

IBN SĪNĀ—AL-BĪRŪNĪ CORRESPONDENCE—V

Translated by Rafik Berjak and Muzaffar Iqbal

This fifth installment of the correspondence between Ibn Sīnā and al-Bīrūnī consists of al-Bīrūnī's objections to the answers he received from Ibn Sīnā. It seems that al-Bīrūnī was dissatisfied by Ibn Sīnā's responses to all but two of the first set of ten questions and all but one of the last eight questions he had sent to Ibn Sīnā. Thus, he wrote back about fifteen responses (leaving out the response of Ibn Sīnā to his sixth and eighth questions from the first set of ten, and the last question from the second set of eight). This section shows that al-Bīrūnī's dissatisfaction with the answers he had received was ultimately based on his own independent views about the nature of the physical world which were in stark contrast to the views held by the Peripatetics who based their views on Aristotelian physics. These short and categorical responses to Ibn Sīnā's answers not only open a window to understand al-Bīrūnī's views on the nature of the physical cosmos, they also reflect the vigor and intensity of the Islamic scientific tradition which was at that time appropriating Greek science through a transformative process.

Keywords: Ibn Sīnā–al-Bīrūnī correspondence; Peripatetic natural philosophy; Islamic scientific tradition; history of physics; criticism of Aristotelian physics; natural elements; schools of thought in Islamic scientific tradition.

Objections of Abī Rayḥān [al-Bīrūnī] on the responses [he had received]; [from] a draft written in his hand and answers by one of Shaykh [Ibn Sīnā's] students.

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On the first question: This is not definitive, as I say that it is not one of the elements in its natural position, because the downward direction is toward the centre and the upward direction is toward the perimeter, and the centre is a point. So if one part of the earth were put at the place of the point, even if it were small, [it would not fit in it], but rather each one of its sides would compete to fit in. And such is [the case of] the perimeter: none of the ascending bodies would fit in it because it is plain and imaginary; and likewise, if there was a path between the water and the centre it would reach it. Therefore it is not in its natural position above the earth, and consequently none of these bodies are present in their natural position. As such, these premises do not annul the claim of the one who said “the heaven is dense”, but its connections prevent it from gravitating towards the centre.

On the second question: Abū Rayḥān said: John Philoponos is far from [deserving] to be described as mischievous; Aristotle, the embellisher of his own infidelity, is more deserving of this description. And I think that you, O wise man, have not seen [Philoponos’] book *On the Response to Pericles* in which [the latter claimed] that the world is eternal, nor his book on what Aristotle embellished, nor his commentaries on Aristotle. And nothing caused the emergence of this objection except what has been accepted as restriction of necessary movements and times from their initial beginnings. Aristotle himself is close to this in his claim on the impossibility of the existence of eternity. When he evaded elaboration on this topic he merely followed his caprice. Your claim that when Aristotle said “the universe has no beginning” he did not mean that it does not have a maker has no validity, because surely if actions have no beginning it is impossible to imagine that the universe has a creator: and if Aristotle’s belief were that the world has a beginning but not in time, what [business] does he have in mentioning the sect and their testimonies about the changes of attributes not necessitating changes in being!

On the third question: Abū Rayḥān said: If one of its extremities were measured toward the centre it would be [regarded as] its bottom, and the opposite would be its top. If, however, it was not measured by its length, it is more appropriate to call it its width, rather than its depth. If one of its extensions deserves that label then the other one should

deserve it too, and as such when a body moves in a straight line parallel to its centre, [it does] not always [move] downwards. However, your saying “that the beginning of the movement of a living body is from the right” is a claim whose validity has not been based on truth: for verily what I see is from back to front—or am I not an animal? And likewise, no one denies that surely the sphere has length, width, and depth (not referring to any one of its extremities) [and] it [well] deserves every one of these labels. If only three of these extremities were designated with these labels, then tell me what is left for the rest of them? You will either say there is no end to dimensions or you would remove these extremities from them.

On the fourth question: Abū Rayḥān said: This is the answer of Muḥammad bin Zakariyyah—since when has his opinion become valid? That superficial and imposing person! He said if a thing has two sides and a center it will not be divisible eternally—and this is impossible. However, your claim does not hold in practical terms, because if antimony were ground finely, it would still not reach the atomic state to which you referred; therefore, division in actuality will discontinue before it reaches the state of your particles, and at any rate what remains is [unnatural], forced. He also said your saying necessitates that the side of a square is like the axis. Both, whether you agree with this or you disagree, the foundation you built will collapse; if you claim that there are spaces between the atoms, you will be asked about the spaces, whether they are smaller or are greater than the atoms themselves.

On the fifth question: Abū Rayḥān said: I am either not aware of these sayings or they are inconsistent with each other, or whoever accepts them is declaring that the Creator, may He be Praised and Exalted, is unable to create universes beyond this one. However, He who is able to create two distinguishable earths and two distinguishable fires, is able to create for each of them a bottom and a top separately. If you do not accept this I will not accept the notion that movements from the centre to the perimeter are congruous and of the same kind. And [what] you said [was on the basis of] the saying of the Baṣarians. And in conclusion to the answer, [Abū Rayḥān] continued: And if you label this as Sophistry, then I myself am the origin of this view, however, I do not say that there is nothing besides these opinions and there is nothing unless it is tangible.

