside. They believe opponents of the void to be unable to advocate for expansion and contraction as they claim no void can be present between the particles of a body.

The second version of the evidence is intended to show the formation of a void in the waterskin. The air in the waterskin is completely sucked out so that the skins

133 See Emiliano Brini et.al., "How Water's Properties Are Encoded in Its Molecular Structure and Energies", *Chemical Reviews*, https://pubs.acs.org/doi/10.1021/acs.chemrev.7b00259 (May 8, 2020).

134 Hatice Arpaguş, "Bağdat Mu'tezile Ekolü: Ka'bî Örneği", *İslâm Medeniyetinde Bağdat Uluslararası Sempozyumu* (Istanbul, 2008), 175.

135 Ibn Mattawayh, *al-Tadhkira*, 117; al-Nīsābūrī, *al-Masāil*, 49.

on both sides adhere to each other. Then, its mouth is tightly closed so that no air may enter it. Afterward, the two adherent sides are pulled apart by applying force. In this case, the two skins are separated from each other and a void is created inside the waterskin. Air cannot be said to enter through the pores of the skin or else a void would be present in the waterskin. If this were the case, an evacuated waterskin would have to naturally fill with air after a while, or an air-filled waterskin would have to empty after a while. However, the fact that the waterskin remains the same after being filled with air and closed invalidates this objection.[136]

Lucretius also used a similar experiment to prove the presence of the void. According to this experiment, if two bodies with wide surfaces adhering to each other were suddenly separated from each other, a void would appear between them until it becomes occupied by air. Even though the air expands quickly, the resulting large gap cannot be filled in an instant. Therefore, even if just for a moment, a void/nothingness would exist between the two bodies.[137] The Baṣran School, on the other hand, seemed to have developed this experiment a little more and put it in a much better form, for the gap is created in a waterskin with stitched edges and a closed orifice makes it more permanent and its status easier to observe. However, conducting this experiment on two flat surfaces with open edges makes observation difficult as air can immediately fill the gap.

2.2.7. The Well Experiment

According to this experiment established by Abū Hāshim, no organism can live at the bottom of deep wells as no air can reach there. Just as a light lowered to the bottom of a well goes out, so does an individual who descends there. In this case, the presence of a void would need to be acknowledged. Ibn Mattawayh and al-Nīsābūrī, however, stated this proof to be poor and unreliable.[138] According to them, the reason why no organism can survive there is not the lack of air but its density (*kasīf*), because living beings need to breathe thin (*raqīq*) air. Therefore, the reason is not the lack of air but the absence of the necessary qualities of air that are required for living beings to breathe. This is why animals that go down there are unable to survive.[139]

We do not know whether the Baghdād School responded to this proof. Perhaps they did not need to do so as this argument was invalidated by critiques from within

136 Ibn Mattawayh, *al-Tadhkira*, 118; al-Nīsābūrī, *al-Masāil*, 48–49.
137 Long & Sedley, *The Hellenistic Philosophers I*, 32.
138 Ibn Mattawayh, *al-Tadhkira*, 117–119; al-Nīsābūrī, *al-Masāil*, 50.
139 Ibn Mattawayh, *al-Tadhkira*, 119; al-Nīsābūrī, *al-Masāil*, 50–51.

the School. Today, certain toxic gases such as carbon monoxide and methane are known to gather in deep holes such as wells and, if inhaled, cause poisoning.

3. Conclusion

The discussions on the void in Kalām started with atomism being introduced into the Islamic world, and the arguments related to it began being articulated intellectually in the early 3rd/9th century. Undoubtedly, the fact that *mutakallimūn* were aware of the discussions in the philosophical tradition motivated this reception. However, the *mutakallimūn* who accepted atomism but rejected the void made original contributions to the philosophical heritage of Ancient Greece, especially through their success in reconciling atomism with the idea of the void. This indicates that they harmonized these arguments with their own beliefs by transforming and appropriating them beyond repetition and imitation.

The debates on the extracosmic void seem to have taken place over rather metaphysical contexts such as creation from nothing, eternity, infinity, and multiple cosmoses. In this context, the Baṣran School advocated the existence of the extracosmic void to base their conception of the cosmos being finite/limited, created from nothing, and later in time, believing the divine creation to be complete only when the cosmos is completed in *malā'* [fullness]. The Baghdād School, on the other hand, rejected such a void on the grounds that it cannot be subjected to sight, cognition, or measurement. In fact, the *mutakallimūn* who advocated for the void believed the same as the opponents of the void, because they believed the void to be nothingness/non-existence. Therefore, some *mutakallimūn* who defended the extracosmic void not surprisingly believed that a hand would be unable to extend beyond the cosmos. Meanwhile, the reactions of the *mutakallimūn* who avoided notions such as eternity, infinity, and infinite regression should be considered to have had an effect on their rejection of the extracosmic void.

The central debates among *mutakallimūn* revolved around the intercosmic void. Considering the evidence presented and the answers given to this, one can see that, while certain theoretical and intellectual arguments were used in these debates, the experimental arguments dominated. The strongest of the theoretical arguments in favor of the void can easily be said to have been the evidence from motion and the strongest evidence against the void to be the evidence from measurement and cognition. However, the answers one group gave to these proofs were unsatisfactory to the other group, as neither the Baghdād School could explain how motion occurs without a void precisely, nor the Baṣran School how the void they consider to

be nothingness might be subject to cognition and measurement. The Baghdād School mostly used experimental arguments that were mainly based on the mechanical works from antiquity and from Aristotle's commentators. Similarly, the Baṣran School benefited from Greek atomism when responding to these arguments. This does not mean, however, that the proofs presented were just being completely imitated, as both Schools proposed some new forms of evidence while reformulating others with examples appropriate to their socio-cultural context. For instance, the bonesetter and cupping glass experiments implemented by the Baghdād School were original, although based on the same principles as previous ones. The experiment with frozen water in a jug was also original, albeit unsuccessful. The Baṣran School's thought experiments, bubbling experiment, first version of the waterskin experiment, and al-Nīsābūrī's paper experiment are all entirely original. The well experiment was also original though unsuccessful. Evidence from motion and the experiments on creating a void between waterskins have their basis in Greek atomism but were significantly improved and strengthened.

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