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IBN SĪNĀ'S CRITIQUE OF MUTAKALLIMĪN'S ATOMIC THEORY

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Kalām occupies an important place in Islamic religious sciences. Literally it means 'discourse' but in fact this science is concerned with the proof and justification of Islamic doctrines regarding the existence of God, His Being, His Attributes, Creation of the Universe, and its subsistence. The followers of this scholastic theology or *Kalām* are called *Mutakallimīn*. It is difficult to say when *Kalām* originated. No branch of *Kalām* could be acceptable to all schools of Muslim thought.[1] Abu'l Hudhail al-'Allāf (751-849 A.D.) gave a new form to this science by introducing the principle of *jawhar* (atom) and *a'rāḍ* (accidents). Later, the followers of Abu'l Ḥasan b. Isma'īl al-Asha'rī (873-936 A.D.) erected the entire structure of their *Kalām* on this very atomic theory.

The atomic theory of Mutakallimīn was not palatable to Muslim fundamentalists. They also believed in continuous creation but denied the existence of *Khalā* (vacuum). To them bodies themselves were *jawhars*, but not indivisible. Their contention was that undoubtedly Allah creates *jawhars* and *a'rāḍ* (accidents) continuously but He is not bound by any laws. Hence the atomic theory was irrelevant and wrong. In fact there was no room for non-theological methods like philosophy, *Kalām*, and free speculation in matters of faith. However, this opposition did not greatly affect the popularity of Ash'arite *Kalām*.

Mutakallimīn's theory was being opposed by another class of Muslim thinkers who were called *falāsifa*. Their opposition was on a different ground. They also had complete faith in Islamic doctrines, but simultaneously they believed that theological anomalies can be resolved on the basis of reason. As Greek wisdom, according to them, was the best product of human brain it may be possible to arrive at the Truth by means of Greek philosophy. Abū Yūsuf b. Ya'qūb. b. Ishāq b. as-Sabbāh Alkindī (800-872 A.D.) was the first to apply such thoughts for confirming religious dogmas regarding God's existence, creation ex-nihilo and annihilation of the world. Later, Abū Naṣr Moḥammad b. Moḥammad b. Tarkhān. b. Uzlugh Alfārābī (870-950 A.D.) advanced this movement further, but in fact the

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climax was reached in the works of Ibn Sīnā (980-1037 A.D.) whose ideas have been termed the 'pinnacle of medieval period philosophy'. He presented a model—How far and in what way faith and philosophy can be reconciled ?

Ibn Sīnā was born in Bukhārā which at that time was supposed to be a part of Iran. This was the time when Iranians were trying to revive their old civilization. They had come to the conclusion that Islam was not another name for Arabic traditions. Accordingly, Iranians expanded the area of Islamic sciences by absorbing whatever valuable material they could obtain from Iranian, Greek, or Indian cultural treasures. Firdausī compiled tales of pre-Islamic kings in his *Shāh Nāma*. Alberunī studied Indian sciences. Ibn Sīnā composed more than hundred books on medicine, philosophy, mathematics and Sufism. In medicine he was a follower of Galen, in logic and philosophy he believed in Aristotelian principles. In mathematics he had learnt the methods of *Ḥisāb Hindī* (Indian arithmetic) and in almost all his works he used mathematical principles. His *Dānish Nāma-i 'Alā'ī* has been called 'Encyclopedia of Islamic Sciences in Persian'. In fact, various Islamic sciences reached Europe through Ibn Sīnā's writings only.

On the question of matter and creation, Ibn Sīnā believed with Aristotle that matter has always existed but at the same time his faith on the Qurānic doctrine was also unshakable. He did accept God as the Creater but in his view the doctrine of continuous creation and atomic theory was wrong. His argument was that even the minutest portion of matter can be divided into two. This division may not be possible physically or in practice, but in imagination it can always be done, as is done in mathematics. For example, if we take a very small number, its half can also be imagined and the nature of existence of the divided and undivided number remains the same. In developing his line of thought, his knowledge of mathematics was helpful. Basing his argument[2,3] on principles of Euclidean geometry, motion, and number theory while applying the method of proof by contradiction he "demonstrated" that an entity like *jawhar al-fard* or *al-juz' al-laḍhī lā yatjazza* does not exist at all. Thus the very foundatiton of Mutakallimīn's atomic theoy was demolished.

First Proof

Take a collection of 16 *jawhars* and arrange them in 4 columns and 4 rows. Assume that no *jawhar* can be inserted between two adjacent *jawhars*.

