From *Rhuthmós* to Rhythm (7th-4th centuries BC)

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Sommaire

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I would like to start our journey by presenting the main conclusions concerning the origin of the term rhythm reached more than 60 years ago by Benveniste in an article that has not attracted enough attention in English speaking countries, but that still sheds a precious light on this matter (Benveniste, 1st ed. 1951, 1966; for a recent interesting if not fully convincing discussion, see Martin, 2006). Before Plato gave to the word *rhuthmós* the meaning it has had ever since, its meaning was quite different.

Rhuthmós vs Skhêma – Temporary Disposition *vs* Fixed Shape

Benveniste's analysis shows that the word ῥυθμός *(rhuthmós)* was commonly used from the 7th to the 4th century in Greek lyric and tragic poetry, as well as in prose, and that it became a technical term only with the ancient Ionian philosophers, especially the creators of atomism, Leucippus (5th cent. BC) and Democritus (c. 460-c. 370 BC).

> We find the word ῥυθμός especially in the Ionian authors and the lyric and tragic poetry and in the Attica prose, especially among philosophers. We best understand the specific meaning *[valeur]* of ῥυθμός in the vocabulary of ancient Ionian philosophers, especially in the creators of atomism, Leucippus and Democritus. These philosophers have made ῥυθμός, (ῥυσμός), a technical term, one of the keywords of their doctrine. (Benveniste, 1966, p. 328, my trans.)

From all identified uses of the word *rhuthmós* among lyric poets, tragedians and philosophers, Benveniste concludes that it meant, at least since the 7th century (p. 330), "form" or "shape," σχῆμα *(skhêma)*. Related verbs as ῥυσμῶ, μεταρρυσμῶ, μεταρρυσμιζῶ *(rhusmô, metarrusmô, metarrusmizô)* meant identically "to shape" or "to transform, physically or morally sth./sb."

> There is no variation, no ambiguity in the meaning that Democritus gives to ῥυθμός which is

> always “form,” seen either as the distinctive shape or the characteristic arrangement of the parts in a whole. Once this point established, one has no difficulty to confirm it with all ancient examples. (Benveniste, 1966, p. 328, my trans.)

But Benveniste notes that there were in ancient Greek several other terms meaning “form” and that *rhuthmós* should in some way differ from them. To show that, he switches from his survey of lexical uses to morphology and etymology, a move that allows him to introduce a revolutionary idea: the term-ending –(θ)μός “does not designate the fulfillment of the notion but the particular modality of its fulfillment.”

> Once this meaning established, we can and must be more specific. In Greek, there are other expressions meaning “form.” Σχῆμα, μορφή, εἶδος, etc. from which ῥυθμός must in some way differ, more clearly anyway than what our [first] translation indicates. The structure of the word ῥυθμός must be interrogated. We can now usefully return to the etymology […] The term-ending –(θ)μός merits attention for the special sense that it gives to “abstract” words. It does not designate the fulfillment of the notion but the particular modality of its fulfillment, as it presents itself to the eyes. For example, ὄρχησις is the fact of dancing, ὀρχηθμός is the one particular dance observed in its full development. […] στάσις is the fact of standing/setting *[de se tenir]*, σταθμός the way of standing/setting. (Benveniste, 1966, p. 332, my trans.)

In other words—Benveniste does not elaborate this point but he makes it quite obvious—*rhuthmós* is a concept of form that is completely opposite to Plato’s. A *rhuthmós* is not a “Form,” an “Idea,” an εἶδος *(eîdos)*, but a shape “as it presents itself to the eyes” of the observer. Far from being outer-worldly, it belongs to the phenomenal world. Moreover, it is not fixed, immobile, and eternal, it has a life of its own. It does not “designate the fulfillment of [a] notion but the particular modality of its fulfillment.” That is the reason why it is “appropriate for the *pattern* of a fluid element” and commonly denotes an “improvised, temporary, changeable form.”

> When the Greek authors explain ῥυθμός by σχῆμα, when we ourselves translate it by “form,” it is in both cases an approximation. Between σχῆμα and ῥυθμός, there is a difference: σχῆμα […] is defined as a fixed, achieved “form,” set somewhat like an object. Instead ῥυθμός, according to its various contexts, refers to the shape in the moment it is assumed by something moving, mobile, fluid, the shape of something that has no organic consistency: it is appropriate for the *pattern* [in English] of a fluid element, an arbitrarily shaped letter, a peplos that one arranges at his discretion, a special disposition of the character or mood. It is the improvised, temporary, changeable form. (Benveniste, 1966, p. 333, my trans.)

