

Homocentric Astronomy and Copernicus

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‘Merchants of Knowledge’ is my analytic term for

A. Jewish scholars connected to Crete who

B. Sold MSS to the Fuggers between 1539 and 1542 and were

C. Multi-lingual and trans-regional and

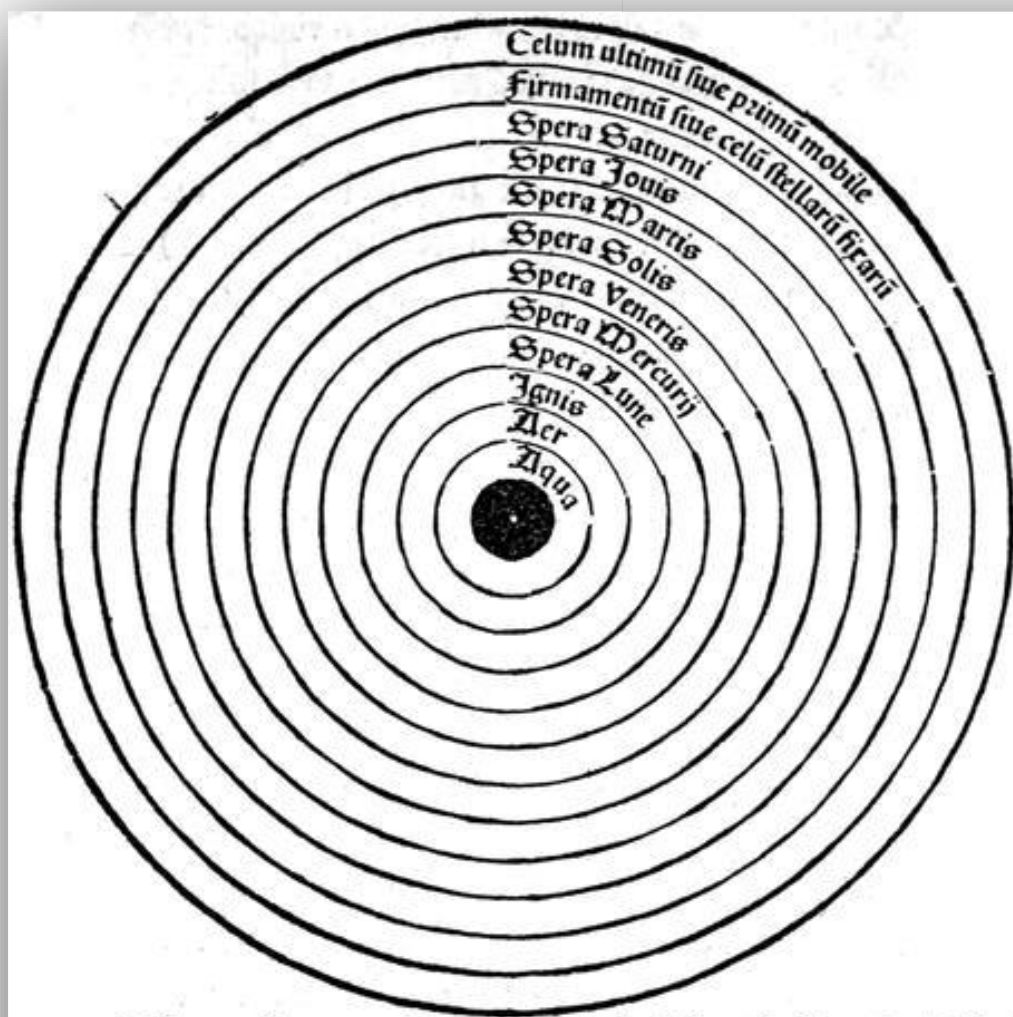
D. Interested in Latin texts and who

E. Came from families interested in commerce

The merchants of knowledge had well-placed contacts including Pico della Mirandola (d. 1494), Domenico Grimani (d. 1523) and ‘Abd al-Raḥmān Mu’ayyadzādeh (d. 1516), an elite Ottoman scholar and judge.



A map of the Mediterranean with the Ottoman Empire, Crete, and Venice, the key locales of the MOKs



A figure of
concentric/homocentric orbs
borrowed from Georg
Peurbach's (d. 1461) *Theoricarum*

