Platonic Legacy (4th century BC) – part 3

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Rhythm in Music – Aristoxenus' *Elements of Rhythmics* (4th cent. BC)

The *Ῥυθμικὰ στοιχεῖα – Elements of Rhythmics* was probably not the first book ever written on musical rhythm in the West but certainly the first that was preserved at least partly (a section of Book 2) (for recent editions Pearson, 1989; Marchetti, 2009). It was part of a larger work comprising some *Elementa harmonica* which also survive incomplete.

Strikingly, Aristoxenus thinks of rhythm in an opposite way to the Moderns who consider first the whole (rhythm) and divide it into primary and secondary segments (measures and notes). He begins with what he calls the "*khrónoi prôtoi* – primary time-lengths."

> It is necessary that there be some smallest [time-lengths] *[ἐλαχίστους τῶν χρόνων – elakhístous tôn khrónôn]*, in which the singer will place each of his notes. The same account obviously holds concerning syllables and bodily gestures. This [time-length] *[χρόνῳ – khrónoi]*, into which in no way can be placed two notes, two syllables, nor two steps, we will call primary [time-length] *[πρῶτον χρόνον – prôton khrónon]* (Aristoxenus, *Elements of Rhythm*, 2.11-12, trans. Marchetti, my mod.)
>
> Let the primary [time-length] *[πρῶτος μὲν τῶν χρόνων – prôtos mèn tôn khrónôn]* be defined as that which is not able to be subdivided by any of the rhythmized objects; the diseme as that which is measured out by two of these, the triseme as that measured out by three, the tetraseme as that measured out by four. The names of all remaining durations will follow analogously. (Aristoxenus, *Elements of Rhythm*, 2.10, trans. Marchetti, my mod.)

Then Aristoxenus considers the "feet" composed of two primary durations (*arsis* and *thesis*) and finally the series they form which he terms "rhythm."

> That by which we mark the rhythm and make it comprehensible to perception is the foot, or more than one. Of the feet, some are composed of two [time-lengths], the *arsis* and the *thesis*, others of three, two *arses* and one *thesis* or one *arsis* and two *theses*, [others out of four, two *arses* and two *theses*]. It is apparent that there cannot be a foot of one time interval, since indeed one signal does not make a distribution of time. For it does not seem that a foot exists without a distribution of time. (Aristoxenus, *Elements of Rhythm*, 2.16-18, trans. Marchetti, my mod.)

This feature of Aristoxenus' theory of rhythm has been interpreted by James Porter as a kind of "theoretical atomism." Rhythm would consist for Aristoxenus in a succession of "atoms of rhythm" or *khrónoi prôtoi* of various shapes/durations perceivable by human sensibility. Therefore, Aristoxenus' contribution would not belong to the Platonic paradigm but to the empiricist and materialist one initiated by Leucippus and Democritus.

> Following phenomenalist principles in their own way, the rhythmicists, for their part, could conceive the units of rhythm as minimal "atoms" consisting of indivisible *chronoi*, or time-lengths (quantitative durations of time)—specifically, "the first duration[s] that can be grasped by perception": these are the *minima* of rhythmical *synthesis*, or composition, that get thrown into complex interrelations, the perceptual effect of which is rhythm. They are, in effect, *atoms of rhythm*. Thus, Aristoxenus, in his *Elements of Rhythm* 2.11, would coin the phrase *chronos prôtos* ("primary time-length" or "duration") and define this entity as the foundational element of rhythmical patterns. (He also devoted an entire treatise to the problem, entitled *The Primary Duration*, only a fragment of which has survived). (Porter, 2000b, p. 62)

In order to prove his case, Porter quotes Aristides Quintilianus (2nd or 3rd century AD) who compares the *khrónoi prôtoi* to atoms.

