

LATE ANTIQUE SCIENCE AND ISLAM

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*The science of the philosophers and the science of the multitude**

It is a well known fact that Proclus, the leading philosopher of the Neoplatonic school in the fifth century, used the word *οἱ πολλοί* in double meaning. The word traditionally meant the 'multitude', the average people, and, especially in the works of the proud pagan philosopher(s), it got a new meaning: the Christians, who represented the average people and the multitude in the cities.

Proclus describes the difference between the philosopher's views and that of the multitude in his commentary on the fifth book on Plato's *Republic* by saying that *the philosophers like to know the universals and the 'lovers of opinion' (i. e. the common people) like to know the individuals*¹. The multitude seeks to know many beautiful things, the philosopher seeks to know the absolute beauty.

One has the impression that our text makes hint on the common people who, deceived by their senses, take the many shadows of our sensible world for real beings, whereas the philosophers who know the world of the ideas only acknowledged the beings of the intelligible world.

This interpretation of the text which is fully compatible with Plato's philosophy is seemingly right. It is, however, not acceptable in its late antique social and cultural setting. In the fifth century A. D. the philosophical struggle about the criterion of the truth was over and there was a new struggle between the pagan philosophy of the initiated

* The science of the philosophers vs. popular science.

¹ Proclus, *Comm.* 258: "Τὴν διαφορὰν τῶν φιλοσόφων ἐν τῷ πέμπτῳ τῆς Πολιτείας πρὸς τοὺς φιλοδόξους λαβεῖν ἐθέλων τελευτᾶ μὲν εἰς τὸ δεῖξαι τοὺς φιλοσόφους τῶν καθόλου τὴν γνῶσιν ἀσπασζομένους, τοὺς δὲ φιλοδόξους τῶν μερικῶν"

few and the popular wisdom of the Christian multitude. The Christians, as the example of the church fathers show, were not ignorant. They were well versed in the contemporary popular scholarly traditions. The great Christological debates of the fourth century provide us with enough evidence to prove how different the two kinds of knowledge were in their character.

The extant works of the Alexandrian Neoplatonic school of philosophers contain the physical, psychological, etc. teachings of the professional scientists, whereas Sextus Empiricus' attacks are launched against a different kind of 'dogmatic' knowledge. The Neoplatonic school followed Aristotle's lead, Sextus' polemics are mainly directed against the Stoics and Epicureans. The church fathers did not base their theological proves on the Aristotelian tradition, their argumentation is similar to that which is in the cross-fire of Sextus' critics.

In the following I want to quote some items of the inferences on God's nature from the fourth century Christian works of theology.

"If men are similar to the irrational animals in their body and they are different because of their rational capacity, then God is similar to men in His body and different in His mental capacity.

If... fire does not change the nature of iron, then the unity of God with body does not change the [human] body.

If man has soul and body which remain the same in spite of their unity, then it is much more so that Christ being God in a human body preserves both of them without change and confusion"².

All these inferences can only be interpreted as sign inferences of the late antique period, the theory of which is well documented in Galen's, Sextus' etc. works. Sign inferences of this kind were used also in the Epicurean philosophical school as well as in different medical schools.

² Bellini 1977:78. e.g.: "εἰ ἄνθρωπος καὶ ψυχὴν ἔχει καὶ σῶμα, καὶ μένει ταῦτα ἐν ἐνότητι ὄντα. πολλῶ μᾶλλον ὁ Χριστὸς θεότητα ἔχων μετὰ σώματος ἔχει ἐκάτερα διαμέροντα καὶ συγγεόμενα."

If we turn to a classical *passee* concerning the Muslim rational theology, we find the following description.

A well known classical summary of the teachings of the Mutakalims is the Chapter 73 of Maimonides' *Dalāla*. In this chapter the essentials of the Muslim rational theology are summed up in twelve propositions. The first three of them are concerned with the discontinuous structure of the material world, or to put it in other words: they are concerned with the atomic structure of bodies and time.

In the first proposition we learn of the nature of atoms that they are devoid of magnitude and they are completely similar to each other. The bodies consist of the conglomeration of these homogeneous atoms.