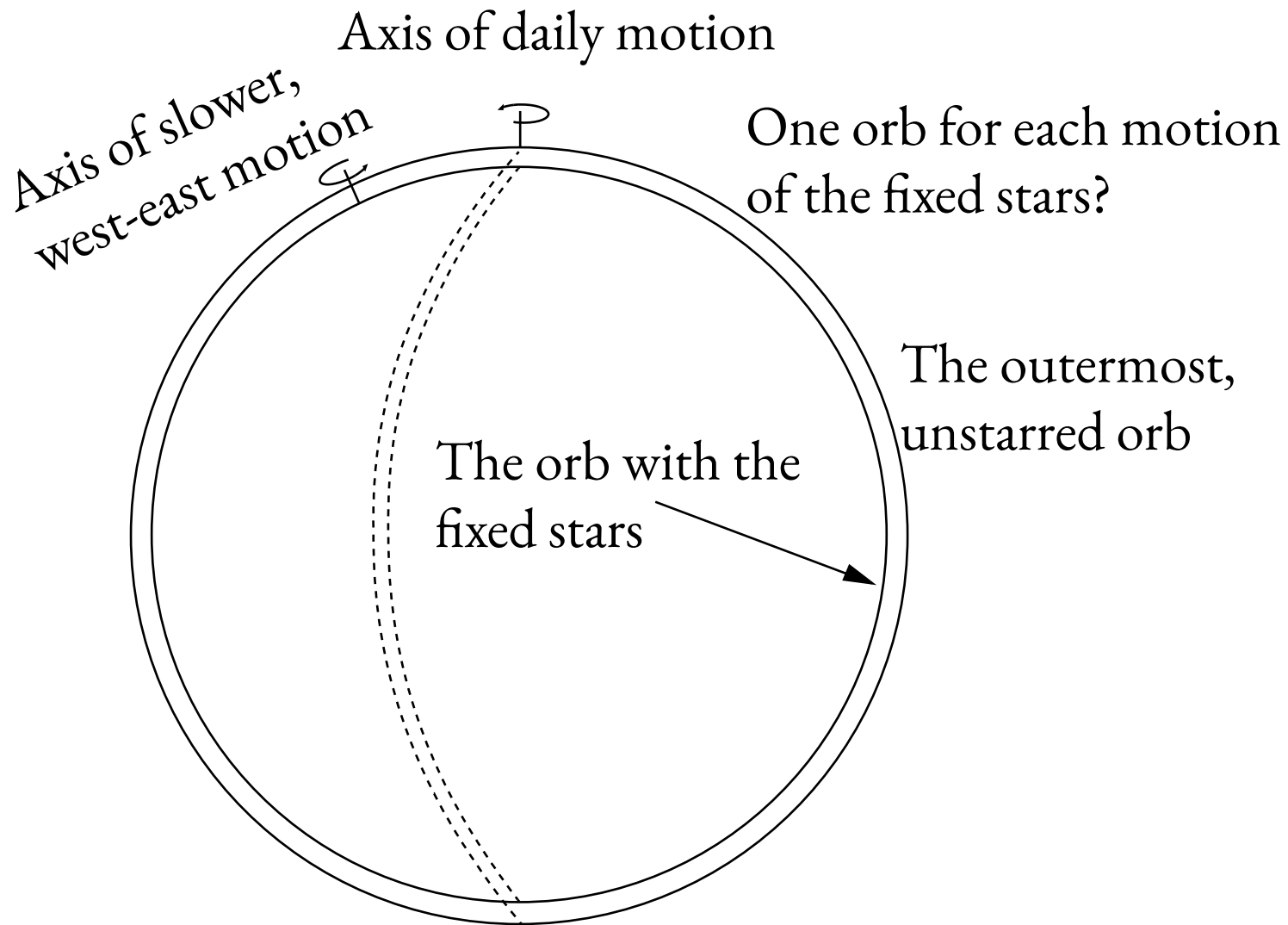
Eudoxus and Calippus (fourth
c. BCE) tried to theorize
concentric orbs that would
account for observations with
mathematical precision.

Unfortunately, their texts do
not survive.

¶ Secundum accidens autē diuiditur in sperā
rectā & obliquam. Illi enī dicuntur habere
speram rectā: qui manent sub equinoctiali:
si aliquis manere possit. Et dicitur recta quoniā
neuter polorum magis altero illis eleuat. Vel
quoniā illoꝝ horiçon interfecat equinoctialē

Diuisio sperę se-
cundū accidens

De spera recta.