As all atoms are equal and similar, a square *ABCD* will be formed, each of whose sides will be 4 atomic units in length.

But the number of atoms in the diagonal will also be 4. This means that the lengths of *AB* and *BC* will be the same as that of the diagonals *AC* and *BD*.

This is against the principles of geometry and personal experience because the diagonal is definitely longer than the sides.

Thus the assumption that 'no *jawhar* can be inserted between two adjacent *jawhars*' was itself wrong.

Hence it is proved that between two *jawhars,* another *jawhar* can be inserted and *jawhar* can also be subdivided.

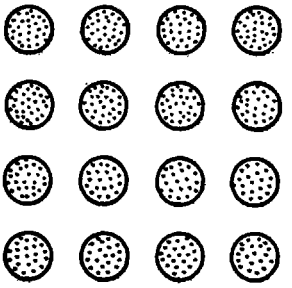

Fig. 1

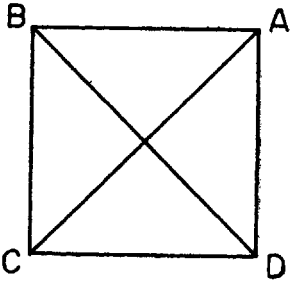

Fig. 1a

Second Proof

Fix a stick making a right angle with the ground. Then the shadow of sun's ray will fall on the ground. The end of the shadow P, the top T of the stick and the sun S will be collinear.

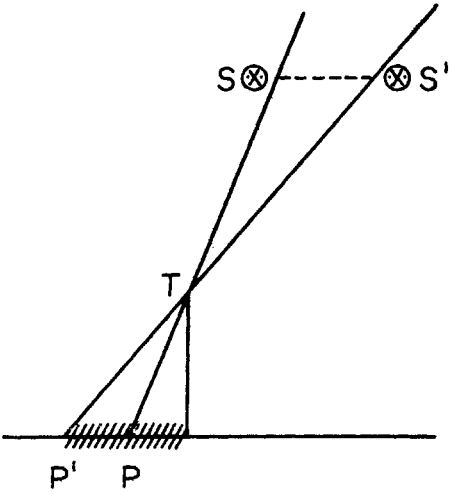

Fig. 2

After a little while the end of the shadow will either remain where it was or move from its place. If the point remains unmoved then the line joining P and T will intersect the sun's ray at two points—S, where the sun was earlier, and S', where it reached later. But it is impossible for a straight line to interesect another straight line at two points.

On the other hand if the shadow moves to P', two cases arise : the distance between P and P' will be equal to the distance between S and S', or the two distances will be unequal. Equality is impossible because when the shadow will move a hair-breadth distance, the sun would have traversed many thousand *farsakhs* (*farsakh* = 6.25 km). If the two distances are not equal, when the sun traversed a *jawhar*-length, the shadow moved very little in comparison. In other words, only a very small part of the *jawhar* could move. But this contradicts the assumption that a *jawhar* is indivisible.

This analysis proves that *jawhar* does not exist.

Third Proof

When a grinding stone moves, on completion of one revolution the parts nearer to the centre traverse much less distance than do the parts near the edge. The reason is that the inner circumferences are much smaller than the outer circumferences.

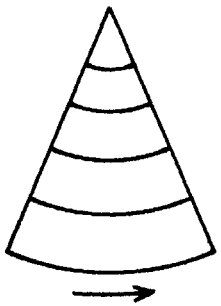

Fig. 3

In other words, when the outer circle moved one *jawhar* length, the *jawhars* on the inner circles moved very much less ; although the grinding stone was moving with a uniform speed. From this, the only inference to be drawn is that different parts of the grinding stone separated so as to move with different speeds. But we see ourselves that the parts of the grinding stone did not separate. Hence, inescapably, one of the *jawhars* must have split.

This proves that if *jawhar* exists at all, it can be further subdivided.

Logicality of Proofs

It is to be noted that the hypothesis of atomism has been 'disproved' not on the basis of logic but by 'observation and experience'. Logic demanded that when the *jawhars* in the rows and columns of the square were 'counted' the *jawhars* in the diagonal should also have been 'counted'. 'Measuring' their length is not right. In counting, integers (or whole numbers) are used, while when we measure quantities,

we need real numbers. Properties of the two types of numbers are different. Integers are discrete implying that between two consecutive integers there can be no other integer. Contrary to this, real numbers, that contain integers, fractions and irrational numbers also, are continuous. This means that if we take any apparently consecutive real numbers, we can find as many real numbers as we like between them, because there is an uncountable infinity of rationals and irrationals between them. Ibn Sīnā takes discreteness of integers as the basis of his assumption, but in the last step of argument tries to benefit from continuity of real numbers. Similarly, in the revolution of the grinding stone, he takes recourse to laws of rectilinear motion although if laws of circular motion were applied no logical contradiction would appear, because all particles, whether near the centre or far, move uniformly subtending an equal angle at the centre. Their rotatory velocity remains the same.