> Later on, in the second century C.E., the musical theorist and more-or-less orthodox Aristoxenian Aristides Quintilianus would write: "*prôtos… chronos atomos kai elachistos* [the primary duration is indivisible and smallest]" (*De musica* 1.14). This formula, *prôtos elachistos kai atomos* [or *amerês*], "first, smallest, and indivisible," is used in a variety of analytical approaches in antiquity that exhibit what might be called "conceptual" or "theoretical atomism" (the analysis of systems of relations—whether made up of sound or bodies or times—into constituent irreducible ["indivisible"] elements). (Porter, 2000b, p. 62)

He also recalls that Aristides Quintilianus calls, at least once, the *khrónoi prôtoi* "points," referring them implicitly to the smallest and indivisible units in geometry.

> Aristides, in his *De Musica* (1.14), calls these minimal lengths of distended time, "points," "just as geometers have used the term 'point' for what in their science has no parts." These are the atoms of rhythm mentioned above, whose significance is purely structural and relational. (Porter, 2000b, p. 74)

However, it is, in my opinion, quite misleading to link, as Porter does, Aristoxenus' theory of rhythm with Democritus' atomist doctrine. And that for many reasons that I will expose in details because it will allow us to present Aristoxenus' contribution thoroughly.

1. Aristoxenus lived in the 4th century BC and therefore it is not conclusive, to say the least, to explain his thought through the work of a thinker living six or seven centuries later.

2. As for ontology Porter himself notices in the previous quote that the significance of “the atoms of rhythm […] is purely structural and relational,” which makes these “atoms,” if we maintain this denomination, utterly different with genuine atoms which exist entirely by themselves and are associated only by contiguity and resemblance of their shapes and never by an overall “structure” determining its elements as “relational.” As a matter of fact, Porter recognizes that “the rhythmicists would not have considered themselves to be atomists of any kind and presumably would have taken no position on the metaphysical nature of time.” (Porter, 2000b, p. 63)

Christopher Marchetti, the most recent editor of *Elements of Rhythmics*, underlines one of Aristoxenus’ conceptual contributions: “the principle of musical function *(δύναμις – dúnamis)*” (Marchetti, 2009, p. 20). He makes quite clear that on the harmonic as much as the rhythmic level—the latter being studied by analogy with the former—Aristoxenus considers primary elements (notes and *khrónoi*) as determined by their relations.

> Aristoxenus’ theory of musical function, *δύναμις*, states that the notes of a tetrachord are recognized not by their absolute pitch, but by their place within the scale structure. (Marchetti, 2009, p. 22)

3. Concerning epistemology, it is most probable that Aristoxenus and the subsequent rhythmicists followed Aristotle and his conception of knowledge based on observation instead of Democritus who indeed was also a kind of pre-empiricist. As Porter himself notices, they considered rhythm in a typically Aristotelian fashion: “They did hold that rhythm is the sensuous division of time, the means by which time is divided into recognizable parts *(khrónoi)* and so becomes aesthetically palpable, as an appearance, as an *aisthêsis*.” (Porter, 2000b, p. 63)

Here we need to say a few words about Aristoxenus of Tarentum himself (c. 360 – c. 300 BC). Specialists tell us that he was instructed by Pythagoreans and wrote several books on Pythagoras and his pupils. Nevertheless, after the middle of the 4th century, he chose to enter the school of Aristotle and, while making extensive use of arithmetic terminology in both his elements of harmony and rhythmic, he rejected the Pythagoreans’ opinion that arithmetic rules were the ultimate judge of intervals and harmony, and probably of rhythm. Instead, Aristoxenus and following rhythmicists *(rhuthmikoí)* as Aristides Quintilianus (2nd or 3rd century AD) relied on sensation and sought to explain their objects phenomenally, that is to say,

> not in terms of the physics of sound production or by abstract mathematical considerations [as in the Pythagorean school] but through principles inherent in our experience of sound as musical, and depending ultimately on *aisthêsis*, on what we perceive as melodious, concordant, and the like (Barker 1978a, p. 16). (quoted in Porter, 2000b, p. 62)

Indeed, we read in the *Elements of Rhythmics* the following assertion.