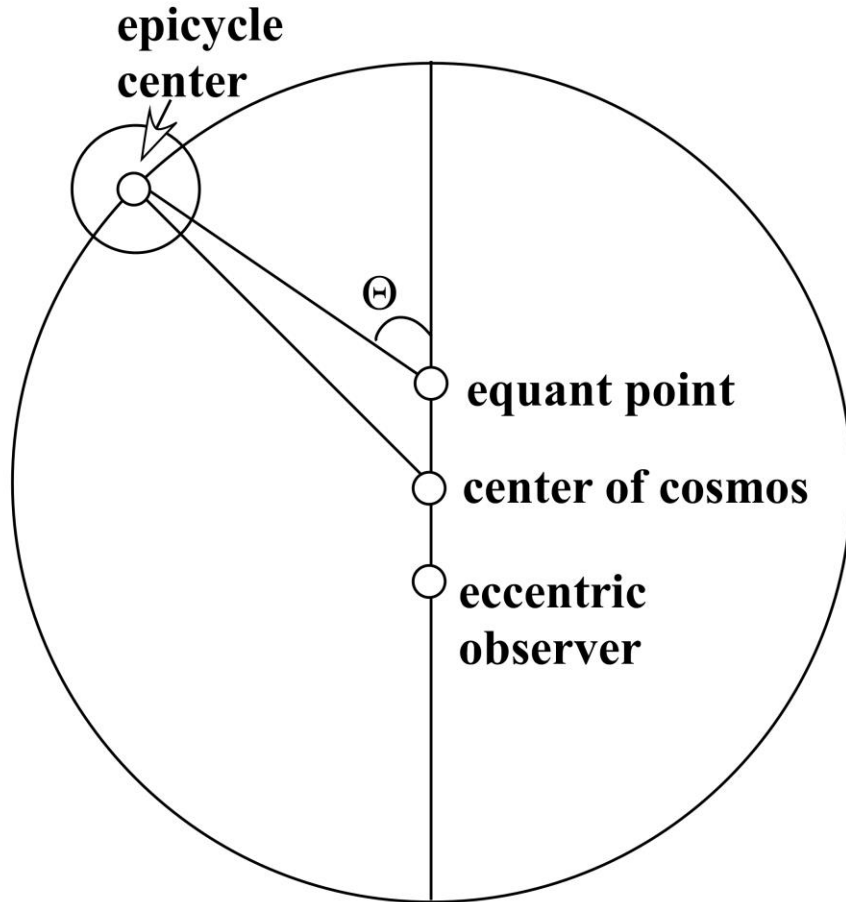


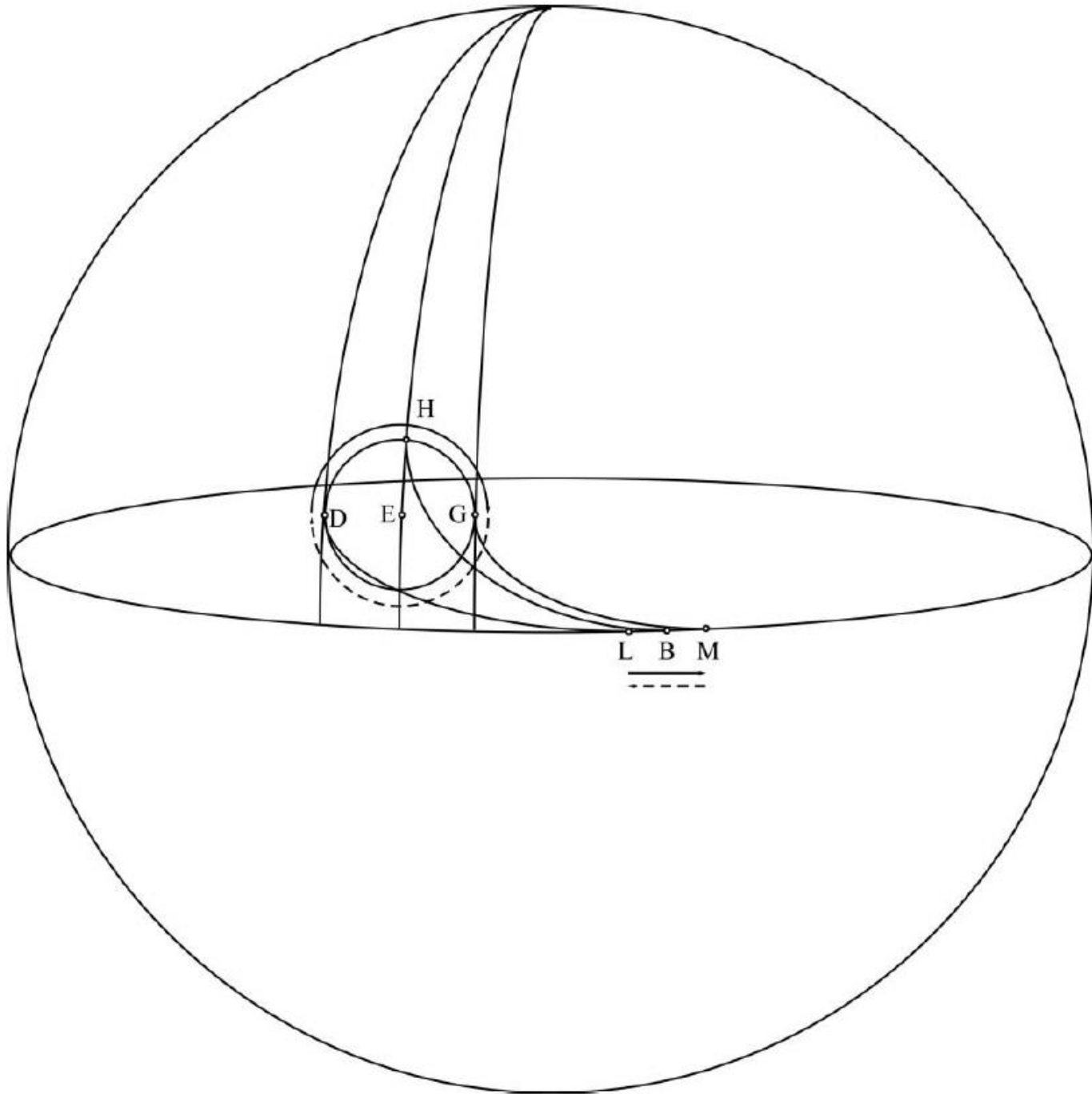
Positing separate
orbs for the two
motions of the
fixed stars

The motion of the first heaven and of all the orbs is one, that is to say diurnal, the rest are by accident and secondary [causes]. It is absolutely not to be denied that different motions produce different specifics, thus in one animal there can be a plurality of motion in species (as he says himself) of which one is from the right to the left. The other is, on the other hand, opposite.

