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## The Pythagorean Method in the *Philebus*

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*Abstract:* The well-known connection between the extant fragments of Philolaus and Plato's *Philebus* is examined in its methodological aspect. By drawing on more texts, it is shown that Plato was aware of an explanatory scheme that can be attributed to Pythagoreanism. His attempt to modify it is also outlined, which sets the historical-philosophical perspective .

*Keywords:* Pythagoreanism, Plato, History of philosophy

Reading and commenting Plato's texts, like any such endeavor, always has its own implicit aims and grounds. Carl Huffman (2013) pointed out that until recently claims about elements of Pythagoreanism in them were a pure triviality, but presently mentions of Pythagoras and derivatives of his name practically disappear from books dealing wholesale with Plato<sup>1</sup>. It is a weak argument that Plato himself in the extant corpus mentions them only twice: his texts are not objectivist prose with references, but rather highbrow literature, with descriptions and allusions for the erudite readers to enjoy. Indeed during the 20th century Pythagoreanism has been completely deconstructed: after work by E. Frank, W. Burkert and L. Zhmud<sup>2</sup>, it became rather clear that there is no consistent way of talking about "Pythagoreans" which carries any real explanatory power. Already in the 19th century it was established that during the Hellenistic era, and also later, new writings attributed to ancient Pythagoreans were actively circulated and they are the source for the main share of "informations" about the allegedly Pythagorean views. However, the qualifier "Pythagorean" comes from antiquity with the meaning that it still has popularly today. Through careful readings it was found that before Plato and Aristotle it refers to thinkers with no attested affinity for mathematics and, also conversely, historically noted people with mathematical contributions were not spoken of as

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<sup>1</sup> [Huffman 2013: 237]; his finding is further confirmed in the materials of a recent conference devoted to the *Philebus* [Dimas 2019: 284 (index)] .

<sup>2</sup> [Frank 1922], [Burkert 1963], [Zhmud 2012]. Discussions and mentions today are kept tightly focused, e.g. [Huffman 1993], [Horky 2013].

"Pythagoreans". A personage who escapes this disjunction in early times is, of course, Philolaus, and the seminal monograph that Huffman published<sup>3</sup> specified by its very title: "Pythagorean and Pre-Socratic." Such chronological positioning might be somewhat devaluing<sup>4</sup> insofar as in the fabrication of Pythagoreanism, naivety to the point of stupidity was a guarantee of authentic antiquity. Later, when Huffman published the article "The Philolaic Method: Pythagoreanism behind the *Philebus*",<sup>5</sup> it becomes clear that Philolaus should not be treated as a pre-philosopher, but on the contrary, the final<sup>6</sup> Platonic Socrates could be seen as his epigone. The disagreement between unnamed philosophers, which Aristotle evidences at the end of the *Metaphysics*, are not misunderstandings and would find an illustration in the *Philebus*. Sayre [Sayre 2005] has already pointed in that direction, but without producing a full explanatory scheme such as the one proposed presently below.<sup>7</sup>

### *The Method*

At the beginning of the *Philebus*, a discussion about the "one and the many" is staged, with Socrates saying that he knew a method for elucidating the problem, although not a particularly reliable one (16d). This appears to involve the use of "limited and unlimiteds", terms known to be typically Pythagorean and attested in a fragment (F1) of Philolaus.<sup>8</sup> This lexical connection also allows reading the allegorical description for the origin of the method<sup>9</sup>: it was given to people by "some Prometheus". Huffman argues that this is a reference specifically to Philolaus<sup>10</sup>, while a more standard understanding would accept that Pythagoras is the one who is meant. The clarification that discoveries were made in the arts (techne) with this method rather definitely points to him. In writing about the "Philolaic method," his use of an adjective mostly avoids the misunderstanding that when Socrates speaks of a method, it is his own

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<sup>3</sup> [Huffman 1993] *Philolaus of Croton: Pythagorean and presocratic*: the first dedicated monograph since the time of August Bökh [Bökh 1819] and, after disputes over authenticity, a modern citation standard.

<sup>4</sup> For criticism of the term "pre-Socratics" insofar as it is not only periodizing, cf. in more detail [Lebedev 2019 : 653-8 ] (esp. n.2).