Benveniste, still without referring directly to Platonic Forms, emphasizes the philosophical significance of the term *rhuthmós*. It actually designated the most common concept of form in the Ionian school, i.e. before Plato imposed his own. In this sense, it still remains a very powerful tool against Idealism.

> But ῥεῖν is the essential predicate of nature and things in the Ionian philosophy since Heraclitus,

> and Democritus thought that, while being produced by atoms, only their different arrangements produce the differences between shapes and between objects. One can then understand that ῥυθμός, literally meaning "to flow in a particular way," was the most appropriate term to describe "dispositions" or "configurations" without fixity nor natural necessity and resulting from an arrangement always subject to change. The choice of a word derived from ῥεῖν to express this specific modality of the "form" of things is characteristic of the philosophy which inspires it; it is a representation of the universe in which the particular configurations of the moving *[du mouvant]* are defined as "flowings." *[fluements]* (Benveniste, 1966, p. 333, my trans.)

Before Plato, *rhuthmós* meant either "a temporary disposition of something flowing," or more deeply, according to Benveniste's morphological analysis, "a particular way of flowing" or "a particular modality of fulfillment of an action."

Rhuthmós as *Dînos*? – Temporary Disposition *vs* Whirl

Here I should say a few words about the critique Michel Serres surprisingly opposed to Benveniste's interpretation in his 1977 book, *The Birth of Physics*. "The linguist," he argues with a bit of philosophical haughtiness, has not recognized the true nature of the pre-Platonic *rhuthmos*, which is a "vortex in the flow," a form "adopted by atoms in conjunction in the first *dinos*."

> The linguist, like Heraclitus, Montaigne and the rest, had never sailed in fresh water. Nothing flows as they thought. Direct physical experience, simple practice, reveal the *rhuthmos* in the *rhein*, or the vortex in the flow, or the reversible in the irreversible. Rhythm is a form, yes, it is the form adopted by atoms in conjunction in the first *dinos*. In the beginning is the cataract, the waterfall: here is the reversibility to this irreversibility: thus *rhuthmos*. (Serres, 2000, p. 154, trans. Jack Hawkes)

This critique is actually supported by very little philological evidence, if any. Michel Serres is obviously projecting posterior concepts on Democritus' atomism. "The cataract," "the waterfall," the "*clinamen*," and the "vortex" are borrowed from Lucretius (c. 99 BC – c. 55 BC) and applied to older atomist doctrine. Theoretically speaking, this is naturally not a problem and Serres is legitimate in elaborating these concepts as he whishes. But philologically, he is clearly wrong. All those terms are posterior even to Epicurus (341 –270 BC) and probably date back to the end of the 3rd century BC.

> The declination or *clinamen* is a term not found in any of Epicurus' texts that have been preserved to us. Everything leads us to believe that this term was forged and introduced by the successors of Epicurus in their polemics against the Stoic Chrysippus (c. 280 – c. 206 BC) on destiny and liberty. (Dumont, 1991, p. 887, my trans.)

Moreover, in the texts presenting the atomist *dînos/dînê*, the term *rhuthmós* is utterly absent. Diogenes Laërtius (3rd cent. AD), for instance, recalls the role played by the cosmic whirl in Leucippus' and Democritus' physics, but he never uses the term *rhuthmós* to name it.

> The worlds are formed when atoms fall into the void and are entangled with one another *[καὶ ἀλλήλοις περιπλεκομένων – kaì allêlois periplekoménôn]*; and from their motion as they increase in bulk arises the substance of the stars. […] In a given section many atoms of all manner of shapes are carried from the unlimited into the vast empty space. These collect together and form a single vortex *[δίνην ἀπεργάζεσθαι μίαν – dínên apergázesthai mían]*, in which they jostle against each other and, circling round in every possible way, separate off, by like atoms joining like. And, the atoms being so numerous that they can no longer revolve in equilibrium, the light ones pass into the empty space outside, as if they were being winnowed ; the remainder keep together and, becoming entangled, go on their circuit together, and form a primary spherical system. (*Lives of Eminent Philosophers. Leucippus*, 9.6-31, trans. R.D. Hicks)

> His opinions [Democritus'] are these. The first principles of the universe are atoms and empty space ; everything else is merely thought to exist. The worlds are unlimited ; they come into being and perish. Nothing can come into being from that which is not nor pass away into that which is not. Further, the atoms are unlimited in size and number, and they are borne along in the whole universe in a vortex *[ἐν τῷ ὅλῳ δινουμένας – en tôi ólôi dinouménas]*, and thereby generate all composite things—fire, water, air, earth; for even these are conglomerations of given atoms. And it is because of their solidity that these atoms are impassive and unalterable. The sun and the moon have been composed of such smooth and spherical masses [*i.e.* atoms], and so also the soul, which is identical with reason. […] All things happen by virtue of necessity, the vortex *[τῆς δίνης – tês dínês]* being the cause of the creation of all things, and this he calls necessity. (*Lives of Eminent Philosophers. Democritus*, 9.7-44, trans. R.D. Hicks)