Agostino Nifo, *Commentary on Averroës, De substantia orbis*

This is a two-dimensional view of a model for an upper planet with an equant





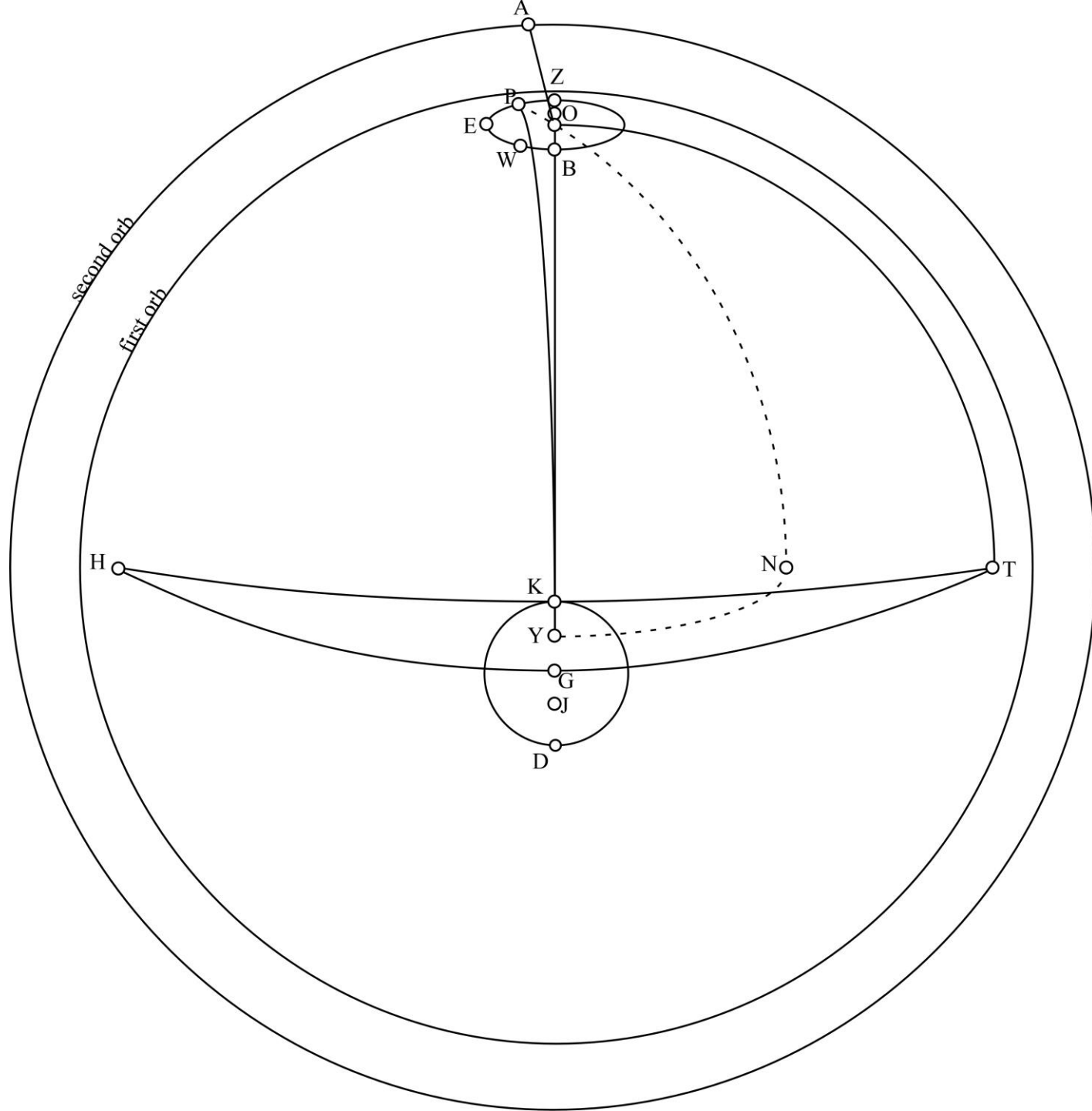
In Regiomontanus' theory, as pole D moves to H and then G, point moves to B and M

The Spanish mathematicians (*mathematici*) intend that the poles of the zodiac revolve about the poles of the entire world describing a small circle, supposing consequently that these motions be granted for the zodiac and the entire world. Consequently, it is not unsuitable for such spheres. He adds that the Spanish mathematicians grant such a motion of the poles to the starry orb. They say that because the starry orb is moved about the poles of the whole, this is the ninth orb's motion in trepidation. From these the truth of the solution becomes clear, as is clear in the rest of the comment.

