

Early Modern Copernicanism and Giordano Bruno

From last lecture..

- What is history?
- The study of men and women in Time
- History does not deal with the ‘beginning’ of a phenomenon, but..
- History investigates the ‘causes’ of a phenomenon
- The importance of studying religion historically
- Is the earth a unique place?
- The ‘causes’ of this issue with a historical focus: why are men and women so invested in the question IN HISTORICAL TERMS?
- Also, assumptions about science and religion: do we really know what they are IN HISTORICAL TERMS?

Old cosmology: a mix of Bible and Aristotle

- Geocentrism
- The earth does not move
- The ‘heavens’ above the earth are incorruptible
- What is behind this formulation? Nature and theology in the later Middle Ages

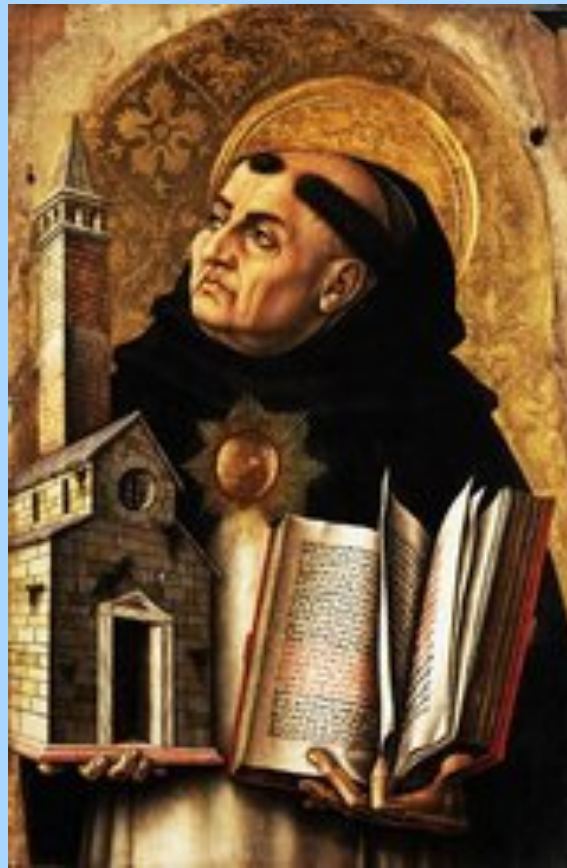
Christianity, Aristotle and Plato



Raphael, 'School of Athens' (1509-10), Stanza della Segnatura



Thomas Aquinas (1225-1274): the Christianization of Aristotle



Aquinas by Carlo Crivelli, mid-fifteenth century

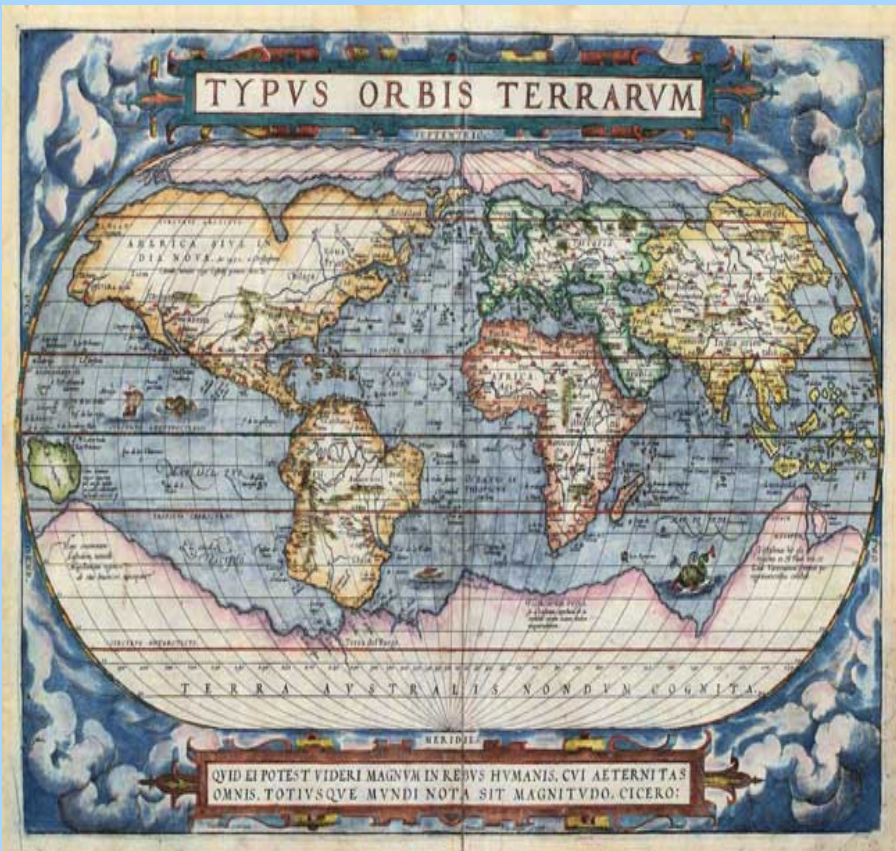
Aquinas and the link between faith, reason and nature