> We have already pointed out that rhythm is concerned with time-lengths *[περὶ τοὺς χρόνους – perì*

> *toùs khrónous]* and the perception *[αἴσθησιν – aísthêsin]* of them, and we must say it again now, because this is in a way the starting point for the study of rhythm. (Aristoxenus, *Elementa rhythmica,* 2.2, trans. Pearson)

After a long discussion of opposing views among scholars concerning the role of the soul in Aristoxenus, Marchetti concludes:

> Nevertheless, Aristoxenus attributes a central role in music theory to perception, which, for Aristotle, was part of the study of the soul. Aristoxenus follows Aristotle in discussing the soul in terms of its faculties. Aristotle discusses the faculties of the soul, including the nutritive faculty, sense-perception, thinking, perceiving, and imagination, in *On the Soul* books 2 and 3. Aristoxenus defines musical intuition, ξύνεσις, at *Elementa Harmonica*. 2.38-9 […] and 2.41 […], as the faculty of soul, combining sense-perception, intellect, and memory, that is specifically involved with the appreciation of music […]. In particular, Aristoxenus describes ξύνεσις at *E.H.* 2.41 […] as being (lit., having plunged) deep within the soul, τὴν ψυχήν που καταδεδυκός. Levin (1972: 230) argues that for Aristoxenus, musical intuition is a function that mediates between hearing and reason. As such, it can account both for a composer's ability to create music and a hearer's ability to respond. Though Aristotle does not mention such a faculty of mind, it is analogous to the faculty of imagination that Aristotle describes at *On the Soul* 428a4-429a9. In developing the role of perception in music theory, Aristoxenus extends Aristotle's method in *On the Soul* of isolating the functions of the soul. (Marchetti, 2009, p. 6)

4. The method consisting in reconstructing a whole phenomenon from "indivisible elements" was already used by Plato (for instance for the composition of primitive names from elements in *Cratylus*, 434 a-b) as well as by his successors.

At the beginning of the *Politics*, Aristotle states that he will follow in his discussion of the State his "regular method of investigation," i.e. "analyze the composite whole down to its uncompounded elements (for these are the smallest parts of the whole)."

> A proof that these people are mistaken will appear if we examine the question in accordance with our regular method of investigation. In every other matter it is necessary to analyze the composite whole down to its uncompounded elements (for these are the smallest parts of the whole); so too with the state, by examining the elements of which it is composed we shall better discern in relation to these different kinds of rulers what is the difference between them, and whether it is possible to obtain any scientific precision in regard to the various statements made above. (*Politics*, 1.1252a)

In *Poetics*, 20, he reconstructs in the same manner the whole language from the minimal vocal entities, that, here too, he calls "elements" *(στοιχεῖα – stoikheîa)*. These, he says, form syllables, the syllables nouns or verbs (plus conjunctions and joints), the words sentences, the sentences discourses.

> Diction as a whole *[τῆς δὲ λέξεως ἁπάσης – tês dè léxeôs apásês]* is made up of these parts: [element] *[στοιχεῖον – stoikheîon* – lit. *one of a series*, us. *an elementary sound of the voice, a letter]*, syllable, conjunction, joint, noun, verb, case, phrase. An [element] is an indivisible [vocal entity] *[στοιχεῖον μὲν οὖν ἐστιν φωνὴ ἀδιαίρετος – stoikheîon mèn estin phônê adiaíretos* – lit. *undivided]*, not every such sound but one of which an intelligible sound can be formed. Animals utter indivisible sounds but none that I should call an [element]. Such sounds may be subdivided into vowel, semi-vowel, and mute. […] A syllable is a sound without meaning, composed of a mute and a letter that has a sound. […] A noun is a composite sound with a meaning, not indicative of time, no part of which has a meaning by itself […] A verb is a composite sound with a meaning, indicative of time, no part of which has a meaning by itself—just as in nouns. […] A phrase is a composite sound with a meaning, some parts of which mean something by themselves. (*Poetics*, 1456b-1457a, trans. W.H. Fyfe, my mod.)

As we see, in *Poetics* these "elements" are explicitly characterized as "indivisible." But we find exactly the same idea in *Metaphysics* applied to any being, the composition of the sounds of language providing again the methodological paradigm.