This teaching of the theologians imply their view of the atomic structure of time as well. As the bodies arise from the unification of small indivisible parts (الجزء الذي لا يتجزأ), so the time is the sum total of short, indivisible instances³.

These two propositions must also entail the atomic structure of movement. In harmony with this necessary consequence the Mutakalims denied the difference in velocity. Their occasionalism prepared the ground for the assertion that God recreated all the bodies in all instances of the discontinuous time in different parts of the discontinuous place. In this case "the motion of the slower object was interrupted by fewer moments of rest"⁴.

The atomist theories rejected the existence of the universals. In the tradition of Islam the philosophers seem to be the heirs to the selected few of the Greek scientists and the theologians inherited the more popular wisdom of the Greek multitude which has been attached to atomism and similar theories admitting only the existence of individuals.

³ Maimonides, *Dalāla* Ch. 73: "وكذلك الزمان ينتهي إلى آتات لا تقبل القسمة"

⁴ Maimonides, *Dalāla* Ch. 73: "الحركة التي نسميها بطيئة تظلتها سكنات أكثر"

The two versions of the atomism

The Greek and Arabic versions of the atomism are similar in a certain respect and different in another respect as well as the Democritean and the Epicurean theories of atomism were similar and different in the Greek philosophical tradition.

In the first instance the Democritean and *kalām* atomism seem to be identical. There are two constituent parts in the world: the atoms and the void. The material world consists of atoms which, falling down in the endless void, collide and connect themselves.

These are the basic views of the Epicurean theory as well. In spite of all similarities there are essential differences between the Democritean and the Epicurean atomic theory.

1. First, in Democritean philosophy all events are necessary. According to this necessitarian physics everything that happens is determined by natural causes or a chain of natural causes.

Countless atoms of various shapes, sizes and weights (Barnes 1986: 365) are in motion in the empty space. They *necessarily* collide and become entangled and their complex induces a vortex-like motion which *necessarily* brings about a world. "No thing comes about in vain, but everything for a reason and by necessity"⁵.

Epicurus, on the other hand, needed free will and freedom of action in his ethics. He introduced a new physical concept which was known as 'swerve of the atoms'. The significance of the swerve of the atoms was summarized by Cicero as well. He writes in his *De fato* as follows:

"But Epicurus thinks that the necessity of fate is avoided by the swerve of atoms. Thus a third type of motion arises in addition to weight and impact, when the atom swerves by a minimal interval, or *elachiston* as he terms it. That this swerve occurs without a cause he is forced to admit in practice, even if not in many words. For it is not through the impact of another atom

⁵ Guthrie 1980: II, 400; Barnes 1986:412-413; Daiber 1980: 67 B 2; Cicero, *Academica* 2, 55. Diogenes Laertius, *Vitae* 9.45: "Πάντα τε κατ' ἀνάγκην γίνεσθαι ...".

that an atom swerves. How, after all, can one be struck by another if atomic bodies travel perpendicularly in straight lines through their own weight, as Epicurus holds? ... Epicurus' reason for introducing this theory was his fear that, if the atom's motion was always the result of natural and necessary weight, he would have no freedom, since the mind would be moved in whatever way it was compelled by the motion of atoms, preferred to accept this consequence that everything happens through necessity than to rob the atomic bodies of their natural motions"⁶.

The existence of the Epicurean world and of every individual being in it was supposed to be due to the chance event of the swerve, so Epicurus succeeded in abandoning the causal determination of everything that happens. The Democritean and Epicurean atomic theory can be distinguished by the substantial difference of necessitarianism which is due to the natural causes, on the one hand, and denial of causality, on the other.

The denial of causality in Epicurus' atomism made the physical causes superfluous and threw the door open to a divine interference when explanation was needed.