<sup>5</sup> [Huffman. 2001] *The Philolaic Method: The Pythagoreanism behind the Philebus*.

<sup>6</sup> The generally accepted opinion is that *Philebus* is one of the last dialogues; quotes are from Fowler's translation and [Gosling 1975].

<sup>7</sup>For an earlier presentation, see [Losev 2020], there the term "quincunx" was used for the five-term explanatory scheme.

<sup>8</sup> Kahn cautiously writes about the Limit and Unlimited that "Plato may have borrowed these terms from the system of Philolaus, where they represent principles of Presocratic cosmology interpreted from a Pythagorean perspective" [Kahn 2013:165].

<sup>9</sup> As Bossi notes, "I completely agree with Huffman that Plato borrows from Philolaus not only the concepts of limit and unlimited, but also an entire approach to the explanation of reality" [Bossi 2013: 272]

<sup>10</sup> [Huffman 2001:71], but a serious alternative is the Pythagorean Hippasus [Horky 2013]

"Socratic method," whatever that term means. Later authors who also comment on this point of the dialogue expressedly use the epithets "divine," "dialectical," both together or separately.<sup>11</sup> The qualification "Pythagorean," which follows most of the earlier proposals, seems to have better grounds to be used.

Socrates says something rather puzzling: he admits that he "had long used a method which sometimes left him at a dead end." What comes with his next line (16c9) is not at all clear, even if it allows connections not only with Philolaus, but also with other passages in Plato's writings:

"the things which are ever said to exist are sprung from one and many  
and have inherent in them the finite and the infinite."

Apparently, it is about the nature of all objects that are dual in nature (σύμφυτον), and in a specific way. Thus, as schematically as possible, in addition to the object that is in the focus of attention, there are also two more pairs of terms, i.e. one five-membered configuration is markedly present. Later in the *Philebus* itself, when the discussion is again brought to an abstract level, Socrates proposes to enumerate the things to be considered, and after he has reached 4 his interlocutor asks if he will not need another, a fifth (23f). Socrates answers evasively, but the exchange sounds unnatural — the text seems to clumsily digress in order to deny something the supposed reader might not have guessed. But for those who know enough details of Plato's musings, the missing fifth is more of a reminder. Already in antiquity, Plutarch made the connection with the five great genera of the *Sophist*; there "the same and the different" intertwine into a being which is either unchanging or impermanent. In the 20th century Natorp mentions the same connection but finds it superficial, while Kahn considers that a fifth component would correspond to "the traditional symmetry between mixing and separation in pre-Socratic physics".<sup>12</sup> However, the suggestion about "unnecessary symmetry"

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<sup>11</sup> "Godly" in [Sayre 2005] or the Latinism "divine" [Bossi 2013], which is also used together with "dialectic" [Gill 2019], "method of the gods" [Horky 2013] or "heavenly tradition" in Gosling's translation and commentary [Gosling 1975]; Huffman calls it "philosophical" several times, but does not consider that Socrates (resp. Plato) actually used it, once it is called "Pythagorean" [Huffman 2001:76].

<sup>12</sup> [Kahn 2013: 167, n.19] "It is because of the traditional symmetry between mixing and separation in Presocratic physics that the interlocutor asks Socrates if he does not need a fifth principle".

has already been categorically rejected by Leon Robin, who insisted that the unnamed fifth in *Philebus* not only has a place, but it is rather significant.<sup>13</sup>

Choosing to remain silent is related to Plato's aim to reshape the original schematism, something that begins with its very exposition and further confuses a systematic reading. Kahn argues that *Philebus* is "a decisive step in the Plato's moving toward natural philosophy," and this is the general thesis about the dialogue developed in his monograph.<sup>14</sup> Disagreement with it prompts the peculiar line from *Philebus* to be taken as an expression of something different, which will emerge if we look at five-membered configurations elsewhere in the corpus. The dialogue itself offers two examples when it points to the blending of vowels and consonants in words that are meaningful or not, and, also, the blending of notes in a chord that is consonant or dissonant. In these places, however, Plato's argument is already directed in another direction, although they are recognizable from their earlier and more detailed treatment in the *Sophist* (261-3). A paradigmatic form there is the "mixing" of nouns and verbs in speech that is either true or false:

Noun	Logos	True
Verb		False

### *Pythagoreanism*

The descriptions woven throughout the texts are not clearly outlined, which does not prevent the same construction from being recognized in the *Phaedo* (86b-c), the *Statesman* (283c), the *Timaeus* (37b-c), *The seventh letter* and more places eventually. While the list remains open, an unequivocal prototype stands out at the supposed beginning of Philolaus' book *On Nature*, the fivefold scheme:

<sup>13</sup>According to him, this is not some baroque false window (fausse fenêtre) and the role is significant (même une place prépondérante) [Robin 1935:102, 106]; for references and more details see [Delcomminette 2006: 254 (n.112)], [Losev 2020].

<sup>14</sup> Kahn suggests that the text should be read as a kind of "move towards cosmology", as the chapter dedicated to the dialogue is titled in his book [Kahn 2013: 157], Ch.5 . *The Philebus and the movement to cosmology*.

(F1) the things of the world and their arrangement have the nature of combining the unlimited and the limiting.

Plato's phrase, it is seen, mostly repeated what was said before with minor changes and modification. According to tradition it was Pythagoras, who discovered the numerical ratios behind the consonances. Switching from physical length to its measure, the chosen unit, is trivial enough; but it is also obvious that lengths are a continuum, something that integers are not. When the lengths of two strings are related as 1:2, 2:3, 3:4 the concords are called octave, fifth and fourth, (1:1 is unison); one can see the consecutive appearance of the numbers (1 to 4) from the natural order, where even and odd alternate. In a fivefold scheme, even and odd will mix as fractions, and only some of the cases are consonant while the rest are dissonant. Indeed, Philolaus notes in a fragment (F5) that "number has two kinds of its own, even and odd, and a third of the two mixed together, the even and odd." Since the two genera exhaust the class of integers, the third can refer only to the rationals.<sup>15</sup> The short quotation swerves to other matter, and it just a guess whether it would further confirm this same fivefold scheme, giving further grounds for its designation as "Pythagorean". The parallel with Plato, however, is unproblematic, and there might be a clue to its origin, if the "one" and "the many" are taken to be the octave and the notes therein. Philolaus own words are about (F1) "the arrangement (cosmos) and the things therein."

"Limited and unlimited" in the *Philebus* are not code names, but apparently abstractions, the prototypes of "same and different" which the Stranger of the *Sophist* situates before „being“, a name for the form of their interweaving. In this dialogue, the five great genera are universals that need no clarification; in contrast, when the procedure is described by Socrates later, he insists that one always checks whether subspecies are to be demarcated. Logical considerations are restricted to whether a predicate is true or not, without discussion about the existence of varieties. A more open-minded look at the Pythagorean attitude shows that in it mathematics is mostly a model, and not a substantive explanation. The deep misunderstanding comes with a literal acception of examples as deeply meaningful facts, something that later

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<sup>15</sup>"Even-odd" understood as multiplication is obviously devoid of any interest. Half a millenium later when Theon of Smyrna argues that one is even-odd his explanation does not really make sense [Theon 1982: 35 (V.15)]; see below (esp. n.23).

rereadings did: it is then that naivety becomes a guarantee of primordial wisdom.<sup>16</sup> A historical culprit is undoubtedly Timaeus, even if he is only a character presenting the demiurgic actions. There is also a simple geometric proof that the Platonic solids are only 5, and for it there is no need for someone to choose the beautiful and most beautiful triangles,<sup>17</sup> as happens in the Plato's *Timaeus*. Whether consonance is a fact or an artifact may be a matter of opinion, but there is undoubtedly a simple physics of standing waves behind it, amenable to an elementary description by numbers.

The biggest misunderstanding is probably due to Aristotle, from whom the rather dismissive sounding "everything is a number" transmission of Pythagorean doctrine starts.<sup>18</sup> What is found in the remains of Philolaus' text is that "everything has a number" (F4): it is the theologians' later obsession with the verb "to be" and various "beings" that misdirected for long any understandings. Their bias distorted the remains of early Greek philosophy which is mostly epistemological, not ontological, and its mathematical paradigm actually functions rather smoothly, regardless of any attempts to prescribe to it some kind of ontology.