On the seventh question: Abū Rayḥān said: If you accept this as a given that the east of the heaven is the right, then the heaven ought to be all right and all left at the same time, because the east of each position is simultaneously the west of another; and it is inappropriate for one thing in one condition to be called by two names of opposite meaning.

On the ninth question: Abū Rayḥān said: If rays reflect from wherever they fall and are heated [as a result of this reflection, then] where is the proof for this? And where is the similarity between this [process] and burning mirrors? Indeed, its burning point is far from the spot of the reflection of rays. If you referred [in your claim] to the reflection, you should have illustrated that, because your words cannot be perceived without illustration. And how can what you say be accepted? The one who says that the ray is a body [has two choices]: (i) either he should prove the existence of vacuum—[and] in that case what you say will not apply to him—or (ii) he should say that the ray exists in the sphere eternally, along with the air in it. Why do you not say that the water is not a body—because if it were a body, two bodies would exist in one location (and [by this] I mean water and clay. You must [also] say that light is a color that is accepted by air or a transparent body; I say the opposite of that, and that is that light can be seen on non-transparent bodies and cannot be seen on transparent [bodies], or what does not accept it. What is seen [of light] inside houses [for example] is what falls from it on the bodies [therein], so if air were accompanying these bodies—and that is possible—then the light would not be seen and there would be no difference between it and other things.

On the tenth question: Abū Rayḥān said: The one who claimed that transformation is the spread of the particles of something between the particles of another thing did not say that the body requires more space if it were heated, but he said instead that fiery entities penetrate the body from its openings and pores, which increases [it] in its fiery parts; as a result of this its mass increases by the union of two bodies. When [for example] a glass vessel is heated, fiery particles penetrate its openings and expand it and thus it cracks. The proof of this [lies in] that we will only find the watery image, not the airy image, except when it condenses and unites: [only then] it abandons its image. If the water becomes air in reality it will not return to water when it

condenses, and [yet] it would not [remain] air because returning to the watery state is a priority over another state. Furthermore, you are obliged to prove that when a body is heated and its dimensions increase, it is as if another body like it came to the world, thus decreasing the dimensions of the world as much as the increase of the former. [As a consequence] eventually there will be no space left—or else where are these increases going to be accommodated?

On the other eight questions:

On the first question: Abū'l-Rayḥān said: You were supposed to say that the reflection occurs off the bodies, and you should have illustrated [your claim], [for] otherwise your answer is nothing but affirming my saying through repetition.

On the second question: Abū'l-Rayḥān said: Your saying “if it never arrives, it is not moving” is incorrect, for we can say that a stone is gravitating towards the center by nature, but never arrived at the center because of obstacles preventing it from [doing so]. I consulted with the one who says this, and his response was: I see this case like a two headed container filled with water, rocks being thrown in the container through one of the two openings so that the water [within] begins to rise; but I would not find any change [in its nature] as a result of [its] rising. Neither can I see any changes in other objects that are moving upward. If the rise of water by the addition of the stones led you to the fire, [then] such is the metaphor for my interpretation; and you will find nothing but [the stone] arriving at the center.

On the third question: Abū'l-Rayḥān said: Your answer presented Aristotle's definition of the vision but not the explanation, and sometimes the definition of a thing requires many different interpretations. According to what you said, the one who sees would not be able to distinguish between dimensions, and [as such] he will perceive small [objects] nearby to be identical to large distant [objects]; and so too would be the case with sounds: loud sounds further away would be heard just as would quiet sounds closer by, the listener being unable to distinguish between the different sounds from their sources. If the transparent [body] were affected by color, then a glass stained with black on one side when looked upon through any other side—except from the side opposite to the

blackened side—should look black. The question was not about perception of what is under the surface of water, but I had asked [rather] about the understanding of how vision penetrates based upon the understanding of reflection of the rays simultaneously under the surface of water.

On the fourth question: Abū'l-Rayḥān said: Your linking heat to the continuing rise of the sun is a huge mistake which does not behoove someone like you, because the place where the sun continuously rises also continuously witnesses the setting of the sun. Habitation does not occur there due to the [intense] cold, and [extreme] heat. Heat does not exist except in places where the time of sunrise is equal to the time of sunset in a single rotation of the heaven. As for the reflection at right and obtuse angles, and linking that to the cause of heat and cold, it is a matter that cannot be understood except by great explanation.

On the fifth question: Abū'l-Rayḥān said: If the width requires width, I say the surface has no length because length requires [more] length, and so on ad infinitum; this is pure sophistry. However, arguments should not be based on words but on meanings.

On the sixth question: Abū'l-Rayḥān said: I did not support but [only mentioned] the opinion of those who accept vacuum. If air expands by suction, as you mentioned, and leaves the flask, where is it going to go if there is no vacuum in the world? [Abū'l-Rayḥān] also claims that another equal quantity of air will be returned to the air whereupon it will shrink, and thus its expansion and contraction will be equal. Furthermore, [as for] your saying that it has been [proven] experimentally, I performed the experiment and the result was the opposite [to what you claimed]: the air left the flask in bubbles [while] no water entered in it whatsoever and I broke as many flasks as would be enough to hold the water of the [river] Jayhūn.

On the seventh question: Abū'l-Rayḥān said: If the flasks were collapsing inward, then what you have said would have been correct, but the matter is to the contrary; they break outward, like a thing that is burdened by carrying something beyond its capacity.

(To be continued)