Wolfson has pointed out that the theory of 'swerve' was known in the Arabic literature (Wolfson 1976:490-491). This characteristic view of the Epicurean atomism was accessible in Pseudo-Plutarchus' Arabic version, where one can read that atoms sometimes move with an 'inclination and bending' (على ميل وانعطاف) (Daiber 1980:126). Saadia Gaon makes a hint on the side-movement of the atoms describing the doctrines of the school which derives the physical world from chance in his great work known as *Imānāt wa-ī'tiqādāt* (I. 3, 9th *madhab*). The doctrine which is referred to with the expression (الاتفاقي المذهب) can only be the Atomism in its Epicurean version.

⁶ Cicero, *De fato* 22-23; *id.*, *De finibus* I, 6, 19: "nam et ipsa declinatio ad libidinem fingitur (ait enim declinare atomum sine causa; ...)". The same idea in Lucretius, *De rerum natura* II, 253-254: "declinando ... fati foedera rumpat ...".

Wolfson admits that there is no direct mentioning of the swerve in the Muslim theological literature, because in the Islamic occasionalism God created the world in every moment in a new combination. In this occasionalistic approach the theory of swerve was indispensable, when they, making place for God, wanted to break the necessity of the natural causes, but it was useless, when God has been introduced, who was an excellent substitute for any chance collision. The Mutakallims were in a bad need of the Epicurean atomism, which denied causality (Wolfson 1976:468), but once having accepted this version of the atomism they did not need its ultimate foundation in the chance inclination of atoms, because God became their explanatory principle.

“God was regarded by the *mutakallimūn* as being the direct cause of everything that happens in the world, which meant a denial of causality. It is this denial of causality on purely religious grounds that made them predisposed to the acceptance of atomism, which in their minds was historically associated with the denial of causality, even though at the same time, on similar purely religious grounds, ... they rejected chance, despite its being historically associated with the atomism accepted by them. Evidently it was simpler for them to substitute their omnipotent God for chance than to harmonize Him with causality” (Wolfson 1976:468-469).

Thus in the Ash‘arite theology it became a canonised doctrine that God was the only and ultimate cause of everything in the physical world and the other causes, the so called ‘natural causes’, which were in the center of the philosopher’s interest in Physics, Metaphysics and Logic (as the middle term of a syllogism), did not play in the *kalām* theory any significant role.

2. The other significant difference between Democritean and Epicurean physics concerns the structure of space and time. Democritean atomism holds the view that “full and empty are elements, calling the one ‘being’ and the other ‘not being’” (Barnes 1986:312; Aristoteles, *Metaphysika* 985 b 5). Beyond ‘full’ and ‘empty’, i.e. the atoms and the

void, there is nothing. Atoms and bodies made up by atoms move along the endless empty space.

After the Aristotelian discussion of movement which resulted in a concept of the world as a continuous structure (in his theory the continuity of space implied the continuity both of time and movement, because – as Aristotle has pointed out – they are correlative notions) Epicurus developed his own theory of minima. After Aristotle Epicurus who put forward the theory of the atomic structure of the material world was necessarily compelled to propound the view that in harmony with the atomic structure of the material world space and time were consisting of minimal indivisible units as well. To put it in other words: space and time, as well as material, were composed of minimal, indivisible parts⁷. This is also a substantial difference between the Democritean and Epicurean version of atomism.

If we consider this difference to be a prime factor in our examination, we have to say that the *kalām* atomism takes up the Epicurean philosophy of nature. Maimonides begins his exposition by saying that “time consists of instances” which “do not admit division, because the shortness of their duration”⁸. In the following sentences Maimonides makes an explicit reference to the complementary nature of distance, time and movement in Aristotle’s physical doctrine⁹. If one of them is

⁷ Asmis 1984: 283 n. 25; Simplicius, *In Ar. Phys.* 618.16-20; Sextus Empiricus, *Adversus Physicos* II, 142: “Πρὸς μὲν οὖν τοὺς εἰς ἄπειρον τέμνεσθαι λέγοντας τὰ τε σώματα καὶ τοὺς τόπους καὶ τοὺς χρόνους (οὗτοι δὲ εἰσιν οἱ ἀπὸ τῆς στοᾶς) ταῦθ’ ἤρμοξε λέγειν· οἱ δὲ πάντα εἰς ἀμερῆ καταλήγειν ὑπειληφότες, ὡς οἱ περὶ τὸν Ἐπίκουρον, νεανικωτέροις μᾶλλον ἐνέχονται ἀπορίαις ... κτλ. Diogenes Laertios, *Vitae* 10.72: “ταῖς ἡμέραις καὶ ταῖς νυξὶ συμπλέκομεν καὶ τοῖς τούτων μέρεσιν ...”.