Nifo, *Exposition of the Metaphysics*

All of these [i.e. Averroës, Ibn Ṭufayl, and Maimonides] said that the principles of natural science upset what Ptolemy proposes regarding this [i.e. astronomy]. And it [natural science] is true and, without doubt, there are attached to Ptolemy's astronomy enormous gaps in his proofs since he did not have completely satisfactory evidence for the epicycle and eccentric he proposed, as Averroës explained in many places. Even the words of the modern astronomers and their like, who thought to save Ptolemy, necessitate that there be a heavenly body without any function so that there will not be proposed any void with a few of the planets. This body nearly solves the difference, that is to say that a part of it is very thick and that a part is very thin and that it occurs with this that it moves in a way agreeing with the rest of the bodies that are with it until no void occurs nor interpenetration of [celestial] bodies as is known to whomever looks at their words. All of this is a worthless fancy.

Elijah Delmedigo, *Commentary on De substantia orbis*



The Eudoxan Couple
 proposed in the Hebrew
 recension of *The Light of
 the World*

Moses Galeano (d. > 1542)

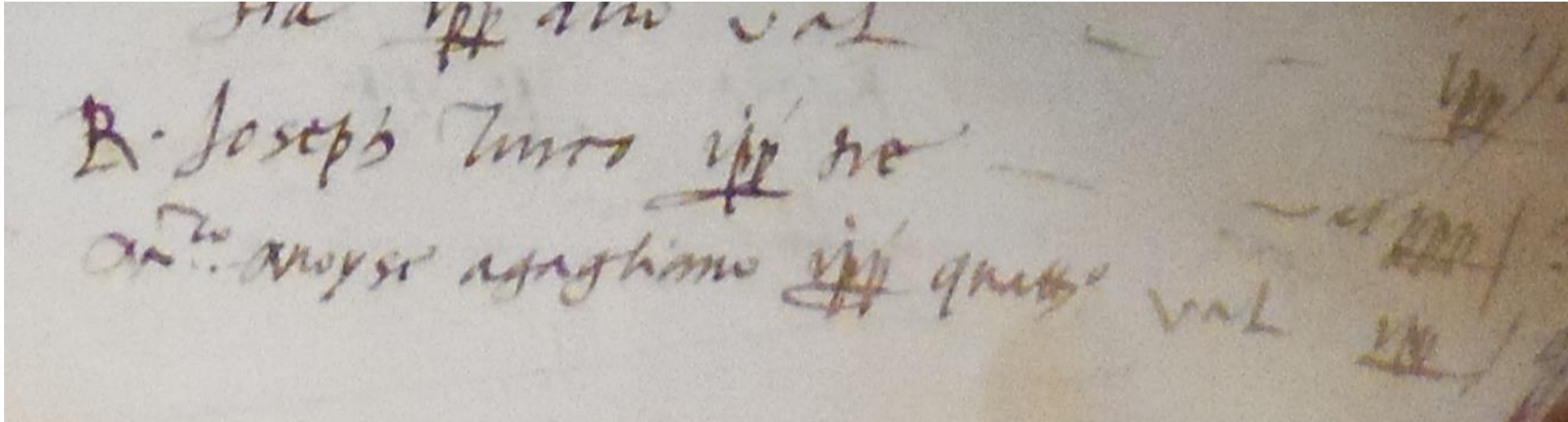
A. Was also known as Mūsā Jālīnūs

B. Wrote in Hebrew, Arabic (in Arabic script) and Ottoman Turkish

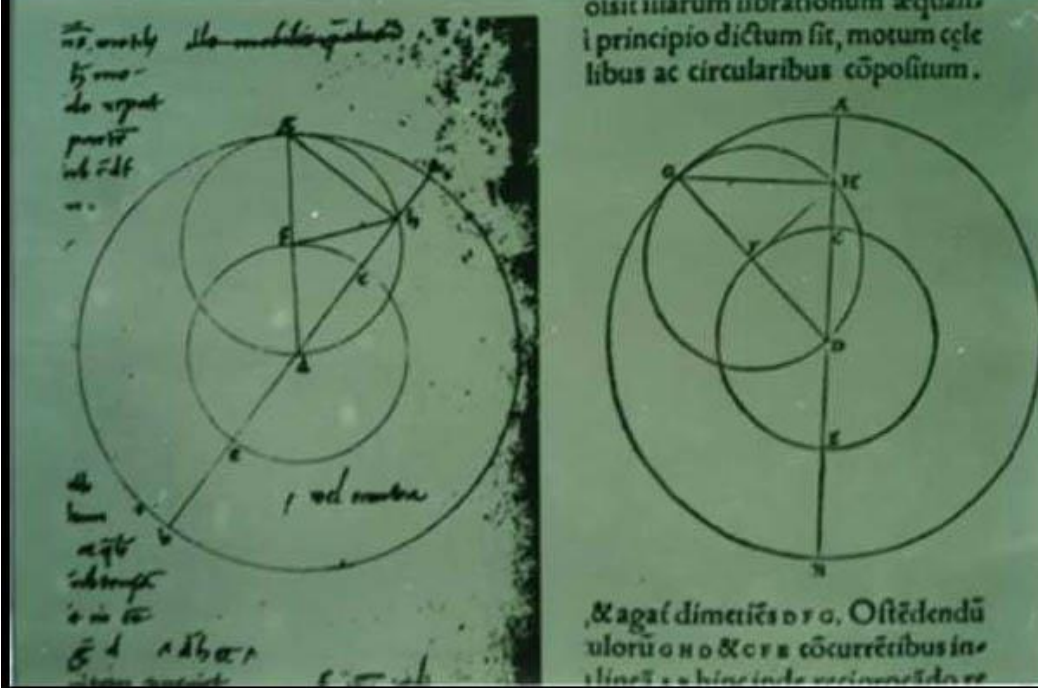
C. Produced an Arabic version of the *Almanach Perpetuum*