The same observation can be made concerning most of the texts presenting or alluding to the atomistic primordial *dînos*: Aristotle (384 – 322 BC), *Physics*, 2, 4, 196a; Epicurus, (341 – 270 BC), *Letter to Pythocles*, quoted by Diogenes Laërtius, *Lives*, 10, 88-90; Diodorus Siculus (1st cent. BC), *Bibliotheca historica*, I, 7; Aetius of Antioch (1st or 2nd cent. AD), *Opinions of the Philosophers*, 1, 4, 1-4; Sextus Empiricus (c. 160 – c. 210 AD), *Against the Mathematicians*, 9, 113; Hippolytus of Rome (170 – 235 AD), *Refutation of All Heresies*, 1, 12; Simplicius (c. 490 – c. 560). Among Latin writers, in *De Rerum Natura*, 5, 621 *sq.*, Lucretius (99 BC – c. 55 BC) naturally refers many times to *turbinatio* but never links it with rhythm or *numerus*.

A fundamental reason why Serres is here mislead is that the coming-to-be of the atomic clusters that constitute the existing cosmic bodies as the earth, the moon or the sun, are said both by Leucippus and Democritus to be resulting from enormous rotating movements, whirls or vortices, but most of the smaller bodies are just clumping of atoms occurring by chance after shocks, disorderly bouncing and movements spreading in all directions.

This is quite clear in Aristotle's accounts of Democritus' physics. The atoms "act and suffer action wherever they chance to be in contact." Subsequently, all things "are generated by their interlocking and bouncing in all directions."

> The "many" move in the void (for there is a void): and by coming together they produce "coming-to-be," while by separating they produce "passing-away." Moreover, they act and suffer action

> wherever they chance to be in contact (for there they are not “one”), and they generate by being put together and becoming intertwined. (*On Generation and Corruption*, I, 8, 325a, trans. H. H. Joachim)
>
> The primary masses, according to them [Leucippus and Democritus], are infinite in number and indivisible in mass: one cannot turn into many nor many into one; and all things are generated by [their interlocking and bouncing in all directions] *[συμπλοκῇ καὶ περιπλέξει – sumplokêi kaì peripléxei]*. (*On the Heavens*, 3.4, 303a, trans. J.L. Stocks, my mod.)

Dionysius of Alexandria (190 – 265 AD), who as a committed Christian criticizes the atomist doctrine but does not lack accuracy, also emphasizes the “fortuitous” movements of the atoms “in an unregulated whirl.”

> For there are those who, giving the name of atoms to certain imperishable and most minute bodies which are supposed to be infinite in number, and positing also the existence of a certain vacant space of an unlimited vastness, allege that these atoms, as they are borne along casually in the void, and clash all fortuitously against each other in an unregulated whirl, and become commingled one with another in a multitude of forms, enter into combination with each other, and thus gradually form this world and all objects in it; yea, more, that they construct infinite worlds. This was the opinion of Epicurus and Democritus. (Dionysius of Alexandria, *On Nature*, in Eusebius, *Praepar. Evangel*. 14, 23-27, trans. S.D.F. Salmond)

The stochastic nature of the atomic movements is one more time confirmed by Simplicius’ *Commentary on Aristotle’s On the Heavens*, which explains that the atoms “move in a vacuum and, after meeting each other, collide with one another, bounce in the direction in which chance launches them, while the others agglutinate.”

> Indeed, they said that the principles are unlimited in number, principles that they thought had the quality of atoms and also the indivisibility, and that they still believed to be passive because of their fullness and free of void. For they said that division occurs according to the void that is in the bodies; for in the unlimited void the atoms, separated from each other and differing in size, position, and order, move in a vacuum and, after meeting each other, collide with one another, bounce in the direction in which chance launches them, while the others agglutinate according to the congruence of figures, magnitudes, positions and orders, and remain together to complete in this way the generation of compounds. (Simplicius, *Commentary on Aristotle’s On the Heavens* 242.15, my trans.)

I will come back below to Serres’ interpretation of *rhuthmos* as vortex which is not without some philosophical interest but should not nevertheless be based on false philological pretenses. As far as Democritus is concerned, all available evidence support Benveniste’s view and not Serres’.