⁸ Maimonides, *Dalāla* Ch. 73, 3:

“الزمان مؤلف من آتات يعنون أنها أزمنة كثيرة لا تقبل القسمة لقصر مدتها.”

⁹ Maimonides, *Dalāla* Ch. 73:

“أنهم رأوا بلا شك براهين أرسطو التي برهن بها أن المسافة والزمان والحركة المكانية ثلاثها متكافية في الوجود”

divisible or indivisible, the remaining two must have the same accident¹⁰. After the elaboration of the Aristotelian concept of movement the Democritean doctrine of the continuous movement in the continuous time in a discrete material world was hardly tenable. Maimonides' words clearly indicate that the *kalām* theory is to be connected with the post-Aristotelian philosophical tradition.

If Epicurus made the necessary modification in the concept of time, he had to modify the concept of movement as well. From his concept of time follows that movement cannot be continuous either. The above quotation from Sextus Empiricus (*Adversus Physicos* II, 142) shows convincingly enough that Epicurus reduced motion to minimal, indivisible parts. Cicero speaks of the swerve of atoms saying that the atoms during their endless movement decline with a 'minimal interval'¹¹ which cannot be reduced to a smaller one¹².

The theory of swerve presupposes minimal units in motion and space. This theory is an indirect proof for the existence of the minimal quantities of time and space. Simplicius is our direct proof. He says in his commentary on Aristotle's *Physics*: "For they [i. e. the Epicureans] say that motion, magnitude and time have partless constituents, and that over the whole magnitude composed of partless constituents the object moves, but at each of the partless magnitudes contained in it it does not move but has moved"¹³. Epicurus' atoms fall down with a continuous

¹⁰ Maimonides, *Dalāla* Ch. 73: "بانقسام أحدها ينقسم الآخر وعلى نسبه".

¹¹ Cicero, *De fato* 22: "... cum declinat atomus intervallo minimo ..."; Lucretius, *De rerum natura* II, 243-244: "Quare etiam atque etiam paulum inclinare necessest / corpora, nec plus, quam minimum, ...".

¹² Cicero, *De finibus* I, 6, 19: "declinare dixit atomum perpaulum, quo nihil posset fieri minus".

¹³ Simplicius, *In Ar. Phys* 934.18-30: "ἐξ ἀμερῶν γὰρ καὶ τὴν κίνησιν καὶ τὸ μέγεθος καὶ τὸν χρόνον εἶναι λέγοντες ... κτλ". On the theory of motion: Asmis 1984:276-290.

movement. Simplicius' atoms do not continuously move, because they are, after having moved in every indivisible part of space in rest¹⁴.

3. The theory of motion in the Muslim *kalām* is not entirely identical with what is to be found in Epicurus' letter to Herodotus, but it bears the unmistakable marks of the Epicurean tradition as related by Simplicius and Sextus Empiricus. This sweeping statement is supported by the following considerations.

Maimonides says that movement is transition from one unit to another unit (Maimonides, *Dalāla* Ch. 73: تلك الحركة هي انتقال جوهر فرد من (الأجزاء من جوهر فرد إلى جوهر فرد يليه فيلزم أن لا تكون حركة أسرع من (حركة). The theory of equal speed is a typical Epicurean invention against Democritus, whose atoms move downward with different speed. (Their collision is due to the difference in speed.)

The problem of the atomism is that a distance consists of equal units. A moving body must touch all the points. If all moving bodies must touch all the points in the same distance, they must traverse the same quantity of the points in the same quantity of the time-atoms.