D. Was present at Sultan II. Bayezit's (d. 1512) court

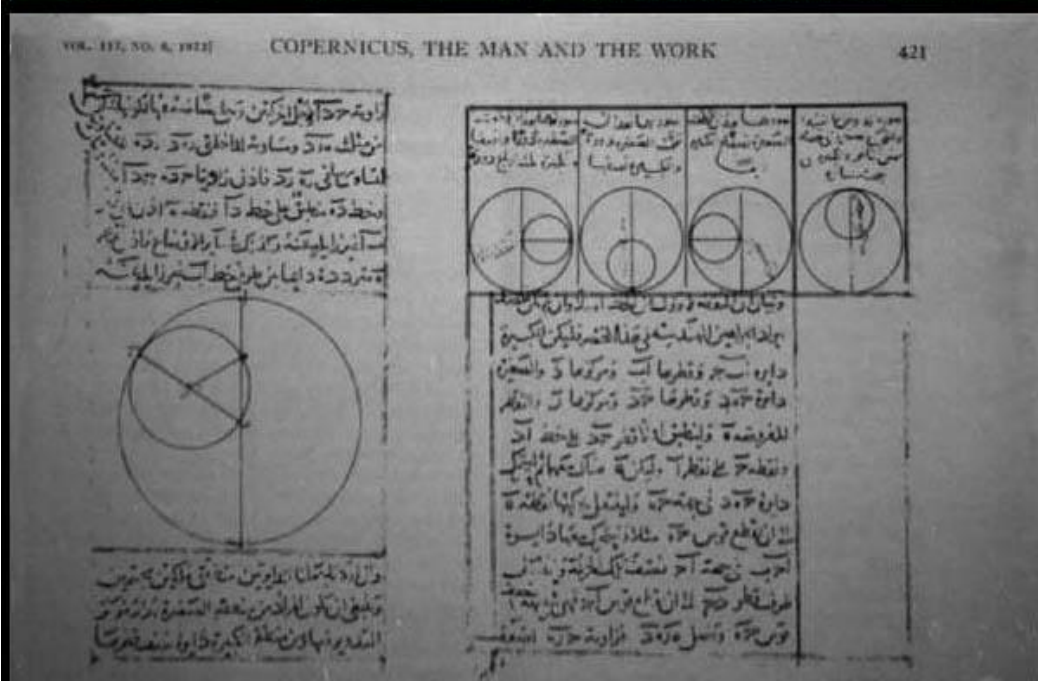
E. Moved to Crete from Istanbul in the mid-1520s