In *Metaphysics*, Aristotle makes clear that *rhuthmós* means fixed shape in Leucippus as well as in Democritus. He even criticizes the atomists for not paying enough attention to motion. This is

evidently untrue and related with his polemic against their conception of motion devoid of prime mover. In any event, the Democritean *rhuthmós* does not appear as a vortex. Aristotle explicitly equates it with *skhêmá*, as that of a letter: “Thus, e.g. A differs from N in shape.”

> Leucippus, and his disciple Democritus [...] hold that the “differences” are the causes of everything else. These differences, they say, are three: shape, arrangement, and position *[σχῆμά τε καὶ τάξιν καὶ θέσιν – skhêmá te kaì táxin kaì thésin]*. For they say that what-is differs only in [rhythm, touching, and turning] *[τὸ ὂν ῥυσμῷ καὶ διαθιγῇ καὶ τροπῇ – tò òn rhusmô kaì diathigê kaì tropê]*. Of these [rhythm] means shape, [touching] is arrangement, and [turning] is position.) Thus, e.g. A differs from N in shape *[σχήματι – skhêmati]*, AN from NA in arrangement *[τάξει – táxei]*, and Z from N in position *[θέσει – thései]*. As for motion, whence and how it arises in things, they casually ignored this point, very much as the other thinkers did. (*Metaphysics*, 1.4, 985b, trans. Hugh Tredennick, my mod.)

In *On Generation and Corruption*, Aristotle repeats the same idea. For Leucippus and Democritus, the atoms “differ from another according to their “shapes” *(morphás)* and the compounds they form to “the elements which constitute them”—hence to their variable shapes —their “positions” and “groupings.”

> Democritus and Leucippus say that there are indivisible bodies, infinite both in number and in the varieties of their shapes *[μορφάς – morphás]*, of which everything else is composed—the compounds differing one from another according to [the elements which constitute them], their “positions” and “groupings” *[ἐξ ὧν εἰσὶ καὶ θέσει καὶ τάξει τούτων – ex ôn eisì kaì thései kaì táxei toútôn]*. (*On Generation and Corruption*, I, 1, 314a, trans. H. H. Joachim, my mod.)

Further down, while discussing Democritus’ conception of “coming-to-be,” “alteration,” and “passing-away,” Aristotle refers to the atoms by using directly the term “figures” *(skhêmata)*, as if their figure or shape was one of their most essential features.

> Democritus and Leucippus, however, postulate the “figures” *[τὰ σχήματα – tà skhêmata]*, and make “alteration” and coming-to-be result from them. They explain coming-to-be and passing-away by their “dissociation” and “association,” but “alteration” by their “grouping” and “position” *[τάξει δὲ καὶ θέσει – táxei dè kaì thései]*. And since they thought that the truth lay in the appearance, and the appearances are conflicting and infinitely many, they made the “figures” *[τὰ σχήματα – tà skhêmata]* infinite in number. Hence-owing to the changes of the compound—the same thing seems different and conflicting to different people: it is “transposed” by a small additional ingredient, and appears utterly other by the “transposition” of a single constituent. For Tragedy and Comedy are both composed of the same letters. (*On Generation and Corruption*, I, 1, 315b, trans. H. H. Joachim)

Whence a very simple fact: in *On Generation and Corruption*, *morphê* or *skhêmá* are clearly used instead of what was called *rhuthmós* in *Metaphysics*. Since the atoms are hard and unbreakable entities, their shape cannot change. Therefore *rhuthmós* means here, without a shadow of a doubt,

fixed form, shape or *figure*.

We find the same kind of use equating *rhuthmós* with *skhêmá* in his famous psychological essay *On the Soul*.

> This is what led Democritus to say that soul is a sort of fire or hot substance; his "forms" or atoms *[σχημάτων καὶ ἀτόμων – skhêmátôn kaì atómôn]* are infinite in number; those which are spherical he calls fire and soul, and compares them to the motes in the air which we see in shafts of light coming through windows; the mixture of seeds of all sorts he calls the elements of the whole of Nature (Leucippus gives a similar account); the spherical atoms are identified with soul because atoms of that [rhythm] *[τοὺς τοιούτους ῥυσμοὺς – tous toioútous rhusmoùs]* are most adapted to permeate everywhere, and to set all the others moving by being themselves in movement. (*On the Soul*, 1, 2, 404a 1, trans. J.A. Smith, my mod.)

So, all evidence confirm the first part of Benveniste's interpretation. There is however something in Serres' misplaced critique that may be saved because it hints at an important point in the older atomist doctrine—precisely that one that Benveniste was the first to reveal in the second part of his reasoning. There are indeed a few good reasons to believe that *rhuthmós* was also used to denote the *changing forms*, *shapes or figures* of the atomic compounds themselves. In these cases, the term was probably employed according to the common pre-Platonic meaning of "impermanent form" and—but this is only a guess—maybe sometimes philosophically "remotivated"—as Saussurean linguists would say—according to the etymological structure of the word as "way of flowing."