The 'continuous movement' of the atoms is contradictory to the atomic nature of space, time and movement which has been utterly formulated by Sextus Empiricus and Simplicius, as the above quotations show. The origin of this slight difference can be found in the philosophy of the Megarian Diodorus Chronus (Long & Sedley 1989-90: II, 48). Diodorus said – as it has been reported by Sextus Empiricus – that “a single thing *is* in motion, but *has been* in motion. And the fact that nothing is in motion follows from his assumption of indivisibles. For the invisible body must be contained in an indivisible place and therefore must not move either in it ... or in the place in which it is not” (Sextus Empiricus, *Adversus Physicos* 10.85-86). We must not forget that

¹⁴ Simplicius, *ibid.*: “λέγουσιν τὸ κινούμενον, καθ’ ἕκαστον δὲ τῶν ἐν αὐτῷ ἡμερῶν οὐ κινεῖσθαι ἀλλὰ κεινῆσθαι”.

in a quotation above Simplicius spoke exactly in the same way (Simplicius, 934.18-30).

All this means that the original Epicurean theory later underwent a change. In the later Hellenistic times some further consequences of the original Epicurean teaching were drawn by later philosophers. The Epicurean philosophy has been rendered by Sextus Empiricus and Simplicius in this new, modified formulation. One of the most important changes is the 'staccato account of motion' (Long & Sedley 1989-90: II, 48).

The Arabic terms (سكنات، تخللات) indicate that the moving body is in rest in every indivisible interval of space. It does not move, but it has moved – as Sextus Empiricus and Simplicius put it using the expression of Diodorus. This 'staccato account of movement' is also to be discovered in Maimonides' example.

The Muslim rational theology says that our senses deceive us, when we see the continuous movement of a millstone. While performing a complete revolution an atom near to center makes a shorter way in the same time-interval, than an atom near to the circumference. It is possible, because the atoms of the millstone disintegrate in every time-atom, and the atoms of the millstone near to the center make more rest in the space-atoms, than those near to the circumference¹⁵.

This account of the movement is not compatible with that of the early Epicurean theory which speaks of a continuous movement, and it is even less compatible with the Democritean theory, but it is in harmony with the Epicurean theory after the Diodorean modification. The Democritean and Epicurean view of the continuous movement does not enable the theologians to disintegrate the whole world in every moment and to recreate the whole world in every moment. The Islamic occasionalism depends on the Epicurean destruction of physical causes which was equal to the destruction of the intermediary causes between God

¹⁵ Maimonides, *Dalāla* Ch. 73:

”تتفكك أجزاؤها عند الدوران، وتكون السكنات التي تتخلل كل جزء يدور قريب من المركز أكثر من السكنات التي تخللت الجزء الذي هو أبعد من المركز.“

and the world. The consequences of the destruction of the (physical) causality which resulted in the increased role of God as a non-physical cause are shown by Judah Halevi who writes as follows: "If the events are deliberately brought about by the First Cause with his first intention, then [all events] are being created in their time in every moment and we can say of the whole world in every moment that it has been created by the Creator just now"¹⁶. The creation of the world in every instant is equal to the movement of the millstone the parts of which disintegrate in every instant and God recreates them in every instant in a new arrangement. The Islamic theory of movement says that is similar to the movement in a motion picture, the continuous movements of which consist of many unmoved pictures. And this is exactly what the late Greek philosophers say when they expound the Epicurean atomism.

This slight, but significant difference can be accomplished by another difference which can be shown between the original Epicurean atomism and the late antique version of it. Epicurus writes in his *Letter to Herodotus* the following words: "We must recognize that this analogy also holds of the minimum in the atom; it is only in minuteness that it differs from that which is observed by sense, but it follows the same analogy. On the analogy of things within our experience we have declared that the atoms has magnitude; and this, small as it is, we have merely reproduced on a larger scale. And further, the least and simplest things must be regarded as extremities of length, ..." ¹⁷ To put it in other words: the atoms consist of smallest (*ἐλάχιστον*) parts which cannot be perceived. Epicurus said that atoms had magnitude¹⁸. The *minima* are 'extremities of lengths', parts of atoms which have no perceivable extension.