> "Element" *[στοιχεῖον – stoikheîon]* means (a) the primary immanent thing, formally indivisible into another form, of which something is composed. E.g., the elements of a sound are the parts of which that sound is composed and into which it is ultimately divisible, and which are not further divisible into other sounds formally different from themselves. (*Metaphysics*, 1014a)

Given his education in Aristotle's school, Aristoxenus obviously knew about this methodological views and it is most likely that he translated them to music, which was still closely related with poetry in his time.

5. Both so called Aristoxenian "theoretical atomism" and "epistemological sensualism" are actually subjected or at least tightly articulated to the new definition of rhythm introduced by Plato and Aristotle, which is, as we have seen, utterly different from Democritus'. This succession of "atoms of rhythm" or "primary time-lengths" or "durations" is neither an "impermanent disposition of something flowing" nor a "way of flowing." Even if it is not induced anymore from number as in the Pythagorean speculations and observed through its phenomenal appearance, even if Aristoxenus takes also into account "irrational" relations between durations, rhythm consists, for him as for his fellows of the Peripatetic school interested in physiology, in what Benveniste described as "an ordered sequence of movements" subject to "numbers" and "divided into alternate times." It is quite obvious that Aristoxenus has the teaching concerning time exposed in Aristotle's *Physics* in mind when he reflects on rhythm (Marchetti, 2009, p. 103). Time is clearly for him "number of motion" and rhythm a "definite" i.e. numbered "arrangement of time-lengths."

> Rhythm cannot come to be in the absence of that which will be rhythmized and which divides time, since time does not divide itself, as we said above, but requires something that will divide it. Therefore it is necessary that the rhythmized object be divisible into recognizable parts, with which it will divide time. This formulation follows upon what has been said and the phenomenon itself: rhythm arises whenever the distribution of [time-lengths] takes on some definite arrangement, for not every arrangement of [time-lengths] is included among rhythms.

> (Aristoxenus, *Elements of Rhythm*, 2.6-7, trans. Marchetti, my mod.)

I am using for this paragraph the excellent presentation made by Marie Formarier (Formarier, 2014, p. 77). The arithmetic ratio between the duration of the *arsis* and that of the *thesis* (raising and lowering of foot or hand) makes it possible to identify to which rhythmic type a particular foot belongs. The simple ratio (2/2) defines the dactylic type, the double ratio (1/2 or 2/1) the iambic type, the sesquialteric ratio (2/3 or 3/2) the paeonic kind. If one of these three arithmetic ratios is observed in a foot, it is said to be "rational." Otherwise, it is called "irrational" (2.24, 2.30). In each of these foot types there are primary feet with a minimum number of times: three for the iambic type, two for the dactylic type, five for the paeonic type (2.31). The composite feet are made from these primary feet and the feet from primary times (2.26).

The article dedicated to Aristoxenus on *German Wikipedia* shows perfectly well this intricate relation between Aristotelian analysis, epistemological sensualism and genuine Platonic definition of the concept of rhythm itself.

> Aristoxenus built his rhythmic largely by analogy to his harmonic. He used the duration *(χρόνος)* as measure, but took also into account incommensurable durations with irrational relations. In analogy to the primary numbers *(πρωτος αριθμος)*, he defined the primary duration *(πρωτος χρόνος)* as a perceptible duration, which cannot be decomposed into several perceptible durations. He established the perceptibility of these primary durations by means of feasibility in speech, singing, or body movement (the smallest primary duration could thus be determined experimentally). This, as he emphasized, yields an infinite number of primary durations, which he used as permanent units. In addition to the smallest primary duration p, all durations between p and 2p belong to this ensemble. Just like Plato in *The Laws*, he defined rhythm as organized duration *(χρόνων τάξις)* parallel to the interval form of the harmonic. (*German Wikipedia*, "Aristoxenos", my trans.)