Above is Galeano in a tax census



The presence of the Tūsī Couple in Copernicus' *De Revolutionibus*

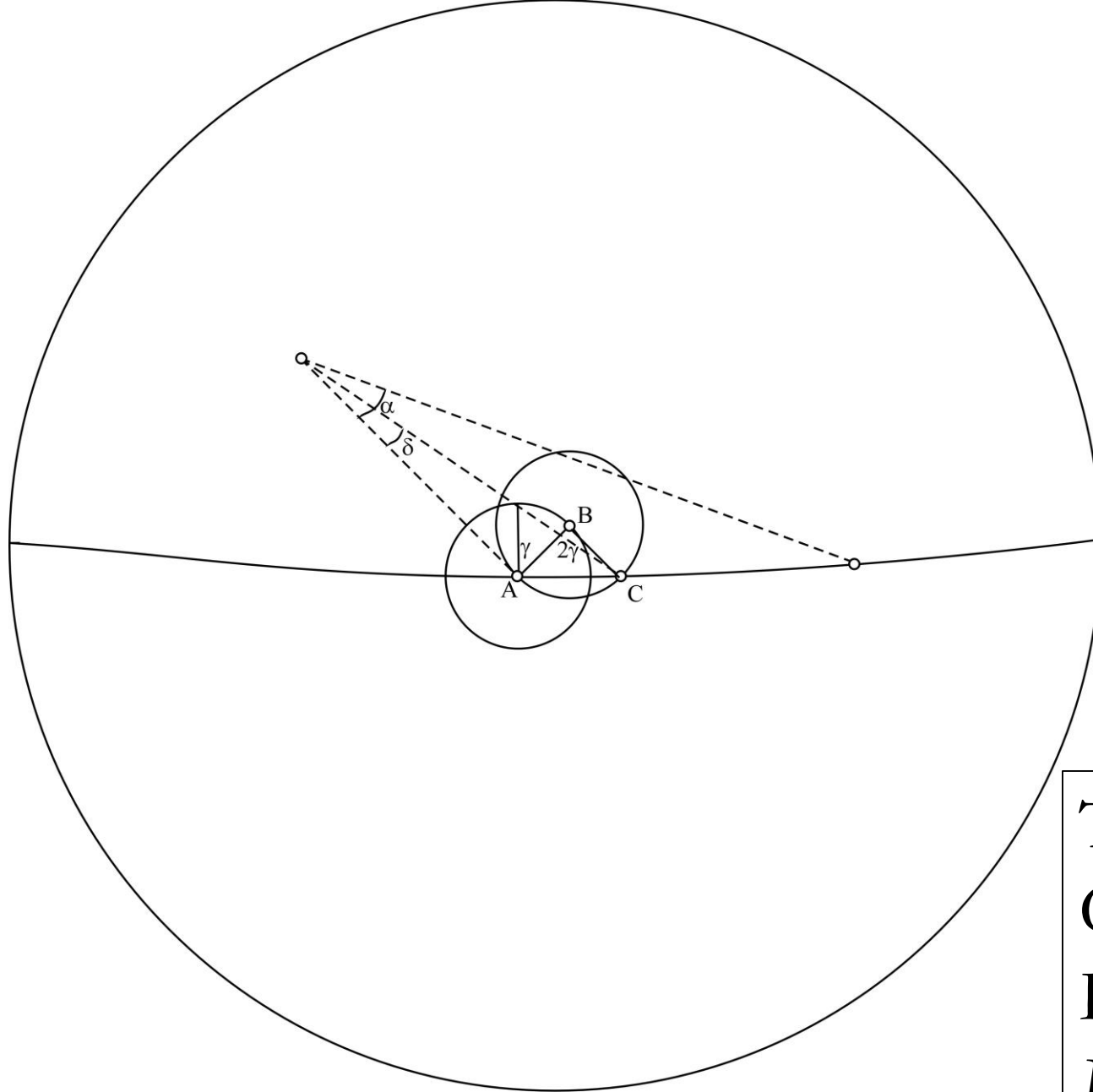


<http://people.sc.fsu.edu/~dduke/tusi.html>

Source:
http://www.columbia.edu/%7Eegas1/project/visions/case1/finished/704-1-4_705.JPG

FIG. 1. The Tusi couple in Nasir al-Din's *Tadhkirat al-Hayyan*, MS. Label 2116, fol. 38b-39a. The Arabic letters along the perpendicular, from top to bottom, are A, H, D, B. The point of contact between the two circles is designated by G.

Giovanni Battista
Amico's (d. 1538)
solar model.



This version of the Ṭūsī
Couple is found in the
Hebrew recension of *The
Light of the World*

Note the resemblance of Copernicus' lunar model (left, below), Ibn al-Shāṭir's (left) and Ibn Naḥmias' (below)