As a matter of fact, a list of Democritus' works preserved by Diogenes Laërtius (3rd cent. AD) shows that Democritus wrote a book entitled *Περὶ τῶν διαφερόντων ῥυσμῶν – Perì tôn diapheróntôn rhusmôn – Of the Different Rhythms (of Atoms)*, which is consistent with the use of *rhuthmós* as fixed shape, but that he also wrote another book entitled *Περὶ ἀμειψιρυσμιῶν – Perì ameipsirusmiôn – Of Changes of (Atomic) Rhythms*, which implies, since the atoms cannot change shape, that *rhuthmós* be used as changing form of the compounds they constitute. Hence the Greek grammarian Hesychius of Alexandria (5th or 6th cent. AD) notes in his Lexicon:

> *Ameipsirusmeîn* (Democritus): [concerning] the compound, to change [rhythm] or form. *[Ἀμειψιρυσμεῖν (Democritus): ἀλ(λ)άσσειν τὴν σύγκρισιν [ῥύθμισιν] ἢ μεταμορφοῦσθαι – allássein tês súgkrisin [rhúthmisin] ê metamorphoûsthai.]* (*Lexicon*, p. 110)

> In this particular case, says Jean-Paul Dumont, the term ῥυθμός can hardly designate, as Diels and Liddell and Scott claim, the *form* or *figure* (σχῆμά), notably because the atoms cannot change form, as it was supposed by the following title. In this last text, the figure is not that of the atoms, but that of the compound. (Dumont, 1991, p. 885)

Another more indirect evidence is given by Theophrastus (c. 371 – c. 287 BC), the successor of Aristotle as head master of the Peripatetic School. In *On Sense Perception*, he presents the doctrine

of Democritus concerning the subject. He begins by recalling that atoms are first characterized by their shape/figure *(skhêma)*. Stratton, the translator, notes that Theophrastus, as Aristotle in *On Generation and Corruption*, identifies both terms: "σχήματα all through this passage means just 'atoms.'" (Stratton, 1917, n. 151, p. 192)

> Heaviness and lightness, to begin with, Democritus distinguishes in terms of size. For if we were to divide each substance into its units, then even though these were to differ in shape *[καὶ κατὰ σχῆμα διάφέροι – kaì katà skhêma diáphéroi]*, he contends, their reality would have as its standard [of weight] their size. (*On Sense Perception*, 2, 61, trans. G.M. Stratton)

But a few lines below, Theophrastus uses again the term *skhêma* to refer, this time, to the atomic compounds and the effects they have on our senses. Stratton feels then necessary to explain in the same note that "in § 63, *τὸ σχῆμα* is used for the 'figure' in which the atoms are *combined*" and not for the atoms separately. *Skhêma* appears thus as *changeable form (tò skhêma metapîpton)*, viz. as *rhuthmós*, which is an interesting and rare example of contamination of a concept usually conceived as fixed and unalterable form, by the motion and change atomistic paradigm.

> Not even of heat or cold is there for him an objective reality; but configuration in "undergoing a change," *[τὸ σχῆμα μεταπίπτον – tò skhêma metapîpton]* effects a qualitative alteration in us also; since what is massed together in anything prevails in it, and what is widely diffused is imperceptible. (*On Sense Perception*, 2, 63, trans. G.M. Stratton)

Unless I am mistaken, we do not have any other philological evidence that *rhuthmós* was used to designate the changing shapes of the atomic compounds but such kind of use is quite likely for theoretical reasons too. Since all atomistic doctrines consider that the countless bodies populating the universe are undergoing constant changes concerning their matter as well as their form, the essentially changeable nature of their atomistic compounds must have triggered the elaboration of a new concept of form.

According to Simplicius of Cilicia (c. 490 – c. 560 AD), who wrote a quite precise *Commentary on Aristotle's On the Heavens* and probably quotes directly from Aristotle's lost monograph *On Democritus*, in Democritus' physics the atomic compounds take shape by the gathering of clusters of "resembling" atoms, "for by nature like is moved by like, and things of the same kind move toward one another."

> For positing the atoms as matter for the things that are, they generate the rest by means of their differences. These are three: rhythm, turning, and touching, that is shape, position, and arrangement. For by nature like is moved by like, and things of the same kind move toward one another, and each of the shapes produces a different condition when arranged in a different combination. (Simplicius, *Commentary on Aristotle's Physics*, 28.4-26)

A short text by Sextus Empiricus (c. 160 – c. 210 AD) sheds more light on this atomistic gathering

process which occurs like the one that results from “the whirling of the sieve” or the “motion of the waves.”

