

References to the planets in the "back cover" inscription of the Antikythera Mechanism

Alexander Jones, April 13, 2011

(Not for circulation or citation.)

Geminus offers a brief account of the arrangement of the cosmos as follows:

Highest of all is the so-called sphere of the fixed stars, which contains the picturing [ειδωλοποιίαν] of all the constellations. However, one ought not to suppose that all the stars are situated on a single surface, but that some of them are actually higher up, and others lower down; but because the sight travels an equal [?] distance, the difference in height is imperceptible. Below the sphere of the fixed stars is situated the sphere of Phainôn, the star called "of Kronos" [Saturn]; this travels through the zodiacal circle in 30 years approximately, and one zodiacal sign in 2 years and 6 months. Below Phainôn, lower than it travels Phaethôn, the star called "of Zeus" [Jupiter]; this travels through the zodiacal circle in 12 years, and one zodiacal sign in a year. Below this is placed Pyroeis, the star of Ares [Mars]; this traverses the zodiacal circle in two years and six months, and a zodiacal sign in two months and a half. The Sun occupies the enclosed space, travelling through the zodiacal circle in a year, and a zodiacal sign in approximately one month. Lower than this is situated Phôosphoros, the star of Aphrodite [Venus]; this moves approximately with equal speed to the Sun. Below this is situated Stilbôn, the star of Hermes [Mercury], and it too moves with equal speed to the Sun. Below all travels the Moon, travelling through the zodiacal circle in 27 1/3 days, and a zodiacal sign in 2 1/4 days approximately.

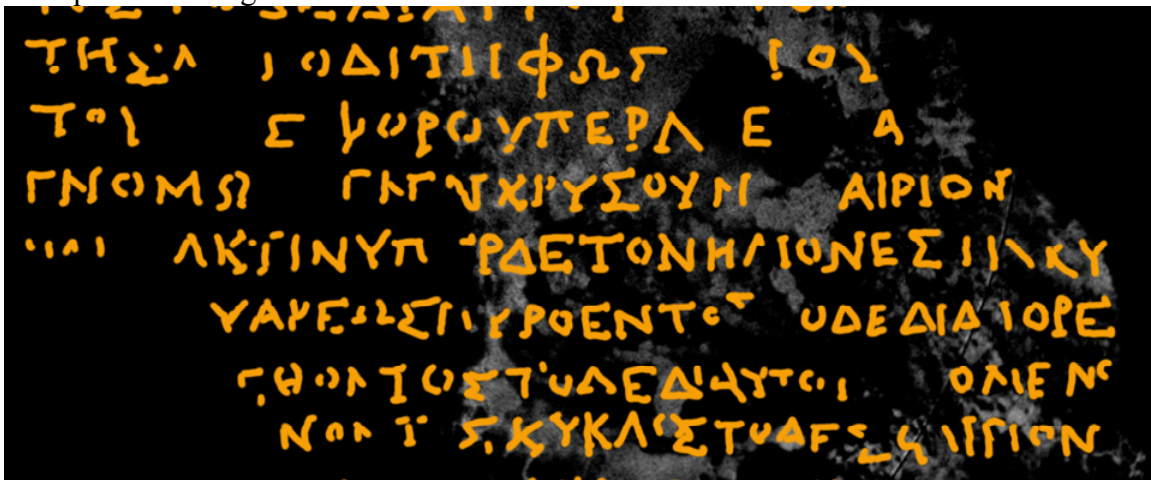
I quote this passage not only because it delineates the kind of post-Aristotelian cosmology that I believe was portrayed in the front display of the Mechanism, but also because Geminus designates the planets by twofold names: the more familiar "theophoric" names ("star of Ares") and their alternative descriptive names (Phainôn = "shining", Phaethôn = "radiant", Pyroeis = "fiery", Phôosphoros = "light-bringing", Stilbôn = "glittering"). In ancient Greek texts, the planets are sometimes informally named simply by the names of the gods with which they were associated, thus Ἄρης meaning Mars, but more commonly one used the more formal expression "the star of Ares" or the adjectival name "Pyroeis" or the combined expression "Pyroeis, the star of Ares".