We can just speculate about the 'unlimiteds and limiting' as far as they are abstractions: the fact is that beyond a few examples<sup>19</sup>- vowels and consonants in speech<sup>20</sup>, or even and odd numbers - there is no way to meaningfully say what they "are (really)", without accepting that principles also have a reality of their own. Pythagorean "metaphysics" is apparently limited to

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<sup>16</sup>Architas and Eurytus are known to be disciples of Philolaus. The first is credited with an ingenious solution to the problem of doubling the cube, which still impresses us today by its ability to think of quantities spatially and geometrically. The second one is said to have made mosaics of colored stones, which he counted to state "this is the number of the man, this is the number of the horse." It is difficult to see how the two would be historically compatible, but it is clear that the story is understandable for anyone, while the proof is not. See [Netz 2014].

<sup>17</sup> [Tim. 54a]; a dodecahedron requires a third rated beautiful type of triangle (that might be suspected of ugliness perhaps).

<sup>18</sup> [Zhmud 1989:277], [Huffman 1993:179]. A phrase of Aristotle conveys his own understanding that "the unlimited and the one are the essence of the things of which they are predicated, *therefore* number is the essence of all things" [Met. 987a19].

<sup>19</sup>Detailed discussions of the limited and the unlimited are invariably part of the *Philebus's* investigations, e.g. [Delcomminette 2003: 216 and 230]; some variants are briefly summarized in a recent paper [Viltanioti 2012].

<sup>20</sup>An intriguing hypothesis is that the example from which abstraction develops are the vowels and consonants, just as atomism could be suspected to originate from them (and not from physics). Plato twice mentions firstly articulated sounds and then notes, both varieties of the generic sound. If mathematization was invented mostly within the Academy, then it is understandable that arithmetic and atomism never got along - Plato's dislike of Democritus has remained proverbial.

the finding that from their "mixing" knowable things, amenable to alethic predication, are generated.

Closer attention to Philolaus' phrase (F1) raises the question of the nature of the combination or blending, whether it is a moment distinct from its results. It is somewhat obvious that if the mixing does not produce something new, it cannot be said to have happened, i.e. tacitly it seems to be somehow successful. This is just how the "dialectic", popularized by the German classical philosophers, is understood: thesis and antithesis, if they are mixed successfully, give a synthesis, and if they fail, they remain in conflict. According to the *Sophist*, for Plato, the philosopher "has knowledge about which things can be mixed/entwined" (253e), and that is barely enlightening. Instead of the earlier symmetrical scheme, when qualities were judged separately from the mixing, Plato later preferred to consider the mixture only as a success. This troublesome point has not escaped the attention of the *Philebus's* commentators: Gosling concludes that "an unsuccessful mixture is not a mixture in the adequate sense at all", Delcomminette argued for the same, and to the question "*Must all mixtures be successful?*" Gill devotes a separate paragraph of her work<sup>21</sup>; Kahn states that "in the *Philebus* the notion of a blend between Limit and Unlimited is quite different from a physical mixture of elementary bodies, and it does not require a reciprocal principle of separation".<sup>22</sup> However, "not requiring" hides the decision to accept only success, without any alternative. Admitting that a failed mixture is not a (true) mixture comes only in the very last pages of the dialogue (64 d-e), where the threat to sabotage the new interpretation is minimal.

Abandoning failure as a proper alternative certainly depends on what is meant by 'mixing', 'entwining' and the like. If the original Pythagorean example was the "mixing" of even and odd numbers into the even-odd, by default the result was an irreducible fraction or one.<sup>23</sup>

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<sup>21</sup> [Gosling 1975: 188] "a poor mixture is not in the required sense a mixture at all"; [Delcomminette 2006:546] "L'exigence de composer un "bon" mélange n'est donc pas différence de celle de composer un mélange en général" and he comments on the difference between *μιξις* and *κρασις*, but notes also that they are "apparently synonymous" [ibid. n.4]; [Gill 2019:87] *Must All Mixtures Be Good?*

<sup>22</sup> [Kahn 2013: 167]

<sup>23</sup> Aristotle's dictum "one is not a number" (*οὐκ ἔστι τὸ ἐν ἀριθμός*) [Met. 14. 1088a]; [Theon 1892:33] is well-known. In Indo-European languages, the definite "one" often functions as opposed to "some"; Plato introduces more ambiguity with a neologism mixing 'one', the adjective word, and the noun 'unit', a detail which is commented upon [Acerbi 2013], [Crivelli 201 9:38].

