

D. The Truth as a Surd

1] The saying “God is an inexpressible number” (ἀριθμὸς ἀρρητὸς θεοῦ) is attributed to a thinker named Lysis, (c. 425 B.C.). Assuming that this refers to the work being done in incommensurable magnitudes at this time, what could he mean?

□□ Why do you think that Theaetetus and Meno, Plato’s two dialogues most directly about knowledge, both have such a central mathematical theme, specifically concerning incommensurables?

3] If Theaetetus and Theodorus represent mathematics and Socrates represents philosophy, what does the dramatic action of this dialogue tell us about the relationship between the two disciplines?

4] If the truth of anything is only approachable by a method analogous to the dyad of the great and small, what is the relationship between humans and the truth?

5] Taking the suggestion of Theon of Smyrna that the method of approximating the ratio of the side and diagonal of the square, and the ratio we now call the ‘golden ratio’ (the method of *anthuphairesis* that we have examined) was known as the ‘ladder of the great and the small’, answer the following questions after reading the quotes I have included regarding the great and small, or the indeterminate dyad:

a] What kind of existence does the indeterminate dyad have?

b] If the truth of anything is only approachable by a method analogous to the dyad of the great and small, what is the relationship between humans and the truth?

Quotes on the Dyad of the Great and Small (The Indeterminate Dyad)

Plato

[1] Socrates: ...greater and smaller...belonging to that kind of being which admits of ‘the more’ and ‘the less’.

Protarchus: You mean the kind that is unlimited?

Socrates: yes... *Philebus 25c*

[2] Socrates: ...‘more’ and ‘less’...When they are present in a thing they never permit it to be of a definite quantity...They obliterate definite quantity...Once you give definite quantity to ‘hotter’ and ‘colder’ they cease to be; ‘hotter’ never stops where it is but is always going a point further...whereas definite quantity is something that has stopped going on and is fixed...‘hotter and its opposite with it must become unlimited. *Philebus 24c-d*

[3] “Take ‘hotter’ and ‘colder’ to begin with, and ask yourself whether you can ever observe any sort of limit attaching to them, or whether these kinds of things have ‘more’ or ‘less’ actually resident in them...” *Philebus 24A*

[4] It is in this way, when they preserve the standard of the mean that all their works are good and beautiful.... The greater and the less are to be measured in relation, not only to one another, but also to the establishment of the standard of the mean.... [T]his other comprises that which measures them in relation to the moderate, the fitting, the opportune, the needful, and all the other standards that are situated in the mean between the extremes. *Statesman* **284a1-e8**

[5] To be other than something properly belongs, not to 'one', but only to an 'other-than-another'. *Parmenides* **139c3-5**

Aristotle *Metaphysics*

Number is derived from Unity and the indeterminate dyad... **1081a**

“...according to them the indeterminate dyad, receiving the determinate dyad, made two dyads; for it was capable of duplicating that which it received.” **1082a12**

“...the unit must be the Idea of an Idea, since it is prior to an Idea, and must have been generated before it.... the indeterminate dyad, as we have seen causes duality.” **1083b**

“...some who...making the element which acts conjointly with unity the indeterminate dyad” **1088b**

“...the indeterminate dyad or the Great and Small...” **1089a**

“...number, according to him, cannot be derived otherwise than from unity and an indeterminate dyad...” **1091a**

“...Positing a dyad and constructing the infinite out of great and small, instead of treating the infinite as one, is peculiar to [Plato]...” **987b26**

“...[Plato] has used only two causes, that of the essence and the material cause (for the forms are the causes of the essence of all other things, and the One is the cause of the essence of the Forms); and it is evident what the underlying matter is, of which the forms are predicated in the case of sensible things, and the One in the case of Forms, namely that this is a dyad, the great and small. Further he assigned the cause of good and evil to the elements, one to each of the two...” **988a 5-13**

“...[Plato's] making the other entity besides the One a dyad was due to the belief that the numbers, except those which were prime, could be neatly produced out of the dyad as out of some plastic material.”