When I first saw the transcription of the "back cover" inscription in the 2006 Nature paper I noticed the following passages:

18 18	Τ Η Σ Α Φ Ρ Ο Δ Ι Τ Η	Ε Ρ Ο Υ
19 19	Τ Ο Υ Σ Ψ Ο Ρ Ο Υ Ι Ε	Ε Ρ Ε Τ Α Ν
22 22	Υ Α Ρ Ε Σ Α Υ Ρ Ο Ε Ν Τ Ο Τ Ο Δ Ε Δ Ι Α Π Ο Ρ Ε	
23 23	Ε Θ Ο Ν Ο Σ Τ Ο Δ Ε Δ Ι Α Π Ο Ρ Ε Υ Ο Μ Ε Ν Ο Υ	
24 24	Ι Ν Ο Ν Ο Υ Κ Υ Κ Λ Ο Σ Τ Ο Δ Ε Σ Φ Α Ι Ρ Ι Ο Ν Φ	

In line 2006.19 the letters ΣΨΟΡΟΥ are impossible for a Greek word or words, but their proximity to Ἀφροδίτη in line 2006.18 suggested that the correct reading might be Venus' descriptive name in the genitive case, τοῦ Φωσφόρου. In line 2006.22 my eye was caught by the sequence of letters ΡΟΕΝΤΟ which is not common in Greek prose vocabulary but occurs in Mars' descriptive name in the genitive case, Πυρόεντος, and moreover ΑΡΕΣ almost immediately preceding was suggestive of some form of Ἄρης, genitive Ἄρεως. (I soon realized that the 2006 transcriptions often do not show where there are spaces containing untranscribed letters between transcribed letters, so ΑΡΕΣ might be either the nominative form with eta misread as epsilon or the genitive form with omega not read.) There was clearly a repetitive sentence structure going on towards the ends of lines 2006.22-23, suggesting that the text preceding the repeated words might be going through a sequence of related items, and sure enough, ΕΘΟΝΟΣ looked like an incomplete reading of Φαέθοντος, the genitive form of Jupiter's descriptive name. If the pattern continued, the next line should have Saturn's descriptive name, probably in the genitive case again, Φαίοντος, and the first transcribed letters were indeed INON.

The CT stacks that Tony sent me in early 2007 confirmed these guesses. Here for example are tracings made from the stack "B2 full TF29 0703A Axial dark".



Thus in lines 2006.22 and following (=23 and following in my current transcription) there is a repeating verbal pattern: theophoric planet name ("star of N"), descriptive name in the genitive case, followed by a new phrase, either τὸ δὲ διαπορευόμενον or τὸ δὲ σφαίριον (which could be variant orderings of the same phrase τὸ δὲ διαπορευόμενον αὐτοῦ σφαίριον, "the little sphere that travels through it"). The reading for Mars is more or less all legible; Jupiter's descriptive name is almost complete and its restoration beyond doubt because of the distinctive sequence of letters ΕΘΟΝΤΟΣ. The restoration of Saturn's descriptive name is not as strongly dictated by the surviving letters, but taking these letters together with the pattern established in the preceding lines, it is all but certain.

It turns out that Venus' descriptive name Φωσφόρου appears twice, both in line 2006.18 (my line 19) immediately following the theophoric name, and again in 2006.19 (my line 20). The engraver seems to have omitted a sigma at the end of ΑΦΡΟΔΙΤΗ in 2006.18, since the preceding definite article τῆς shows that the genitive form Ἀφροδίτης should follow as expected in the formula "the star of Aphrodite".

Mercury (ὁ τοῦ Ἑρμοῦ Στίλβων or, in the genitive, τοῦ τοῦ Ἑρμοῦ Στίλβοντος) is so far missing. Its expected place is either right before Venus or right after, depending on whether the inscription's author considered Mercury to be below or above Venus. Line 2006.20 (my 21), with its "golden little sphere" situated on a pointer, must be talking about the Sun, so if Mercury is to come between Venus and the Sun, its reference in the inscription would have to be entirely in the lost part of 2006.19 (my 20), a rather tight fit. I think it is more likely that Mercury was mentioned before Venus, i.e. before 2006.19 (my 20). Line 2006.18 in fact begins with the letters ΤΟΣ followed by a phrase τὸ δὲ δι' αὐτοῦ φερόμεν[ον] that has the identical meaning as the phrase restored in 2006.22-23 (my 23-24), τὸ δὲ διαπορευόμενον αὐτοῦ, "the [little sphere] travelling through it". We can thus likely restore τοῦ τοῦ Ἑρμοῦ Στίλβον- at the end of 2006.17 (my 18).