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Lesson 58: Motion in Accidents

Introduction

The motion which is familiar to ordinary people is motion in space and position, such as the motions of the earth's revolution about the sun and its rotation about its axis. However, philosophers have expanded the concept of motion to include any kind of gradual change, and they have established two other kinds of motion: one is qualitative motion, such as the gradual change of states and qualities of the soul, and the changes in color and shape of bodies.

The other is quantitative motion, such as the gradual growth of a tree and the increase in its height. As a result, motion has been divided into four groups in accordance with the related category. All of these are related to accidental categories: motion in space, motion in position, qualitative motion and quantitative motion.

The ancient philosophers did not allow motion in substance. There are only a few ancient Greek philosophers from whom some claims have been reported which are comparable to substantial motion. Among the Islamic philosophers, Sadr al-Muta'allihin developed and gave numerous reasons in support of the existence of substantial motion. From this time, the problem of substantial motion became famous among Islamic philosophers. Here, we shall first review the four types of accidental motion, and then we will discuss substantial motion independently.

Spatial Motion

As was indicated, the most sensible type of motion is spatial motion, whose channel is the space of bodies. Philosophers have introduced the category of where ('ayn) as pertaining to its distance. However, as was previously mentioned, the category of where, like the other relative categories, is not a whatness of species or genus. Instead, it is a relational and relative concept,
which is abstracted from the relation between a thing and its location

Space is also an analytic accident of bodies which does not have a entified object. In reality, the location of every thing is a part of the volume of the whole material universe which is considered separately, though it does not possess a separate existence.

Anyway, motion in space is either intentional, as when a man transfers himself from one place to another of his own will, or non-intentional, like the spatial movements of non-living bodies. Non-intentional motion, in turn, is divided into natural and unnatural motion, for it is either required by the nature of the thing, or it is under the influence of a constraining force.

Intentional motion, which is based on the soul of the willing agent, is really a subordinative (taskhiri) action which would not occur without the intermediary of the soul. The souls of animals and men use a natural agent to move their bodies or other objects, so the direct and proximate agent of intentional motion is nature.

On the other hand, constrained motion, whether it derives from that which constrains (qasir), as asserted by us, or from that which is constrained (maqsur), as most philosophers have held, is ultimately produced by the nature of the body. Hence, every motion derives from nature, and for this reason, nature is introduced as the agent source (mabda' fa'ili) of the motion of bodies. In other words, every motion has a source of its tendency (mabda' mayli) which is either a property of the body's nature or appears by means of the influence of the nature of another thing.

The ancient philosophers presented views about the source of motion in moving bodies, some of which were discussed in Lesson Thirty-Eight. However, their explanations were based on the assumptions of the then current natural sciences and do not correspond to contemporary scientific theories.

But, in general, it can be said that corporeal motion does not lie beyond these two alternatives: either it is required by the nature of the moving existent—and in this case the motion continues until it confronts an obstacle—or the essence of the moving existent does not require motion, but it occurs under the influence of a foreign factor. If this foreign factor itself does not require motion essentially, another factor will have to exist, until it culminates in a material factor that essentially requires motion.

This factor corresponds to the thing which in modern physics is called 'energy.' It is the transference of energy to bodies which causes their motion. But it must be noted that the validity of this correspondence depends on the validity of the related scientific theory. However, the existence of a natural factor that essentially requires motion is a philosophical theory to which the correctness or incorrectness of scientific theories makes no difference.

Motion in Position

Just about everything that has been said about spatial motion applies to motion in position as well. Basically, motion in position may be reduced to spatial motion because although in motion in position the

place of the entire body does not change the parts of the moving thing gradually change location, so that, for example, the part which was to the right moves to the left, or the part which was above moves below.

The discussion of whether position is really a category is similar to that about the category of where (’ayn). The division of motion in position into intentional and the non-intentional is similar to the corresponding division in spatial motion.

A notable point is that philosophers do not consider circular motion to be required by nature, and in this regard modern physics says that motion which is not in a straight line must be the resultant of several forces. The final judgment about this kind of problem is the responsibility of the empirical sciences.

Motion in Quality

The third category in which motion occurs is the category of quality. It may be further subdivided by attending to its kinds, such as motion in mental quality, motion in sensible quality, motion in qualities specific to quantity and motion in dispositional qualities (kayf isti‘dadi).
The most indubitable among the types of motion in quality, is motion in mental quality, for it is perceived by infallible presentational knowledge.