6. The last argument against any Democritean pedigree of the Aristoxenian doctrine concerns the ontological basis of the definition of rhythm. Endorsing Aristotle's hylomorphic conception, Aristoxenus sets a difference between *ῥυθμός – rhuthmós* and *ῥυθμιζόμενον – rhuthmizómenon* – the matter that is to be brought into form, for instance the sound, the language, the marble. In musical arts, this matter is composed of the syllables of the speech, the sounds of melody, or the movements of the orchestic.

> One must observe that there are these two natures, that of the rhythm *[τήν τε τοῦ ῥυθμοῦ – tên te toû rhuthmoû]* and that of the rhythmized *[καὶ τὴν τοῦ ῥυθμιζομένου –kaì tên toû rhuthmizoménou]*, related to each other very much as the shape and that which is shaped in regard to one another. For just as a body takes on many types of shapes *[σχημάτων – skhêmátôn]*, if its parts are differently arranged, whether all parts or some of them, so also each of the rhythmized objects *[τῶν ῥυθμιζομένων – tôn rhuthmizoménôn]* receives many forms, not by its own nature, but by the nature of the rhythm *[τοῦ ῥυθμοῦ – toû rhuthmoû]*. The same text, arranged into [time-lengths] *[χρόνους –khrónous]* differing from each other, takes on variations, such as are equivalent to those very variations of the nature of the rhythm *[τοῦ ῥυθμοῦ φύσεως – toû rhuthmoû phúseôs]*. The same account holds for melody and anything else of such a nature as

> to be rhythmized *[ῥυθμίζεσθαι – rhuthmizesthai]* by the sort of rhythm *[τῷ τοιούτῳ ῥυθμῷ – tôi toioútoi rhuthmôi]* that is organized in [time-lengths] *[ἐκ χρόνων συνεστηκώς – ek khrónôn sunestêkôs]*. (Aristoxenus, *Elements of Rhythm*, 2.3-4, trans. Marchetti, my mod.)

Aristoxenus here visibly resumes and amplifies the Aristotelian view of becoming and being. For Aristoxenus, a rhythm is clearly an Aristotelian form that actualizes potentialities of word, sound, or movement by driving the poetic, musical or dance performance until completion, i.e. by organizing their matter in order to provide it with a form. So rhythm has the consistency and the teleological dimension of any Aristotelian forms, especially those animating living bodies.

> One must apply perception from here regarding this analogy, striving to see, concerning each of the things mentioned, of what sort is the rhythm and of what sort the rhythmized object *[τοῦ τε ῥυθμοῦ καὶ τοῦ ῥυθμιζομένου – toû te rhuthmoû kaì toû rhuthmizoménou]*. For none of the bodies such as can be shaped *[σχηματίζεσθαι –skhêmatizestai]* naturally is the same thing as the shapes *[τῶν σχημάτων – tôn skhêmatôn]*, but rather the shape is an arrangement *[διάθεσίς – diáthesis]* of the parts of the body, arising from its having each of them in some certain way, whence it is called a shape *[σχῆμα –skhêma]*. So too the rhythm *[ῥυθμὸς –rhuthmòs]* is not the same thing as any one of the rhythmized objects *[ῥυθμιζομένων – rhuthmizoménôn]*, but is something arranging the rhythmized object *[τὸ ῥυθμιζόμενον – tò rhuthmizómenon]* in a certain way or in another way and making it thus or so in respect to [time-lengths] *[τοὺς χρόνους – toùs khrónous]*. (Aristoxenus, *Elements of Rhythm*, 2.5, trans. Marchetti, my mod.)

This definition allows Aristoxenus to discriminate between arrangements of time-lengths which respect "the nature of rhythm" and are to be called "good rhythms" and those which are not enough properly organized to receive such name and will be considered as "arrhythmic." Each *ῥυθμίζωμενον* is indeed capable of *ῥυθμός* or *εὔῥυθμός – eúrhuthmós* as much as *ἀρρυθμία – arruthmía.*