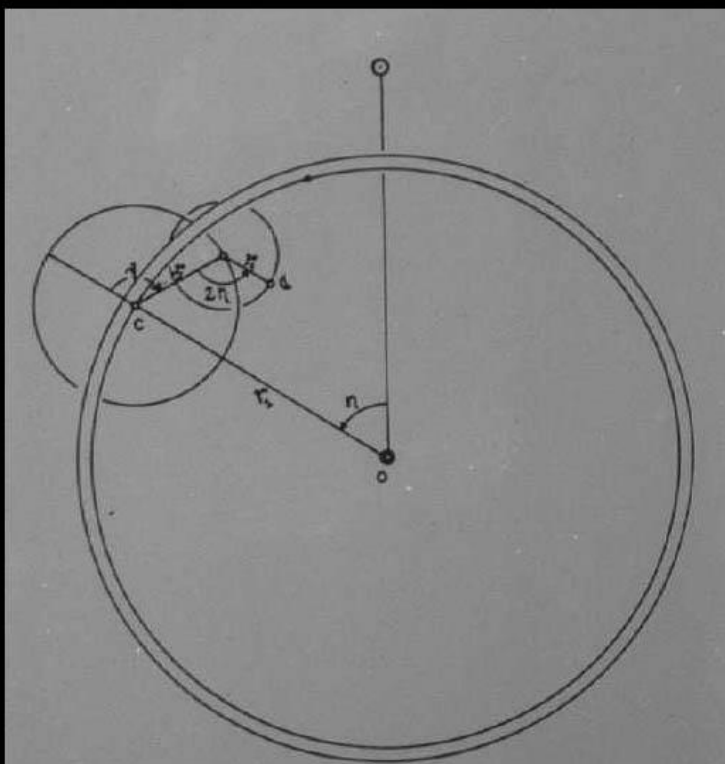
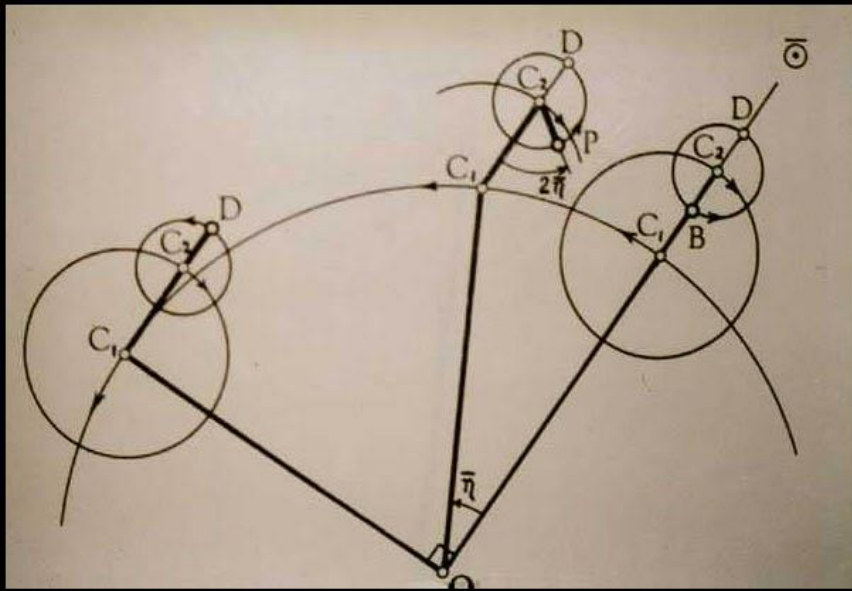
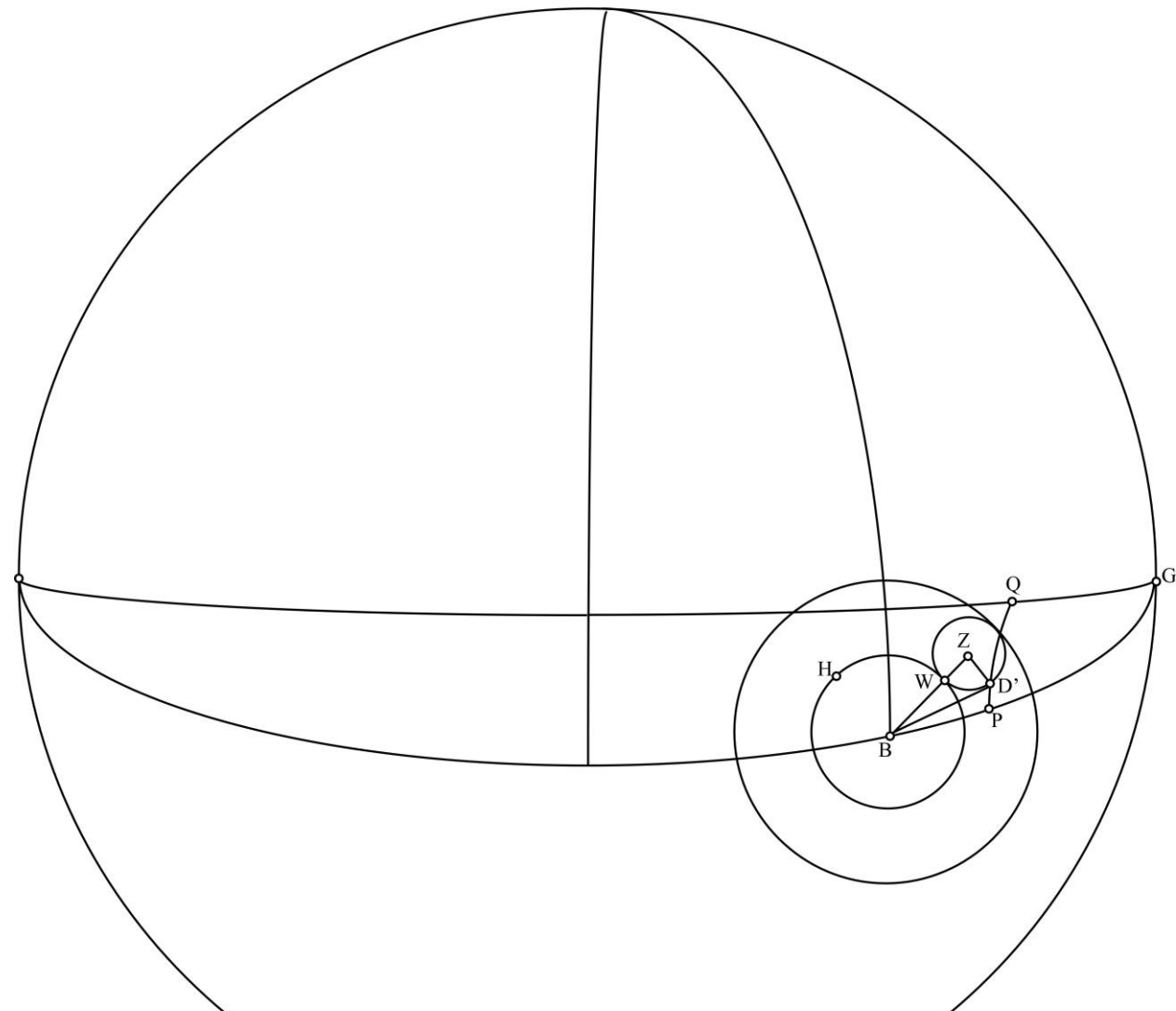


FIG 13



Key Conclusions:

- There is plenty of direct and circumstantial evidence for a trans-regional exchange of homocentric astronomy
- Scholars affiliated with the University of Padua were interested in the correspondence of homocentric astronomy with observations
- Note the remarkable contents of *The Light of the World*, a text that does make it to Padua
- Scholars not partial to homocentric astronomy could employ homocentric techniques