Meaningless words or false speech are unsuccessful mixtures, naturally finding their place a fivefold schema, while for Plato's philosophizing they have become an endemic problem. Plato does not explain why he will not consider a cause for a separation, just as convinced readers of the *Timaeus* will insist that the world, though it once came into existence, will not disintegrate in the future.

Admitting ignorance about what Philolaus' limiting and unlimiteds (in the plural) represent, challenges the meaning Plato intended when he used them (in the singular). The results in the fivefold schematism are obviously different, but they are just as immediately analogical. For Philolaus (F1) they are the order-cosmos and the things in it; for Plato - "the one and the many". The central term for Philolaus is some kind of 'nature', while in Plato it remains undistinct, but the parallelism suggests that this is number, understood as substantialized counting. If nature is giving birth (*natus*), then counting also generates (certain) numbers, understood as "one and many" that come to fit, as it were, a pre-existing arrangement.

Aristotle would later analyze counting [*Met.* XIV] as the operation leading to some particular number. It proceeds by choosing a suitable standard (unit, measure) and mechanically checks for each of the specimens in the field of attention, whether it corresponds to it or not. Without keeping an account, the operation is reduced to deciding whether a chosen predicate, concept, idea, etc. is suitable for a given individual. Correct counting is also correct judging. But if all kinds of things, regardless of their nature, can be counted, then numbers are also kind of universals, or at least their prototype. Aristotelian operationalism, faced with a set of three dogs or four roses, will always assume an answer to the preliminary question "what is a dog?" or "a rose"; the earlier Pythagorean interest appears to have been in "what is 3?" or "4". Conceived as a theory of ideas (forms), Platonism lies somewhere in between. Plato knows that the circle of fifths does not close in octaves, or that a side and a diagonal in a square are incommensurable, so "even and odd" cannot be the ultimate explanation. But geometric shape, and more generally "eidos", are determinations on a par with numbers. In the Academy, among the successors of Plato, number acquired a special significance, and in the *Philebus* (17a) Socrates already reprimands those who pass too quickly from the One to the indefinite, i.e. skip the central instance, which, according to his explanation, is the determination of number, and ultimately - of commensurability.



*The Secrets of Success*

According to Kahn in the *Philebus*, Plato does not so much return to natural philosophical considerations as he concretizes his dialectic, and there it is deemed "a decisive step in Plato's movement toward natural philosophy".<sup>24</sup> Perhaps this is an elegant way of not saying "Socrates' return to the pre-Socratics", although it seems that Plato is trying to reshape what is already known for his own purposes. As in the *Sophist*, the fivefold scheme is outlined first and next the canonical examples of grammar and music are aduced. They are also a pretext for a display of expertise<sup>25</sup>, while the profusion of details is also the imposition of numbers, something which he awkwardly did already at the start of his exposition. In retrospection this appears as an attempt to mitigate the surprise coming at the end of the dialogue: measure, the finding of a number, will be placed as the highest and first in the ranking. Viewed in this way, it could be said that the *Philebus* is the attempt to solve a Socratic problem with the Pythagorean method.<sup>26</sup>

Instead of a simple yes/no answer to the question, "Is pleasure preferable to reason?" Plato produced a list of values in which reason came second and pleasure fifth. Even with minimal acumen, readers could probably predict the straight answer, but nobody could suspect what kind of argument Plato's text will develop. Ultimately, the exposition of the method is the real subject of the dialogue.<sup>27</sup> With the examples and all that has been said up to this point, it can be assumed that the scheme that Plato proposes would show how from the pair of reason and pleasure, through mixing in the good, truth and beauty are revealed: the pairwise analogy, as everywhere, is rather obvious, while the ambiguity surrounding the central operation just as steadily remains. Quite hastily and unconvincingly, Socrates has removed the problem of success by saying (65) "if we cannot grasp the Good with one idea, let's catch it with three"<sup>28</sup>, and it becomes visible that in the successful synthesis the place of the Good is taken by commensurability.

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<sup>24</sup> [Kahn 2013:157] and n.14 above.