‘..although God exceeds all sensibles and senses, his effects, from which the demonstration is taken for proving God exists, are sensible. And thus the origin of our knowledge in sense holds even when what is known exceeds sense’ (introduction to the proof of God’s existence from the ‘Summa contra Gentiles’)

1492: the earth is not that small

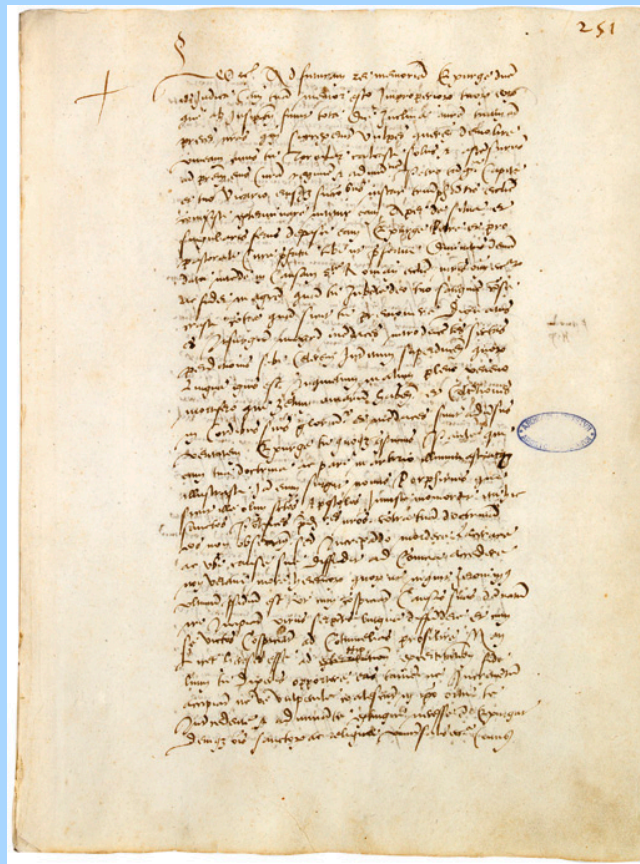


World map, Brescia, 1483 ca.