¹⁶ Halevi, *Kuzari* 220:

"ولو كانت الحوادث مقصودة قصدا أوليا عن العلة الأولى لكانت مخلوقة لحينها مع اللحظات ولجاز أن نقول في العالم بأسره في كل حين أنه الآن خلقه الخالق".

¹⁷ Diogenes Laertius, *Vitae* 10.59: "Ταύτη τῇ ἀναλογίᾳ νομιστέον καὶ τὸ ἐν τῇ ἀτόμῳ ἐλάχιστον κεκρήσθαι".

¹⁸ *Ibid.*: "ἐπεὶ περ καὶ ὅτι μέγεθος ἔχει ἡ ἄτομος".

The quotations show that both Sextus Empiricus and Simplicius reduce everything to atomic elements, but they do not distinguish between 'minima' and atoms. The lack of this distinction results in the fact that some Muslim scholars said that atoms have a magnitude, some others said that atoms do not have any magnitude¹⁹.

Referring to the question of magnitude Maimonides says in his First Proposition that the acceptance of atoms destroys all geometrical proofs²⁰. This objection is not new, because it was known in the ancient Greece and Rome as well²¹. The new moment in Maimonides' work is that he shows that atomism destroys the science of geometry even if the atoms do not have magnitude, because of the difficulties concerning lines and surfaces.

Ibn Rušd writes in his commentary on *De anima* as follows: "What Aristotle means thereby, as it seems to me, is this: *And similarly he who assumes that it is possible for a point to be self-moving will admit that as a consequence of his assumption the point would be a body. Accordingly we may well say that the self-moving round atoms of Democritus are so very small that they are called points, for the point, according to its use in this assumption, is nothing but a body*"²².

The sceptic Sextus Empiricus, while trying to show how unfounded the theory of 'body' is, refers to the same procedure. He objects to the geometers that "they assert that line is produced by the flow of the point, the surface by that of the line, and the solid body by that of the surface", while they say that "point is a sign without parts or dimension" (*Adversus Physicos* III, 19-20, 77-89).

¹⁹ Frank 1984:39-53, esp. 43; and Maimonides, *Dalāla* Ch. 73. First Proposition:

"كم بوجه ولا للجزء الواحد منها"

²⁰ Maimonides, *ibid.*: "أن بحسب المقدمة الأولى تبطل جميع براهين الهندسة كلها وبالجملة"

²¹ Cicero, *De finibus* I, 20: "ne illud quidem physici, credere aliquid esse minimum; quod profecto numquam putavisset si a Poluaeno familiari suo geometrica discere maluisset quam illum atiam ipsum dedecere".

²² Ibn Rušd, *Comm.* 69. The passage is quoted by Wolfson 1976:482.

The self-moving point which produces lines and the self-moving lines which produce bodies are constituent parts of 'pythagorizing' geometry. aš-Šahristānī speaks of points as limits of lines, of lines as limits of surfaces, and of surfaces as limits of bodies (aš-Šahristānī, *Nihāya* 508). The treatment of the question in aš-Šahristānī's *Nihāyat al-iqdām* is nearly identical with that in Sextus' passage quoted above.

The question of the 'mathematicized Pythagoreanism' which was 'resolved into a physical Atomism' (Peters 1967:115) represents a problem which has been treated by C. Baffioni in a considerable length (Baffioni 1982:143-210). Here I do not want to elaborate a question of the Greek philosophy, so I confine myself to the brief statement that the doctrine of the unextended mathematical atoms which constitute bodies as the numbers of Pythagoras do not represent an Epicurean view. The coalescence of the original Epicurean atomism with the Pythagorean tradition is a later development in the history of the Greek philosophy.

The physical doctrine and its methodological basis

This physical doctrine was highly compatible with the methodology of demonstration both in the late antique sources and in the Islamic rational theology.