> For there is an old opinion, as I said before, circulating among the physicists from way back, about like things being capable of knowing like. […] Democritus bases his reasoning on both living and non-living things. For animals, he says, congregate with animals of the same kind, such as doves with doves and cranes with cranes, and this also applies to other non-rational animals. And the same applies to non-living things, as can be seen with seeds being sifted and pebbles at the beach. For in the one case, by way of the whirling of the sieve, lentils are arranged separately with lentils, barley with barley, and wheat with wheat, while in the other case, by way of the motion of the waves, oblong pebbles are pushed into the same place as oblong ones, and round ones into the same place as round ones, as if similarity in these cases had a sort of uniting force over things. (Sextus Empiricus, *Against the Mathematicians*, 7, 116-117)

These resembling atoms then “interlock” with each other through their “weaving together”—Diogenes Laërtius said, one remembers, that they “fall into the void and are entangled with one another.”

> Each thing is thought to become one because of the weaving together of atoms. Abderites, such as Democritus, called weaving together “interlocking.” (Simplicius, *Commentary on Aristotle’s On the Heavens*, 303a7, trans. Ian Mueller)

> He thinks that the substances are so small that they escape our senses, and that they possess all sorts of forms and all sorts of shapes and differences in magnitude. From them, as from elements, he was able to generate and compound visible and perceptible bodies. The atoms struggle and are carried about in the void because of their dissimilarities and the other differences mentioned, and as they are carried about they collide and are bounded together in a binding which makes them touch and be contiguous with one another but which does not genuinely produce any other single nature whatever from them; for it is utterly silly to think that two or more things could ever become one. (Simplicius, *Commentary on Aristotle’s On the Heavens* 295.1-22, trans. J. Barnes)

And they eventually hold together “up to the time when some stronger force reaches them from their environment and shakes them and scatters them apart.”

> He explains how the substances remain together in terms of the ways in which the bodies entangle with and grasp hold of one another; for some of them are uneven, some hooked, some concave, some convex, and others have innumerable other differences. So he thinks that they hold on to one another and remain together up to the time when some stronger force reaches them from their environment and shakes them and scatters them apart. (Simplicius, *Commentary on Aristotle’s On the Heavens* 295.1-22, trans. J. Barnes)

Thus I do plainly agree with Pierre Sauvanet’s conclusion.

> Leucippus and Democritus provide to rhythm its very first conceptual meaning as “rhythm” of atoms. But it is clear that we must not mean by this their fall, their deviation, in short, their movement, but their design, their structure, in a word, their *schema*, and even more precisely not the schema of the atoms themselves but that of their compounds. Rhythm is the form taken by atoms in ephemeral conjunction. The rhythm of atomists is the instantaneous schema of the underlying structure of the world, through the incessant combination of atoms of matter. (Sauvanet, 1999, p. 43-44, my trans.)

In the pre-Platonic atomistic world forms do exist, individualized entities do last for a certain period of time, but they are essentially changeable, transitory, fluent. Accordingly *rhuthmós* was probably a key concept of this worldview. The direct evidence favorable to this hypothesis are scarce but acceptable; but there are plenty of indirect evidence which make it quite plausible. Nevertheless, it was not a whirl or a vortex. Such concept, whose theoretical significance is not lessened by this conclusion, seems to be posterior by at least a century.

_ *Rhuthmós* as *Métron* – From Temporary Disposition and Way of Flowing to Ordered Sequence

The last pages of Benveniste’s article are dedicated to the question of how these particular concepts of form have been forgotten. And the answer is quite simple: it is Plato who is responsible for the semantic shift of the term *rhuthmós* towards its actual meaning as a collateral development of that of Form which somehow *replaced it*.

> The problem is to understand the conditions that made the word ῥυθμός able to express what we mean by “rhythm.” […] The modern meaning of “rhythm,” which does exist in Greek, results a priori from a secondary specialization, since the meaning of “form” is the only one attested until the middle of the 5th century. This development is in fact a creation to which we can assign a date if not, at least, one particular occasion. It was Plato who specified the concept of “rhythm” and gave to it its new meaning by delimiting the traditional semantic value of ῥυθμός. (Benveniste, 1966, p. 334, my trans.)

In the *Symposium* (c. 385–370 BC), Plato notes, without being very specific about the nature of those elements, that “rhythm is produced by fast and slow, which in the beginning were at variance but later came to agree,” just like harmony is “consonance” or “kind of agreement” between sounds that ceased to vary.