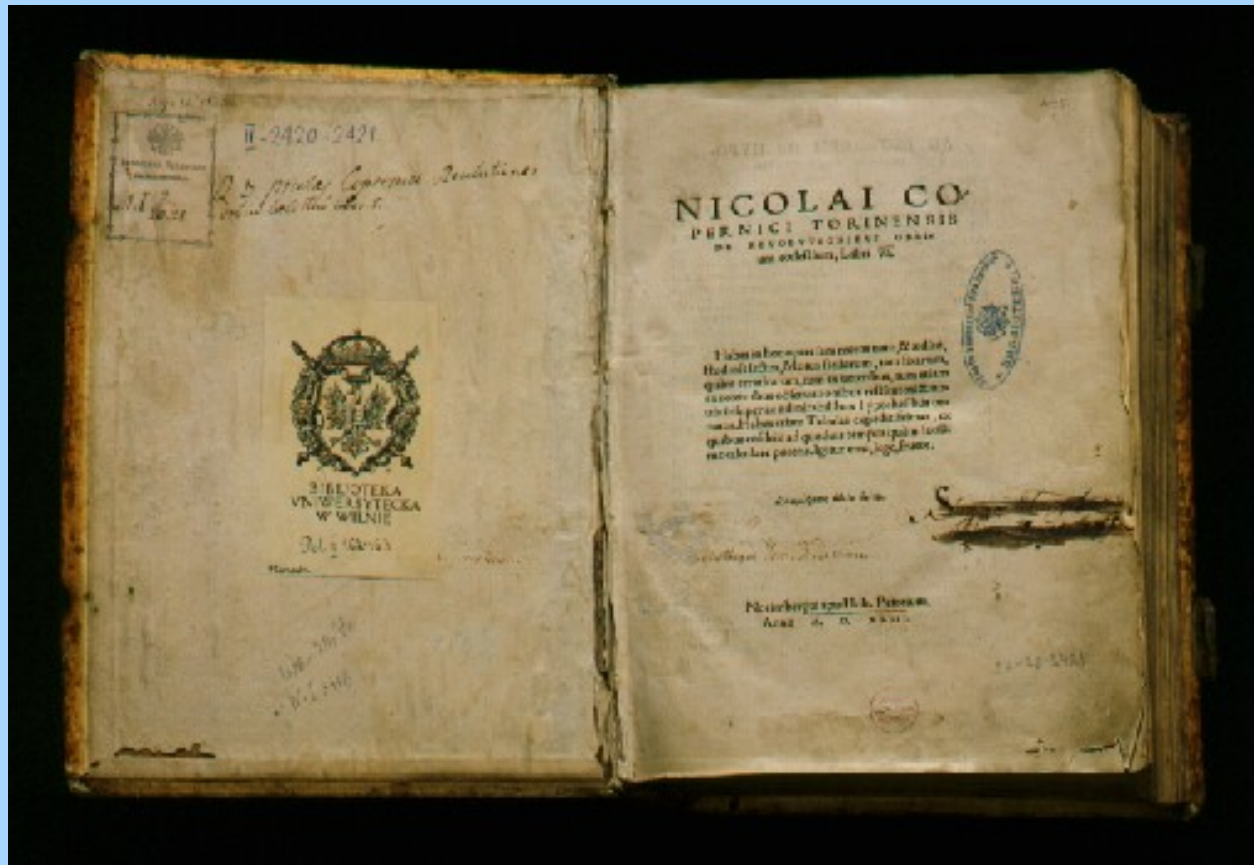
World map, Amsterdam 1570

1517: earth (and heaven) turned upside-down



Text of the Bull 'Exurge Domine', with which Luther was excommunicated by the Pope, 1520, Vatican Library

Nicholaus Copernicus: the earth is not the center



Nicholaus Copernicus' s *De Revolutionibus*, I ed. 1543

The problems with Copernicus' s theory:

- 'Wrong' theology
- 'Wrong' timing
- 'Wrong' calculations
- For some decades, **NOBODY CARED!**

Wrong theology: ‘Then spake Joshua to the LORD in the day when the LORD delivered up the Amorites before the children of Israel, and he said in the sight of Israel, Sun, stand thou still upon Gibeon; and thou, Moon, in the valley of Ajalon. And the sun stood still, and the moon stayed’ (Joshua, 10:12-13)