For example, everyone finds within themselves an affection or love for someone or something, and gradually this attraction becomes intense. Or one feels a dislike toward someone or something which gradually changes into an intense loathing, or the opposite, a state of intense anger appears and gradually is mollified, or a state of intense joy appears and gradually vanishes. From a philosophical point of view, these gradual changes are considered motion.

Motions such as these may be considered to be like sensible qualities, such as color, but we know that the reality of color and the qualities of their intensity and weakness are still subjects of discussion among physicists. Therefore, the existence of this type of motion in quality is not as certain as the previous type.

The third type of motion in quality is motion in shape. If two ends of a string which are extended to form a straight are line gradually brought together in such a way that a curve is formed, then the plane surface and its straight line (if the line it possesses is actual) gradually becomes curved. However, if this transformation is really gradual, it will be subordinate to motion in the position of the string itself or to the spatial motion of its parts.

Another example of this kind of motion in quality may be found in the speeding up or slowing down of any motion, because it is a quality specific to the quantity of its speed, as was explained in the previous lesson.

The fourth kind of motion in quality is motion in dispositional qualities and their gradual intensification and weakening. However, in Lesson Forty-Eight it became clear that the concept of disposition is a kind

of concept which is abstracted from the decrease and increase in the conditions for the occurrence of a phenomenon.

Therefore, if the occurrence of the conditions is really gradual, the motion in the disposition of quality can be considered a concept abstracted from several motions. If it is assumed that the occurrence of a phenomenon depends on only one condition, and that this condition really comes about gradually, then in this case, motion in dispositional quality can be considered a concept abstracted from the motion of the mentioned condition.

Motion in Quantity

Motion in the category of quantity for a moving body is assumed either in disjoint quantity and number, or in continuous quantities and amount. But in addition to the fact that number does not have real existence, it makes no sense to speak of numbers changing gradually, for change in number is obtained only by means of increase or decrease in units, and these increases and decreases occur instantaneously, although it may be based on gradually fulfilled prerequisites or spatial motion.

If motion in continuous quantity is supposed in a line, its changes depend on the changes in the surface [on which the line exists], and the changes in a surface in turn depend on the changes in volume, and until the volume of something increases or decreases the amount of its surface or lines will not increase or decrease.

An increase in volume will be obtained either as an effect of the attachment of another body or as an effect of the expansion and extension of its own parts. Likewise, a decrease in the volume of a body will occur either as an effect of the removal of a section from it, or as an effect of pressure on its existing parts.

Change which is obtained as a result of composition and decomposition, attachment and detachment, is usually instantaneous, although the prerequisites for it might be fulfilled gradually. However, a case of gradual composition and decomposition may be imagined, for example, such that two liquids each of which is assumed to possess a true individual unity are gradually poured into one another so that they are mixed and a third liquid with its own individual unity results.

Regarding the fact that every compound liquid is composed of uncountable molecules the proof of individual unity for each of the two assumed liquids and for the mixture of the two is exceedingly difficult. In reality, this kind of analysis and synthesis are sets of instantaneous connections and disconnections which appear following the spatial motion of the parts.

Decrease or increase in the volume of a body as a result of the expansion or compression of its parts is in fact another way of describing motion in space and position of its molecules and atoms. For example, when water boils and turns into steam its volume increases, but this increase in volume, according to

that established by physicists, is nothing but the increase in the distance of the molecules of water. Likewise the transformation of steam into water and gas into liquid is nothing but the decrease in the distance of these molecules and atoms.

Therefore, the growth of plants and animals has been considered a clear instance of motion in quantity, and although it is obtained by addition of other bodies such as water and nutrients, it is assumed that each of them possesses a single specific form whose amount gradually increases.

It seems that the establishment of true motion in quantity is also difficult in these cases because undoubtedly vegetable growth is under the influence of the addition of foreign materials which are transferred into them by spatial motion, and the connections and disconnections of their parts take place instantaneously.

Likewise, when two bodies move toward each other, or one of them moves toward the other, although they gradually approach each other, their attachment takes place at a single instant and without any duration. After their new parts are put in their places, although their chemical and physiological actions and reactions take place gradually, there is no reason that the specific form of a tree or an animal also develop gradually to include the new part. It is possible that the change of the prior quantity to the new quantity occurs instantaneously, and is a kind of generation or corruption, not something gradual and a kind of motion in quantity.

It is to be concluded that demonstrating that there is motion in quantity is more difficult than demonstrating the other kinds of motion. It is possible that what is called motion in quantity is really a set of spatial motions, instantaneous connections and disconnections, or instantaneous generation and corruption.

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