Non-Existence of Khalā

Having disproved the existence of *jawhar*, Ibn Sīnā inferred that *khalā* also does not exist. When *jawhars* themselves are non-existent, where does the question of emptiness between them arise. There is no reason why a *jism* (body) should not be compact as a body. The reason for apparent emptiness is that owing to the particular shape of the body, all its parts may not exactly fit into each other. Then even if we assume that *khalā* exists, there will be another *khalā* inside it, whose emptiness could be less or more. Then inside the interior *khalā* there must be another *khalā* also. Thus the sequence of *khalā* inside *khalā* inside *khalā* inside *khalā* ... will never terminate.

This means that *khalā* possesses extension and it can be subdivided indefinitely. The only conclusion that can thus be drawn is that *khalā* is neither a *sha'i* (thing) nor a *lāsha'i* (non-thing). Besides, it cannot be a property either. So, Aristotelian dictum is right that 'vacuum is only a hollow concept'. Besides, experience also confirms this view. For example, if a jug full of water is rotated in the air, water remains where it is. If *khalā* existed nothing could have stopped water from falling down. Besides, the speed of anything that moves in the air will be limited, howsoever fast it may move. If *khalā* existed at least some thing could move with unlimited speed. But experience shows that no such motion ever takes place. This only proves that Nature abhors *khalā*.

Motion

Mutakallimīn believed that motion took place only because of God's will who created the *a'rāḍ* of *ḥarakah* (accident of motion), attached it to all the *jawhars* of the *jism* (body) and continually renewed it. Obviously this hypothesis was not acceptable to Ibn Sīnā. He asserted that every material thing or body has its own natural place in the system of Universe, but because of unfavourable circumstances it does

not always get its due position. So the body has a feeling of 'lack of perfection'. Therefore, it seeks the place in space which perfectly matches its own nature. This search is called *ḥarakah* (motion). In the sublunary world everything is imperfect. Accordingly, material bodies move with a desire for attaining perfection. As the bodies would like to choose the shortest path so as to reach their goal in the shortest time, the motion should naturally be in a straight line. That it why, if there are no obstructions, fire or air will always rise upwards and water or clay will always fall downwards. But the movement of Heavens is on a different principle. There in the Higher World, *i.e.* the world of moon and above, everything is perfect. So the motion there is always circular because circle is the only perfect path where distance from the centre never changes.

But in Ibn Sīnā's philosophy, motion does not simply mean change of place by a body. According to him it is forging from potentiality to actuality in time either in a continual or a non-immediate manner.[4] This concept of motion becomes the basis for his views on time. While agreeing with Aristotle that time is the measure of motion, he further asserts that the feeling of motion comes with the feeling of time, but time cannot be perceived without motion. Space can be measured in terms of some selected unit but man does not possess any ability of measuring time directly. If things do not move from one situation to another, how can the question of 'earlier' and 'later' arise ? Hence, if there is no change there will be no time. But the Heavens are in perpetual revolution and motion is always taking place. This undoubtedly leads to the conclusion that time also exists. If there were no Heavens, then directions, motion or time would not exist either. We know that motion has no atoms so time also cannot have any *jawhar*. However, for dividing time in imagination or measuring motion according to common practice, it may be possible to partition time into year, month, day, hour and *āan*. Contrary to the Ash'arites and other Mutakallimīn who claimed that *āan* was a *zamānī jawhar* (time-atom), Ibn Sīnā asserted that any small measure of time can be taken as a *ḥadd* (limit) and *āan* can be only such a *ḥadd* which exists only in imagination.