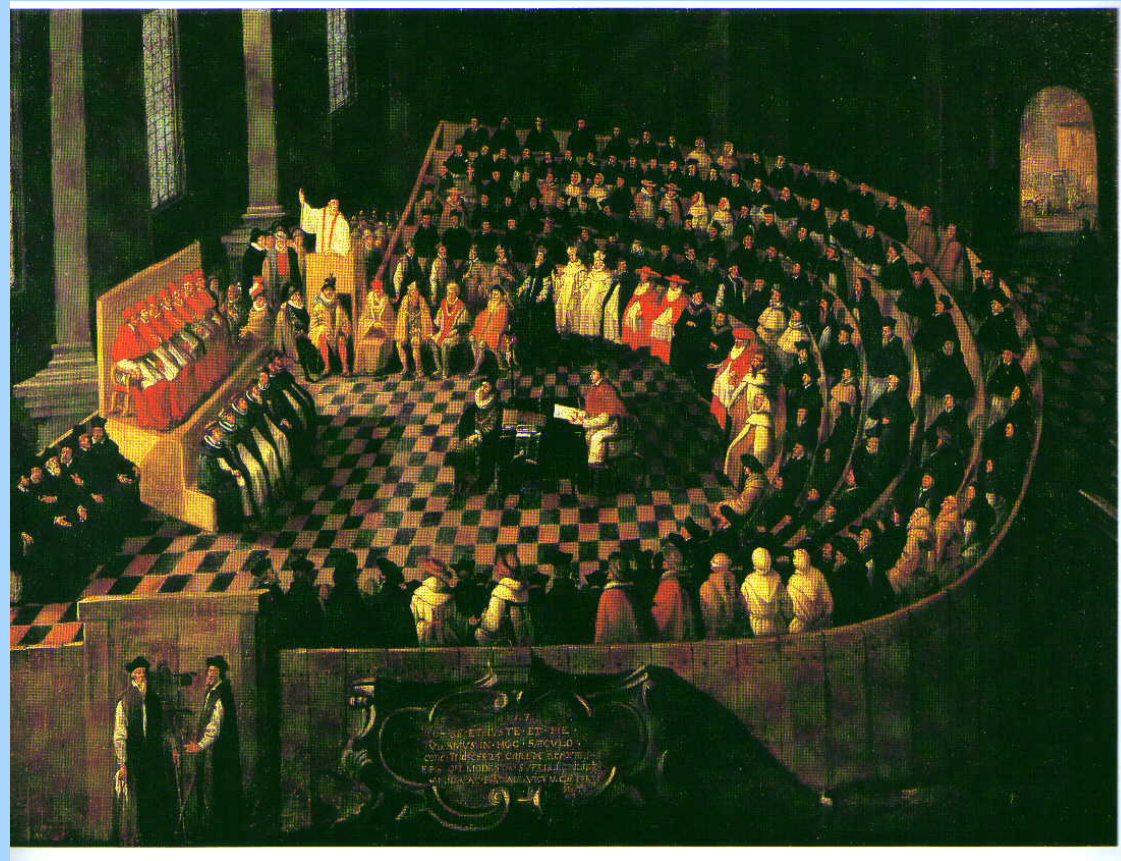


Wrong timing: the Protestant Reformation spreading fast..



Religious map of Europe, ca. 1560s

Wrong timing: the Reformation and the Council of Trent (1545-1563)