> Music also, as is plain to any the least curious observer, is in the same sort of case: perhaps Heracleitus intends as much by those perplexing words, “The One at variance with itself is drawn together, like harmony of bow or lyre.” Now it is perfectly absurd to speak of a harmony at variance, or as formed from things still varying. Perhaps he meant, however, that from the grave and acute which were varying before, but which afterwards came to agreement, the harmony was by musical art created. For surely there can be no harmony of acute and grave while still at variance: harmony is consonance, and consonance is a kind of agreement; and agreement of things varying, so long as they are at variance, is impossible. On the other hand, when a thing varies with no disability of agreement, then it may be harmonized; just as rhythm is produced by

> fast and slow, which in the beginning were at variance but later came to agree. In all these cases the agreement is brought about by music which, like medicine in the former instance, introduces a mutual love and unanimity. (*Symposium*, 187a-c, transl. Harold N. Fowler)

Then Benveniste points out that in the *Philebus* (360–347 BC), Socrates emphasizes the significance of intervals (διαστήματα – *diastêmata*) whose characters, differences and combinations one must know if he wants to seriously study music. These combinations have been called "harmonies" (ἁρμονίας – *harmonías*) by "our fathers." But there are other similar qualities, inherent this time in the *movements of the body*, which are "measured by numbers" and "must be called rhythms and measures."

> **Socrates —** But when you have learned what sounds are high and what low, and the number and nature of the intervals and their limits or proportions, and the systems compounded out of them, which our fathers discovered, and have handed down to us who are their descendants under the name of harmonies; and the corresponding effects in the movements of the body, which they say are measured by numbers and must be called rhythms and measures (ῥυθμοὺς χαὶ μέτρα – *rhuthmoùs kaí métra*); [...] when you have thus grasped the facts, you have become a musician. (*Philebus*, 17c-e, transl. Benjamin Jowett and Harold N. Fowler)

Finally in the *Laws* (360–347 BC), Plato explains that young men are fiery but that they can "attain a sense of order" *(τάξις – táxis)*, which is a human privilege. The "order of motion" is called "rhythm," while the "order of voice" is termed "harmony."

> **Athenian —** At the commencement of our discourse we said, if we recollect, that since all young creatures are by nature fiery, they are unable to keep still either body or voice, but are always crying and leaping in disorderly fashion; we said also that none of the other creatures attains a sense of order, bodily and vocal, and that this is possessed by man alone; and that the order of motion is called "rhythm" *(τῇ δὴ τῆς κινήσεως τάξει ῥυθμός ὄνομα εἶν – têi dê tês kinêseos táxei rhuthmós ónoma eìn)*, while the order of voice (in which acute and grave are blended together) is termed "harmony," and to the combination of these two the name "choristry" is given. We stated also that the gods, in pity for us, have granted to us as fellow-choristers and choir-leaders Apollo and the Muses,—besides whom we mentioned, if we recollect, a third, Dionysus. (*Laws*, 664a-665a, trans. R.G. Bury)

Thus the new meaning of rhythm emerged in the Platonic dialogues around the middle of the 4th century. The *rhuthmós* which was previously considered as an ephemeral disposition of something varying, an "improvised, temporary, changeable form," or a "way of flowing," became "an ordered sequence of movements" subject to "numbering" and "divided into alternate times." It was entirely subjugated by the *métron* , i.e. "that by which anything is measured," be it a rule, a measure of content, of size, a due measure or a limit (Liddell-Scott-Jones, *Greek-English Lexicon*). Moreover, these natural forms which were knowable through the senses, i.e. scientific observation, would now consist of more or less perfect reflections of transcendent Forms and were to be judged accordingly through the intellect. Democritean forms would be erased for the centuries to come by Platonic Forms.

> We see how this definition still respects the traditional meaning, but also how it transforms it. Plato still uses ῥυθμός in the sense of "distinctive shape, arrangement, proportion." He innovates by applying it to the form of the movement that the human body performs in dance, and to the figures executed by this movement. The decisive factor is there: in the notion of a corporal ῥυθμός associated with the μέτρον and subject to the law of numbers: the "form" is now determined by a "measure" and subject to an order. This is the new meaning of ῥυθμός: the "disposition" (literal sense) is made by Plato into an ordered sequence of slow and fast movements, just as "harmony" results from the alternation of acute and grave. And the order in movement, the whole process of the harmonious arrangement of body attitudes combined with a meter, is now called ῥυθμός. (Benveniste, 1966, p. 334-335, my trans.)

The Platonic innovation radically changes the meaning of the term *rhuthmós* and endows it with the universalizing power of numbers and mathematics. Since everything that has a certain duration can be regularly organized in a succession of alternate times, the rhythmic model—which is fundamentally a *metric* model in the mathematic sense—becomes applicable to any phenomenon developing in time.