It was al-Fārābī among the philosophers who gave an account of this kind of reasoning²³. In his short commentary on Prior Analytics al-Fārābī devoted a chapter to inferences based on similarity. He summarized the essentials of analogical reasoning as follows:

"It is now necessary that we discuss the 'transfer' from a judgment by sensation in some matter, or knowledge about it gained by other method, to another matter outside the realm of sensation, without subordinating that other matter to the first one. This is what the people of our time call 'inference from evidence to the absent' (الغائب استدلال من الشاهد إلى). The

²³ His work has been edited by Türker, Dānešpežūh, and al-ʿAḡam. English translation: Rescher 1963. This translation will be quoted below.

manner of this 'transfer' is: that it is known by sensation that a certain 'matter' is in a certain condition, and that a certain 'thing' is present in a certain matter, and so the intellect consequently transfers this condition or thing from this [known] matter to some other [unknown] matter *similar* to it and thus judges with respect to it upon this [known] basis"²⁴.

The above-quoted sentence "without subordinating that other matter to the first one" aims at making a distinction between the inferences derived from similarity and those of Aristotle, the proving force of which consists in the subordination of special cases to more general rules.

Other characteristic feature of this inference is that our intellect sets out of a *sense-perception* and entitled by the *similarity* between the object(s) of sensation and another thing which is examined and cannot be approached with sense-perception it transfers the observed circumstance to the unobserved thing.

After having described the 'inference by transfer' al-Fārābī gives the following example: "One knows by sensation that some corporeal substances, like the animals and similar things are created, and consequently the intellect transfers the createdness from the animals or plants, and thus judges about the sky and stars that they are [also] created. But it is only possible that one can 'transfer' [createdness] from the animals to the sky, and thus to impute to it the createdness which was found by sensation in the animals, if the animals exhibit a similarity" (Rescher 1963:93-94).

Is the Arabic theory of *al-qiyās* based on any kind of similarity, as it can be observed in the examples just quoted, or are there strict rules

²⁴ Rescher 1963:93. al-Fārābī, *Mantiq*, ed. Türker 267; ed. Dānešpežūh 175; ed. Rafiq al-ʿAḡam 45:

"يلزم القول في النقلة بالحكم المحسوس في أمر ما أو المعلوم فيه بوجه آخر إلى أمر ما غير محسوس الحكم، من غير أن يكون ذلك الأمر الآخر تحت الأمر الأول، وهو الذي يسميه أهل زماننا الاستدلال بالشاهد إلى الغائب. وجهة هذه النقلة هو أن نعلم بالحس أن أمرا ما بحال ما وأن شيئا موجود لأمر ما فينقل الذهن تلك الحال أو الشيء من ذلك الأمر إلى أمر آخر شبيه به فيحكم به عليه."

how to use similarity for inferences? This question must be clarified in the following.

al-Fārābī while examining this problem writes as follows:

"...and not just any agreeing similarity at all, but a similarity in some matter that is *relevant* to the characterization of the animals created. That is, there must be a similarity between the animals and the sky in a matter which lends truth to the judgment that createdness pertains to this entire matter, such as 'being contingent', for example. For if it is known by sensation that the animals are created and that they are similar to the sky in respect of being 'contingent', and [if] the judgement regarding createdness is true about everything that is 'contingent', then the 'transfer' of createdness from the animals to the sky will be a true one. But if the judgment that it is created is not [assumed as] true of everything 'contingent', and the sky is 'contingent', then it is not possible [to make] the 'transfer' [of createdness] from the animals to the sky, before [it has been shown that] it is possible that createdness actually exists in everything 'contingent'. [The 'transfer'] is *bound to the condition* which draws [the conclusion about] the sky from a similarity with the animals in a matter relating to the createdness of the animals; because createdness is only found as something actually present in animals due to a connection with 'being contingent', through some special form of connection. This form of connection is not to be found in [the case of] the sky. Therefore, when the situation is of this kind, then it is not possible at all for the 'transfer' to be maintained"²⁵.