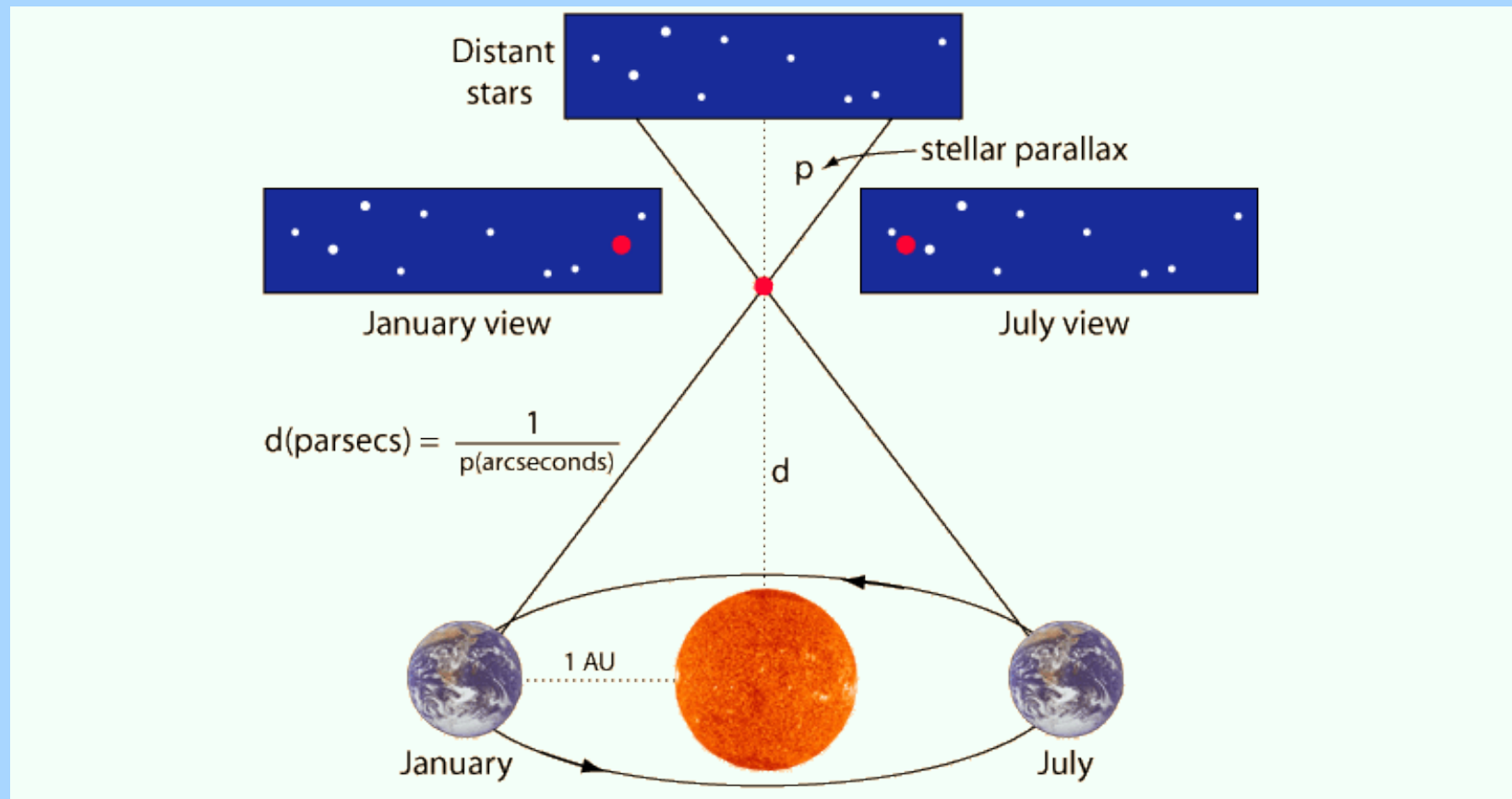
Wrong calculations: the orbits



Wrong calculations: the size



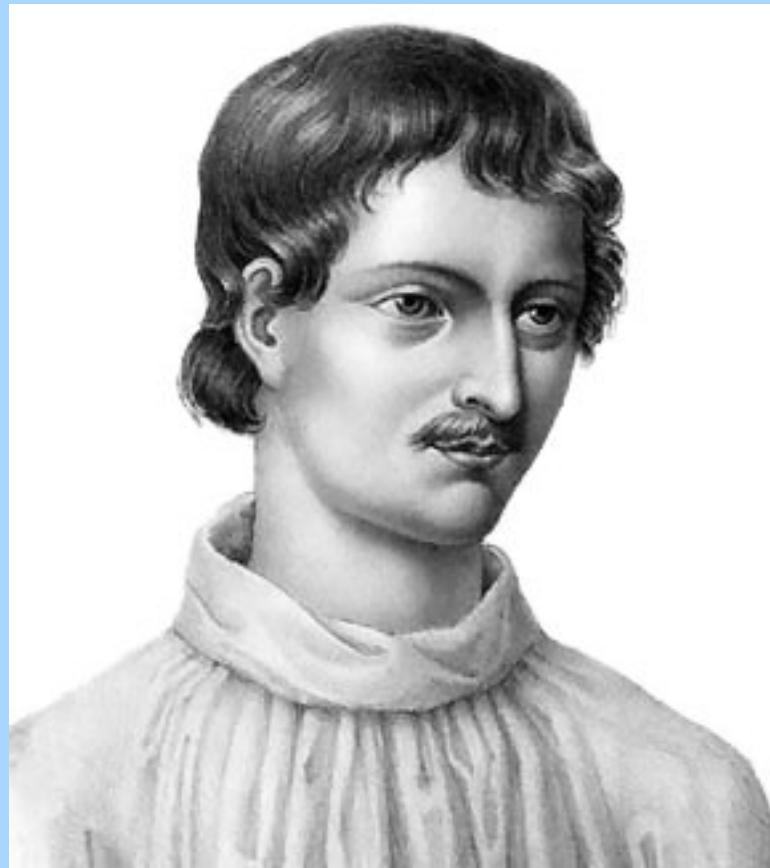
Wrong calculations: the problem of the parallax and the phenomenological issue



Parallax first measured by
Friedrich Wilhelm Bessel
(1838)



Giordano Bruno (1546-1600) and Copernicanism



Bruno as a 'magician'



Bruno and 'memory'