<sup>25</sup> Also in the *Republic* (524-31).

<sup>26</sup> From antiquity to the present day different opinions have been expressed about the scope of the text; a short review is found in [Aleknienė 2017].

<sup>27</sup> Similar seems to be the opinion of Sayre [Sayre 2005]; this is the thesis of Delcomminette, whose voluminous monograph [Delcomminette 2006] is subtitled: "an introduction to Platonic agathology (*Introduction à l'agathologie platonicienne*).

<sup>28</sup> The proposition seems entirely ad hoc, the more so when admitting that for three terms the logic is either subordination or lack of completeness.

The alternative that the mixing could somehow fail, i.e. to obtain from reason and pleasure non-good, is silently suppressed, although there is no way to prevent the thought of the antonyms "falsehood" and "ugliness". The only negativity that the *Philebus* allows is non-genuine pleasures,<sup>29</sup> but in fact success is foreordained by the abandonment of the fifth component, implied as corresponding to some separation (23f).

A similar treatment is found earlier in the *Phaedo* (86b-c), where the Pythagorean Simmias is made to say that "(if) our body is of hot and cold, dry and moist, our soul, one might say, is the compound and harmony when they are joined in due measure". Compound and harmony, or due measure, stand as doublets, but are logically independent, in so far as it is evident that there could be a compound without harmony.

### *Hesitations*

Observing that all other examples show some parallelism or analogy between the two initial components and the resulting ones suggests to consider that in both cases (*Philebus* (23c-e), *Phaedo*) something has been omitted. Usually it is found that the two pairs form a more or less logical square, and such is the final configuration of the *Philebus*. These reconstructions of the examples noted in Plato's texts may not always be immediate, nor they are particularly problematic. For example, from the oppositions mental/physical and one/many, four of the five great genera in the *Sophist* are obtained: "same, immutable, mutable and different." In the *Timaeus* the world soul coordinates indivisible/divisible and authentic/inauthentic. The ranking from 1 to 5, which ends the conversation in the *Philebus* (66a-c), accordingly breaks down into  $1 + 2 \times 2$ , i.e. the central, "first", element (commensurability), and the two pairs which form a square of opposite relations: from the pairs inside/outside and singularity/multiplicity the 4 components (of the 5-fold scheme) are immediately derived:

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<sup>29</sup> Contested since antiquity and still debated, cf. [Delcomminette 2003].

	<i>Inside</i>	<i>Outside</i>
<i>One</i>	Reason	Truth
<i>Many</i>	Pleasures	Beauty

For us such squares represent the combinatorial exhaustion of some possibility, while the questions whether it precedes their being, whether completeness is something more than the presence of all combinations, reach beyond logic. Ultimately, this is the function of the central component. Potentiality and actuality became fundamentally different only with Aristotle but until then the Pythagoreans or Plato hesitated.

Archytas, the Pythagorean, is credited with the invention of the quadrivium, where the "fundamental" sciences, arithmetic, geometry, music and astronomy are inscribed. In the Pythagorean view the world is not double, so this is knowledge pertaining to nature-physis (as in the quotations from Philolaus). If the central or "key" component of the scheme is called "harmony", then the whole device comes to look like a Platonic construct. In fact, in one of the rare cases when Plato mentions the Pythagoreans (*Rep.* VII, 530d) his move is just this: in the middle of the quadrivium, after arithmetic and geometry and before music and astronomy, stereometry was added, a discipline sufficiently ambiguous to be seen as ideal and/or material.

Obviously, in this case there is little room for the idea of "mixing", but aristotelian "metexis" obtains rather well. Historically, the fact remains that the quadrivium, with its robust logic, survived long after this attempt at innovation. Instead of the binarisms opposing the four components, in Plato a linear arrangement stands out, and it is not surprising that in the *Epinomis* astronomy will be assigned the supreme place.

Logic does not allow for compromises, but still they find a way to survive: the famous tetractys, apparently launched by the early Academy [Zhmud 2019], proposes the summation of the first four natural numbers into a fifth. The hints about some profound thought and symbolism of this simple arithmetical example would scarcely have been successful without some vague knowledge of the early schematism. When much later Theon of Smyrna enumerates some variants of the tetractys, among them are listed progressions and divisions,

be they logical or mechanical [Theon 1892: (38)155]. They shows how problematic a "summation" remains as a replacement of the previous "mixing".