²⁵ al-Fārābī, *Manṭiq*, ed. Rafīq al-ʿAḡam, 45-46:

فينقل مثلا الذهن من الحدوث من الحيوان أو النبات فيحكم عليها بالحدوث الذي أحس في الحيوان متى كان بين الحيوان وبين السماء تشابه ما، وليس أي تشابه اتفق لكن التشابه بالشيء الذي من جهته وصف الحيوان بالحدوث. ونلك أن يتشابه الحيوان والسماء بأمر يصح الحكم بالحدوث على جميع ذلك الأمر، مثل المقارنة للحوادث مثلا. فإن الحيوان متى علم بالحس أنه محدث وكان مشابها للسماء في مقارنة الحوادث له، وكان الحكم بالحدوث يصح على مقارن للحوادث أنه محدث وكانت السماء تقارن الحوادث، لم تمكن النقلة من الحيوان إلى السماء، من قبل أنه يمكن الحدوث موجودا للمقارن الحوادث للحيوان، لأن الحدوث إنما يكون موجودا للحيوان

In this method of 'the transference of judgment' means an inference from an individual to another individual. The philosophers proceeded from one universal to another universal, following the hierarchic order of a Tabula Porphyriana. The *mutakallimūn* were not able to prove anything of a universal concept (the existence of which they did not accept), the philosophers' proofs were directed towards the universal concepts, the individuals fell outside of the realm of their sciences.

This fact explains Ibn Taymiyya's criticism of the logicians. He denied the validity of the Aristotelian definitions and syllogisms, because they referred to universals. He rejected the Philosophers' knowledge of God, because God is an individual and a categorical syllogism has no bearing on individuals (Ibn Taymiyya, *Radd* 125-126, 128, 134-135, 138). The concrete knowledge of God as an individual being on one hand and the abstract knowledge of genera and species, on the other, are two completely different realms of the human knowledge which do not have any connection.

In this world there are only individual beings with a lot of peculiar features (*op. cit.* 134-135), whereas categorical syllogism can only prove a small number of necessary common features of classes of beings (*op. cit.* 150). Consequently, Ibn Taymiyya had to accept the other method which was popular in the antiquity and which was accepted by different schools of philosophy, medicine, etc. He made inferences from signs which are called *āyāt* (*ibid.*).

The Greek philosophical schools which rejected the idea of the 'second voyage' (Stoics, Epicureans, Sceptics) and the medical schools which followed them (Methodikoi, Empeirikoi) largely applied the analogical reasoning. These late antique philosophical and medical schools were the ultimate sources for the Muslim rational theologians.

Consequences

This philosophical difference enabled the Muslim scholars to incorporate some arts – which could not be defined by the philosophers as such – into the body of sciences. Cicero speaks in his famous work *De divinatione* of two kinds of divination: that which is to be considered as an art and that which is not to be regarded as art²⁶. The basic method of the scientific divination is the analogical reasoning. Observation of usual connections between two events serve as a starting point for conjectures concerning the future²⁷. Observation was the point of departure for the empirical medicine as well. In this light it is completely understandable that Cicero refers to medicine in defence of divination²⁸.

The method of *al-qiyaṣ* and the analogical reasoning are the basis of Ibn Sirīn's *Interpretation of dreams*. The terminology of the book (*aṣl, dalla 'alā, taṣābuh*, etc.) (an-Nābluṣī, *Tagṭiya* 10), the wide use of the terminology of the analogical reasoning is characteristic for the Persian Daniel-name as well.

The concrete examples given by the book quoted show that interpretation of dreams relies on similarity.

This fact explains the philosopher's opinion who – speaking of the religious Muslims – use the expression *al-ḡumbūr* (and this is the parallel expression to the οἱ πολλοί of the Alexandrian Neoplatonists) and who say that syllogistic demonstration is apt for teaching the selected few, but the religious teaching of masses can rely on similes and analogical reasoning.

²⁶ Cicero, *De divinatione* 34: "duo genera divinationum esse dixerunt, unum, quod particeps esset artis, alterum, quod arte careret".

²⁷ *Ibid.*: "Est enim ars in iis, qui novas res coniectura persequuntur, veteres observatione didicerunt".

²⁸ Cicero, *De divinatione* 24: "At non nunquam ea, quae praedicta sunt, minus eveniunt. Quae tandem id ars non habet? earum dico artium, quae coniectura continentur et sunt opinabiles. An medicina ars non putanda est? quam tamen multa fallunt".

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