“For some speak of the first principle as matter...e.g. Plato spoke of the great and the small, the Italians of the indefinite...” **988a24**

“...we derive lines from "Long and Short," a kind of "Great and Small"; and the plane from "Wide and Narrow," and the solid body from "Deep and Shallow." **992a10**

“...one might regard the substance which they make the material substrate as too mathematical, and as being a predicate and differentia of substance or matter rather than as matter itself, I mean the "Great and Small,"” **992b1**

"great" and "small," and "greater" and "smaller," whether used absolutely or relatively to one another, are essential attributes of quantity” **1020a22**

“...it is apparent that "equal" is intermediate between "great" and "small,”” **1056a10**

“...the genera posterior to number --the line, plane and solid. Some derive these from the species of the Great and Small” **1085a5**

“...in seeking the opposite of Being and unity, from which in combination with Being and unity existing things are derived, they posited the relative (i.e. the unequal), which is neither the contrary nor the negation of Being and unity, but is a single characteristic of existing things, just like substance or quality...they employ in their arguments and speak of Great and Small” **1089b10**

“...Plato makes spatial magnitudes out of a Great and Small.” **109b30**

“...the unequal, i.e. the Great and Small, is absolute badness...” **1091b30**

Aristotle *Physics* “...Plato’s ‘great and small’...he makes these his matter, the One his form...” **187a17**

Simplicius (6th century Neo-Platonist)

“The Indefinite Dyad which is called Great and Small, along with Unity, are principles of all things, including the Ideas themselves...”

“..Plato called the Dyad the Unlimited Nature since neither the Great and Small nor the Greater and Smaller are bounded, but involve the More and Less which pass on into Unlimitedness.”

“Aristotle reported that Plato, in his remarks on the Good, said that the Great and Small was matter, that it was unlimited, and that it contained all sensible things, which were unknowable because of their material, fluid, and unlimited nature...”

“...the Dyad can take the form of a mathematical continuum...”

“those things which are spoken of as having the relation of great to small all have the ‘more or less’ so that they can go on to infinity in the direction of the ‘still greater’ and the ‘still less’. In the same way, the broader and narrower, the heavier and lighter, and everything

spoken of in that way can go on to infinity. But what is spoken of as equal and at rest and attuned has not the 'more or less' as their opposites have. There is always something more unequal than what is unequal, something more in motion than what moves, something more out of tune than what is out of tune. Hence, that which is of this nature is inconstant, formless and infinite, and may be called not-being by negation of being." Simplicius *Commentary on Aristotle's Physics*, Diels, Vors, p. 247 quoting Hermodorus.

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They say that Plato maintained that the One and the Dyad were the First Principles, of Sensible Things as well. He placed the Indefinite Dyad also among the objects of thought and said it was Unlimited, and he made the Great and the Small First Principles and said they were Unlimited, in his Lectures On the Good; Aristotle, Heraclides, Hestiaeus, and other associates of Plato attended these and **wrote them down in the enigmatic style in which they were delivered** [Barnes 1984: 2399 (emphasis added)]. Simplicius *Commentarius in Physica* 453.25-30

Porphry

"..Unity and the Indefinite Dyad are elements of number"

"Plato made the More and Less to be the Unlimited Nature..."

"Plato considered matter to exhibit the More and the Less, along with the Great and the Small."

Chalcidius

"Numenius says that Pythagoras gave the name of Monad to god, the name of Dyad to matter; this indeterminate Dyad is by no means generated, but determinate (matter) has come into being. That is to say, before it was adorned with form and order, matter was without birth and origin, but its birth was its being adorned and embellished by the god who regulated it..." [fragment 52, 5-24]¹

Alexander of Aphrodisias

"...each of the numbers participates in Unity and in the Indefinite Dyad...Plato said the Ideas are numbers..."

"Plato spoke of his Dyad as being both Indefinite and Unlimited..."

"Thinking to prove that the Equal and Unequal [other names for One and Indefinite Dyad] are first Principles of all things, both of things that exist in their own right and of opposites...he assigned equality to the monad, and inequality to excess and defect; for inequality involves two things, a great and a small, which are excessive and defective. This

¹ From Kahn (2001) pg. 132

is why he called it an Indefinite Dyad - because neither the excessive nor the exceeded is, as such, definite. But when limited by the One the Indefinite Dyad, he says, becomes the Numerical Dyad.”

Commentary of the Metaphysics[Barnes 1984: vol. 2, 2398]

Plotinus

"out of the indeterminate dyad and The One arise the Ideas and the numbers": for the dyad is the Intellectual-Principle.” **First Ennead, Fourth Tractate, Section 2**

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