> For many are the proportions and arrangements of them [the time-lengths] that are clearly foreign to perception, and few are those that are proper and can be arranged into the nature of rhythm *[τὴν τοῦ ῥυθμοῦ φύσιν – tên toû rhuthmoû phúsin]*. The rhythmized object *[Τὸ δὲ ῥυθμιζόμενον – Tò dè rhuthmizómenon]* is, in a way, common to both arrhythmia and rhythm *[κοινόν πως ἀρρυθμίας τε καὶ ῥυθμοῦ – koinón tôs arruthmías te kaì rhuthmoû]*, for it is naturally able to receive both constructions: the [eurhythmical] and the arrhythmic *[τό τε εὔρυθμον καὶ τὸ ἄρρυθμον – tó te eúruthmon kaì tò árruthmon]*. Suffice it to say that the rhythmized object *[τὸ ῥυθμιζόμενον – tò rhuthmizómenon]* should be thought of as such a thing that it is able to be arranged into all sorts of time interval durations and all kinds of combinations. (Aristoxenus, *Elements of Rhythm*, 2.8, trans. Marchetti, my mod.)

This does not mean though that "irrational ratios" between time-lengths should be considered as arrhythmic. As we have seen above, they too pertain, Aristoxenus insists, to rhythm.

> One must not err here, failing to perceive how the legitimate and the irrational are incorporated into the matter of rhythms. […] in rhythms are to be understood the legitimate and the irrational.

> The one is apprehended as legitimate by the nature of the rhythm *[τοῦ ῥυθμοῦ φύσιν – toû rhuthmoû phúsin]*, the other only by the ratio of the numbers *[τῶν ἀριθμῶν μόνον λόγους – tôn arithmôn mónon lógous]*. (Aristoxenus, *Elements of Rhythm*, 2.21, trans. Marchetti)

A proper rhythm is a formal cause that organizes the time-lengths in such a way that they reach an achieved form that is their final cause, no matter the rationality or irrationality of the ratios between time-lengths. Arrhythmia denotes by contrast any series of time-lengths that is close to a chaotic or stochastic arrangement.

Aristoxenus has been given credit by specialists in music history for having for the first time fully theorized harmony and rhythm. But from a rhythmological viewpoint, his contribution to the theory of rhythm, at least as far as we know it, is not as positive as it seems. Concerning rhythm, there are two opposite sides in Aristotle work: that interested in natural science which we find in *Physics* and *Metaphysics*, where Aristotle remains mainly faithful to Plato and to his joint conception of time and arithmetic, while introducing a new concern for teleology linked with his interest in living beings; that more original and also today more fruitful which we find in *Rhetoric* and *Poetics*, where Aristotle initiates a scientific knowledge, yet emancipated from too simple arithmetic and partly from teleology, of two crucial human activities: language and poetry. Aristoxenus is clearly on the first side: he and most of his followers consider rhythm as an ordered sequence of time-lengths and that order as numerical and teleological. His work has oriented music studies ever since in a Platonic and even sometimes Pythagorean direction, while participating in the obliteration of the theory of forms developed by the first atomists as much as the poetic conception of rhythm which was also part of the Aristotelian legacy.

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At the end of the 4th century, one can observe the emergence of three opposite trends.

The first is the spreading of the Platonic concept of rhythm. In Aristotle's *Physics* and *Politics* as well as in Aristoxenus' *Elements of Rhythmics*, the same common perspective can be found.

2. Clearly, Aristotle, his collaborators and successors are the main vectors of the spreading of what may be called *the Platonic metric paradigm of rhythm*.

3. While building on the formal and arithmetical foundations laid by Plato and Aristotle, Aristoxenus provides the first *general theory* of rhythm, i.e. a theory that is totally independent of the *matter* that is to be rhythmized and that can be therefore put in use in entirely new domains. Although his work has not been entirely transmit¬ted to us, he is for this reason one of the most important actor of the success of the Platonic-Aristotelien definition of rhythm.

4. From the 3rd century on, this paradigm will motivate and support, as we shall see in the next chapter, the penetration and development of rhythm into radically new fields such as life science and medicine. This will be the beginning of a lasting success that will develop further in Antiquity and the Middle Ages and will finally dominate the Modern Times until present.