> One can now talk about the "rhythm" of a dance, a walk, a song, a diction, a work, anything that requires a continuous activity divided by the meter into alternate times. The notion of rhythm is now fixed. From ῥυθμός as spatial configuration defined by the arrangement and proportion of distinctive elements, one reaches the "rhythm" as configuration of movements ordered in time *[la durée]* […], "any rhythm is measured by a defined movement." (Aristotle, *Probl.* 882*b* 2) (Benveniste, 1966, p. 335, my trans.)

With Plato begins "this vast unification of man and nature under a consideration of 'times,' intervals and identical returns" by which Benveniste started his article. A cosmic and mathematical rhythmic paradigm, one of the most solid support of Idealism, is now under way and will develop with neo-Platonic philosophers as Plotinus (206-270 AD) or Boethius (480-524 AD), theologians like Augustine (354 – 430 AD) or more modern thinkers as Novalis, Schelling, Steiner, and many others.

> This vast unification of man and nature under a consideration for "times," intervals and identical returns, was allowed by the use of the very word, the generalization in the vocabulary of modern Western thought of the term *rhythm* which, through Latin, derives from the Greek. (Benveniste, 1966, p. 325, my trans.)

Michel Serres is thus obviously wrong when he presents Benveniste's philological enquiry as a Platonic assessment of rhythm.

> No, it was not Plato who first made possible and imagined rhythm, it was the atomists. Linguistics meekly follows usual practice, the nature of things and abstract theory. Democritus saw the rhythm where it is, Benveniste did not see it. Heraclitean irreversibility is [rhythmized], here, there, [by] Democritus and all the atomists. (Serres, 2000, p. 154, trans. Jack Hawkes, my mod.)

Serres does not realize that his predecessor goes exactly in the opposite direction, the same actually he tries to get into. One is puzzled by so much misunderstanding but also very much interested in this baroque case because it provides a perfect example of one of the most common barriers that rhythmology will have to overcome. I think that this unexpected and deplorable error has probably something to do with the lack of adequate linguistics and poetics in Serres' work, where one finds only information theory (noise p. 34, 144, 155, signal p. 135, 146, 154, 155, 164), semiotics (signs, coding, p. 143, 147, 179), rhetoric (deviation and difference from the norm, decline, p. 22, 78, 91) and poor conception of poetry (as verse, p. 135, 145, compared metaphorically to a vortex, p. 139). Paradoxically, given the fact that he studies one of the longest and most beautiful poem written in Antiquity, language and poetry are utterly absent of his reading and because he rejects the most recent theories developed in his time and relies on outdated conceptions, he lacks the tools that would be consistent with his own discoveries concerning the history of physics. After having suggestively compared rhythm with *dinos* or vortex (p. 154, 163), Serres identifies it subsequently with the series of natural numbers (p. 154), meter (p. 145, 154), period (p. 151), repetition (p. 151), metric measure (p. 156), which is indeed a nice example of regression in the flow—Plato's face reemerging right at the center of the atomistic whirl.

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We have reached our first significant conclusion. Benveniste's philological analysis suggests the following points:

1. The term *rhuthmós* designated in the 5th century the various temporary forms taken by the ever running Heraclitean world flow—whether conceived as flow of atoms or not—as they present themselves to the eyes of the observer.

2. The atomist philosophers made it, for the first time, one of the most important concepts to explain nature on a materialistic and pre-empiricist ground.

3. *Rhuthmós* commonly meant "temporary disposition of something flowing," but also, implicitly, due to its morphology, "particular way of flowing or fulfilling an action".

4. It never denoted the order of a sequence of time but either an ephemeral form of something due to change, an instantaneous time-stop, or, when it involved a duration, a form that was itself changing during its *per-formance*.

5. The sub-concepts measure, number, periodicity, and the idea that a *rhuthmós* should be known by looking for its essence, its Form, were introduced in the definition of rhythm only by Plato during the first half of the 4th century.

6. The Platonic conception of rhythm obfuscated the previous one and made it very difficult to recover.

7. It largely ruled over Western cultural history up to present and was responsible for the tremendous success of idealist and sometimes irrational views equating man with nature.

What I want to do in this book is to use these ancient semantic values as critical tools to deconstruct the Platonic domination upon the history of rhythm, but above all to identify the resurgences and new developments of the pre-Platonic *idea of rhuthmos*—which I will transliterate without its original accentuation to suggest that, in these instances, I will not talk about the ancient Greek *term* but about the *question* that Ionian philosophers were pointing at while using it. By doing so, I hope to be able to show that the history of rhythm, although dominated by the idealist Platonic conceit, offers also a bunch of original propositions which still are of the greatest interest to us.

Next chapter