Kahn notes that "mixing" is an archaic wording, distinct from the more sophisticated Platonic terms, and without them examples remain the just a backbone of abstractions: however a possible distinction of thinking *with* examples from thinking *about* examples is a theme taken up in the works of Levi-Strauss - a so-called "wild" thought contrasted with a "tamed" one. Thus the "theory" of the four classical elements outlined by Empedocles is seamlessly confirmed by later Aristotelian logic. If the binary logic and the independent predicates are represented spatially in a square, then its center is unreal: there is no room for the key concepts of Platonism, such as Good, being, soul, etc.<sup>30</sup> The Pythagorean method could be an explanatory scheme, a proto-logic better than myth; earlier, rhyming speech has been persuasive in an other mode, later intangible symmetry<sup>31</sup> has become more convincing.

In giving his succinct account of Pythagoreanism Aristotle states that in it "things exist in imitation of numbers" (987b 11-3), and this is a good phrasing when one thinks about the vibration of a strings; however, a statement like "justice is 4" is ridiculous. Attention to abstractions such as beauty or truth is not at all the same as attention to physical phenomena, but neglecting the difference leads to propose that "numbers are causes." Aristotle's own theory of "Four causes" was undoubtedly an achievement in antiquity, and his taste for anything on the subject is understandable. At the beginning of the *Metaphysics* (988a7-17) he explains that for Plato two principles are the causes of good and evil. So, the full Pythagorean scheme is here: two ingredients, now called by other names, causality, and the antinomic resulting pair. As it can be seen, Plato replaced "cause" with number and later with idea (form). In the *Timaeus* , the demiurge shapes the world we know by applying "eidos and numbers" (53 b), and in the *Philebus*, Socrates explicitly states that when passing from the one to the indefinite or inversely (17a), one should always consider number, i.e. it stands in the middle of the schema.

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<sup>30</sup>The line divided from the *Republic* is actually a logical square [Losev 2022], so the place of the Good remains problematic. In later times, however, the Neoplatonist Porphyry would not hesitate to break the Aristotelian logical square of predicates to return to the archaic five [Losev 2020].

<sup>31</sup>The Greeks did not recognize specifically what today is "symmetry" (mirror, inverse, etc.) and used the word primarily as an expression of today's "proportional" [Hon 2008].

Argumentation in the *Philebus* proceeds clumsily and unconvincingly - the purpose of the dialogue remains unclear and most of his assessments are far from admiring. The maneuvers and compromises used to restore a previously reduced fivefold configuration are puzzling. Structuring around some center, explicit or implicit, is undoubtedly Pythagorean. A quote from Philolaus (F6) shows that although nature's principles and manifestations are knowable, nature itself, the central component, remains unknowable. He states that it "admits divine knowledge, but not human," and Plato seems to follow him strictly, when he makes Socrates declare that he will pray the gods to tell him what the Idea of mixture is (25b). Then comes the explanation that some goddess has done it (26 b) and this is a sure guarantee of success. In the finale, it is made clear that by declaring the supremacy of commensurability, Plato has revealed the key to divine knowledge and its method.

Between the first and the second presentation of the method in the *Philebus* (16c-e and 23c-e), the notable difference is whether its scheme is with 5 or with 4 components. It turns out that the later variant proceeds with the tacit assumption that the mixing the original two components is (always) a success and continues with its consideration; the earlier one assumed that mixing leads to two alternatives, each being worth mentioning. Plato's most confusing move comes after the mixture is declared to be a Good, which is immediately replaced by the triad of commensurability, truth and beauty, so that the dialogue ultimately ends with a list of five components.

Plato's considerations in the *Philebus* suggests some oscillation between 5 or 4 as the number of components in schemes of reasoning. But if something superfluous is always present, then these numbers would rather be 4 and 3: so the fivefold scheme is easily revealed to be a square of oppositions, while the insistence that only a "successful" mixture is mixture, shows that it actually functions with only 3 terms. Correspondingly, it appears that the Pythagoreans operated with some heuristics, which the Platonic pruning deformed into a dialectic.

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