The second trend is far less visible. It is composed of scattered innovations which all were made by Aristotle and which deeply yet imperceptibly transformed the concept of rhythm. It has largely been ignored by specialists who, due to lack of strong poetic theory, mainly concentrated on the first. Nevertheless it is of greatest interest to us. We may call it the *poetic Aristotelian paradigm of rhythm*.

1. In *The Politics* Aristotle first endorses Plato's holistic and hierarchical views on politics. The whole is superior to its parts, he says, the state to the households and the households to the individuals. Humans are superior to animals, men to women, adults to children, free men to slaves, Greeks to Barbarians. Nevertheless, when he considers musical rhythm his perspective somehow changes. Unlike his master who was very suspicious about the mimetic power of rhythm, he considers it not only as a powerful means of education of the citizens to be used by the state, but also as a means for the individuals of enjoyment, noble leisure, education of the spirit, and possibly of achieving goodness and excellence. This profoundly humanist and democratic intuition will be lost very soon as the Athenian democracy disappears in 322—the same year in which Aristotle passes away—and monarchies develop in the Greek world. The holistic and hierarchical view that gives to the Platonic rhythm concept its ethical and political color will naturally prevail in a world in which it fits perfectly, but Aristotle alternate suggestion, as we will see, will reappear much later in the West from the 18th century on and nurture new views on the relation between subjectivity, society, state and rhythm.

2. When in *The Rhetoric* Aristotle changes focus from music to public speech, he introduces a second important innovation in rhythm theory. The study of speech makes him realize that the definition of rhythm drawn by Plato from his observation of music and dance and his Pythagorean speculation cannot be applied without change to language. Combination of short and long or fast and slow segments, or order of movement, do indeed partake in speech rhythm but they constitute only part of it. Rhythm appears now as a larger whole that transcends metric elements as well as bodily figures. In addition, Aristotle elaborates further what he already sketched in the *Politics*. Rhythm has the power to shape the *psychè* of the individual that can be used to achieve political ends—a kind of use he does not particularly appreciate but that, as a scientist, he feels compelled to examine due to its prevalence in his time—or, as he explains in *The Poetics*, larger ethical objectives through *mímêsis* and *kátharsis*.

3. In *The Poetics*, Aristotle complements the changes he already sketched in *The Rhetoric* and introduces a third significant innovation. Both essays form a diptych. While the latter transforms the Platonic conception of rhythm into something larger than a mere series of metric elements or bodily figures, the former expands the previous limited utilitarian views of power of rhythm on individual psyches—how to influence an audience—into a general ethical doctrine that emphasizes the liberating effects of poetic rhythms. "Success" or "beauty" in "poetry in itself" is reached when the *rhythms and tunes* organizing a poetic work are good enough to trigger *kátharsis* by *re-presenting human actions and emotions*, i.e. not so much by making a faithful copy of them in order to reach the otherworldly ideas of which they are degraded copies, as by *presenting them anew* in order to come closer to *their quintessence*. In *The Poetics*, the concept of eurhythmy, that was so important for Plato, receives a completely new meaning which is not based on *aesthetic pleasure of the spectator*, as for aesthetics, nor even on *persuasion of the audience*, as for rhetoric, but on *the ethical liberating effects produced on each one and all of us by the well rhythmized re-presentation of life*, i.e. the effective presentation of experiences, actions and characters *under new guises*. Thanks to the mediation of this larger rhythm, ethics and politics can now be based on the poetic power of

language.

The third trend is a brilliant but limited revival of Democritean atomism with Epicurus (341–270 BC), whose works were unfortunately completely lost except for a few fragments and letters, and one of his followers, the Roman poet Lucretius (c. 99 BC – c. 55 BC). Thanks to his impressive didactic poem *De rerum natura*, we are able to retrace another conception of rhythm which preserves most ancient features of *rhuthmós* while elaborating and developing them anew. This third trend we may call the *physical Democritean paradigm of rhythm*. I will try to sketch its forgotten history in a chapter below but we will have first to pay a due attention to the amazing spreading of the Platonic paradigm in science of the living and medicine.

Next chapter