Metaphysics, the Real Science

In propounding his views on time, space and motion, while criticising the theology-oriented theories of the Mutakallimīn, Ibn Sīnā uses a lot of technical terms from physics and advances mathematical proofs, but in fact, he does not consider these problems from the material point of view. For him physics is *'ilm-i-zīrīn* (low-grade science), though mathematics is *'ilm-i-miānagīn* (medium-grade sciences), because in mathematics, the arguments are based on logic and generally there is no scope for ambiguity or contradiction. However, observation and logical analysis can throw light only on the apparent and outwardly aspects of an entity. At most,

its relation with the manifestations of Nature can be seen, but the mystery of its existence cannot be understood through these sciences. The real science is *Ilāhiyāt* (metaphysics) which is the *'ilm-i-barīn* (superior-grade science). *Ilāhiyāt* (metaphysics) deals with the problems of existence, quiddity of beings and correlation of their external manifestation with internal aspects. Ibn Sīnā does not believe that the world is devoid of order, dependent on chance only. He asserts that the world is orderly, harmonious and organised because the existence of everything is dependent upon the *Dhat-i-Muṭlaq* (Absolute Being) who is Himself perfect. Therefore, the objective of theoretical sciences should be to understand the essence of the existence of things on the basis of *Ilāhiyāt* (Metaphysics). Accordingly, Ibn Sīnā does not think that physics or mathematics is unnecessary or wrong. These are important sciences because they prepare the mind for understanding the superior science.

Ibn Sīnā's Ilāhiyāt (Metaphysics)

Ibn Sīnā's own contribution to this superior science is considerable. He bases his *ilāhiyāt* on a classification of Beings into *wājib al-wujūd* (necessary existence), *mumkin al-wujūd* (possible existence), and *mumtani'* (impossible existence). *Wājib al-wujūd* is The Being that is Self Existent and cannot be "NOT", but *mumtani'* neither exists nor can ever come into being. But a *mumkin al-wujūd* entity has always existed in essence but it cannot appear by itself. For it to come into being a chain of causes is necessary. The chain necessarily must have had an end somewhere, and that end is the *Sabab-i-Awwal* (first cause). In fact the *Sabab-i-Awwal* is also the *Sabab-i-Ākhir* (final cause) who has always existed and will always exist, *i.e. wājib al-wujūd.* It is through the medium of *wājib al-wujūd's Ta'qqul* (intellection) that *mumkin al-wujūd* things can be brought into the world of reality from the realm of possibility. In the hierarchy of Being or chain of Existence, the *wājib al-wujūd* is prime, then follow the ten *'Uqūl Mut'ārifa* (intellects) emanating one after the other, afterwards appear the four elements water, fire, air and earth, and lastly the material bodies and compounds.

But between *wājib al-wujūd* and the world, there is no temporal relation of "earlier" and "later". Suppose there are two things A and B such that existence of B depends upon A, but existence of A is independent of B. We can, then, say that in essence A precedes B. For example, all whole numbers 2, 3, 4, *etc.* depend upon 1 but even if there were no 2, 3 or 4, *etc.* 1 could still exist. Accordingly 1 is called the predecessor, and 2, 3, *etc.* are successors, although there is no temporal difference between 1 and the whole numbers. We cannot say that there was a time when only 1 existed, while 2, 3, 4, *etc.* appeared later. From this analysis Ibn Sīnā draws the conclusion that it is wrong to believe that creation began at some particular moment of time. As for time, it is neither eternal nor was it Not once. It cannot be thought of separate *t'aqqul* of *wājib al-wujūd.*

Crisis of Faith

These views of Ibn Sīnā are not free from logical contradiction and confusion. For example, according to his hypothesis *t'aqqul* (intellection) is *ghair māddi* (non-material) and can accept or issue only *ma'qulat* (rationals)..., but detailed description of the hierarchy leads exactly to the opposite conclusion that non-rational material entities like the sky, the heavenly bodies like the stars and the moon issue from *t'aqqul* of the *'uqūl*. Then the assumption is that only single can issue from single, but no explanation is given why in the sublunary world such a vast multitude of animate and inanimate beings issues forth from a single intellect—the tenth *'aql*.

But, it must be said that the task that Ibn Sīnā had set before himself was not easy. As Afnan[5] puts it, his views can be called "the product of crisis in faith". For him Islamic doctrines were basically correct but he did not want to accept traditional faith blindly without applying the test of reason, although he nearly always realised that it is not always possible to prove a truth. However, when he came across any contradiction between common faith and philosophy, he did not try to reconcile the two forcibly. In fact no other Islamic thinker has brought out the similarities and dissimilarities between Islam and philosophy as clearly as Ibn Sīnā has done in evolving his *ilāhiyāt*. For that matter, it is not always possible to avoid logical inconsistency in questions of metaphysical nature. The importance of Ibn Sīnā's contribution to human thought lies in his emphasis on the need of tolerance and use of rationality in problems involving faith. And this approach is valid even today.

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