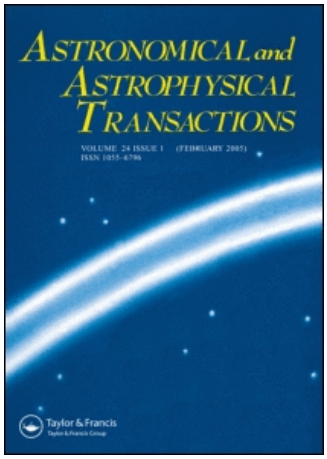

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ARCHAEOASTRONOMY AND ARATUS' PHAENOMENA

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The astronomically determined dates of *Phaenomena's* origin are surprisingly ancient (about 2000 BC). The contents of the poem, however, refer to rather advanced astronomical concepts that can not be accounted for as later revisions. They *may* be related with the mythology of the Egg–World. Data on the constellations' synchronous ascensions and crossing by the equinoxial and heavenly tropics might result from an ancient search at some Stonehenge–like observatories.

KEY WORDS Aratus, constellation, heavenly tropics, equinoxial, precession, heavenly sphere, Egg–World

The *Phaenomena* poem by Aratus (about 310–245 BC) is a versification of two of Eudoxus' works that are lost. Though thoroughly studied in a philological way, the poem has been very underestimated as a source for the early history of astronomy.

The poem contains descriptions of the constellations which allows one to determine the latitude and the date of the observations. The latitude is obtained from the area of the sky unknown to Aratus, while the date comes from the positions of the constellations in relation to the pole of the world which is drifting due to precession. Several investigations proved that the origin of the poem is surprisingly ancient. The most recent studies using different approaches produced similar dates: 2600 ± 800 BC (Ovenden, 1966) and 2000 ± 200 BC (Roy, 1984). The evaluated latitude of the observations is $36 \pm 1.5°$ North.

Having accepted these dates, we must review the history of the development of ancient astronomical concepts. The region of origin is found to be to the North of the main centers of civilisation of the time, Mesopotamia and Egypt. Therefore, the origin must be attributed to some then "non-writing" nation which might have populated the South of Asia Minor or the northern areas of Iran.

Geometrically, the world as pictured in the poem (excluding the concept of the spherical Earth) corresponds to a rather advanced astronomical model usually attributed to Plato and Eudoxus. The elements of this model are: a spherical heaven surrounding the Earth, the concept of heaven revolving around the world's axis, awareness of the four main heavenly circles, the equinoxial, the ecliptic and

the tropics. Moreover, these concepts are inherent to the poem and can hardly be accounted for as later revisions.

The antiquity of the origin is confirmed by some archaic features of the poem which may be traces of the mythology of the original creators. These are the concept of the flat Earth (confirmed by referencing a fixed inclination of the heavenly tropics to the horizon), the Earth floating on the water (in the poem, the horizon is called "ocean", the descending luminaries getting "into the ocean") and the deification of the sky called, in the poem, "Zeus".

We may assume that the authors of the origin were connected with "horizon astronomy". Several of Aratus' phaenomena could be seen at night at observatories like Stonehenge (which is contemporary to the astronomically dated origin). These are the data on the synchronous ascents and descents of the constellations and the detailed description of their crossing by the equinoxial and the tropics. (The equatorial constellations pass the markers of the sunrises and sunsets at the equinoxes while the tropic ones pass the markers of the solstices).

We may assume the origin to be a sort of an oral religious "sermon". This accounts for the conservatism and longevity of the monument. The concept of the spherical sky and the flat Earth "floating" upon the ocean was shared by Vedantic Aryans in the form of the Egg–World myth. Its origins are found in the beliefs of the Orphics to which the Pythagoreans were close. (Note that Eudoxus was taught astronomy by Architus of Tarent, a Pythagorean). There are references of the flat Earth "floating" upon the water in Phales.

Aratus' *Phaenomena* shows the surprising possibility that the elements of spherical astronomy were developed 1700 years or more before Eudoxus on the basis of the unique mythological concepts of the sky as the shell of the Egg–World and searches at Stonehenge–like observatories.

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