Bruno as a spy



Bruno as a heretic



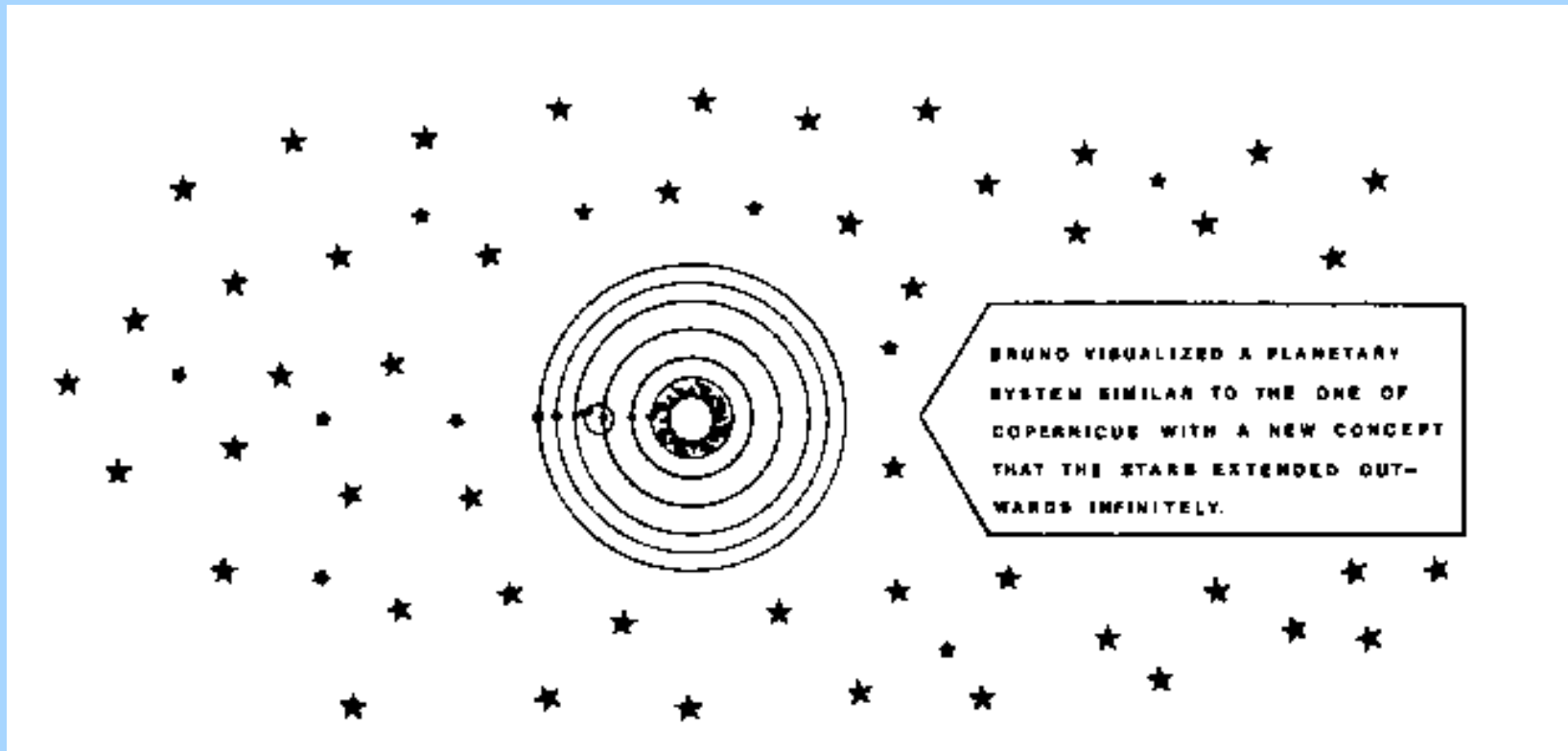
But Bruno was also an interpreter of Copernicus!

- Bruno's 'The Ash Wednesday Supper' (1584) as a defense of Copernicanism, but...
- Bruno thought that Copernicus was too much of a mathematician and not enough of a physicist, and he criticized Copernicus's epicycles
- Bruno and the 'Copernican mistake': are the moon and the earth on the same epicycle? Was Copernicus wrong or was Bruno not a good scientist? And what's really the point here?

Bruno goes beyond Copernicus

- The ‘solid orbs’ of Copernicus
- The ‘closed’ universe of both Copernicus and Aristotle
- Bruno’s ‘pure’, uniform substance instead of the solid orbs
- Bruno’s notion of ‘impetus’ as opposed to Copernicus’s ‘sympathy’: theology, natural philosophy, physics and ‘magic’
- The universe is not closed (‘De immenso’, 1591)!

Bruno's universe



Summarizing...

- Copernicus: a system to discuss and refine
- ‘Magic’ , religion and natural philosophy: all parts of the same body of knowledge
- Bruno’ s science: ‘mistakes’ (lunar orbit) and intuition (impetus)
- Bruno’ s science: the relationship between ‘physics’ and ‘mathematics’ in the context of early modern natural philosophy

Important points:

- Natural Philosophy in the early modern world was NOT like science in our own times
- Many points of contacts between natural philosophy and religion: indeed they were part of the same discipline
- The historian focuses on the PROCESS by which natural philosophy becomes 'science' and as such other than religion and philosophy