History of science: who, when, how, for whom

Introductory lecture

17 February 2022

DE*00w

Organisation of this subject

- „Mark will be awarded on the basis of a short presentation on a given topic and active participation in class discussions.“
- „Alternative ways to pass the course may be agreed upon individually.“

But:

- This is a lecture, which are by definition NOT compulsory
- „reasonable participation“ --- two classes may be missed without any need to excuse oneself.

What is science?

- system of knowledge
- describes *physical world* and its phenomena
- unbiased observation
- systematic experimentation

- Sometimes confused with research
- Are humanities also sciences?
- Are social sciences also sciences?

Relation of science to philosophy, society, …

- Most of those called scientists until 1800 were also philosophers
- Reminder: philo-sophia, love of wisdom
- Change: early modern era --- 16th to 18th century
- (Timeline: Middle Ages 500 – 1500, beyond: modern era)
- Modern sciences: emancipation, since 1800
- Emancipation brings the need to tell the history of the field
- i. e. first historians of physics were physicists, etc.
- History of medicine and history of technology

George Sarton (1884-1956)

- Belgian-American historian of science
- Founder of the History of Science Society (1924), US-based
  - Annual meetings since 1924
  - Journal: Isis
- Why are historians of science so rare?
  - Those who understand science look down on history
  - Those who write history fear science
- A need for history of science, not divided geographically or on a disciplinary basis

Syllabus

1. Science and society.
2. Science in the early modern era.
3. Science and technology in the modern era.
4. Science, technology and society in the 19th and 20th century.
5. Communicating science to the public.
6. Scientists as public figures.

Ancient observations: studying the planets

known from Ancient times:

Mercury

Venus

Mars

Jupiter

Saturn

discovered since the 18th century:

- Uranus: 1781
- Neptune: 1846
- Pluto: 1930 (until 2006)

Astronomy and astrology

Johannes Kepler (1571-1630)

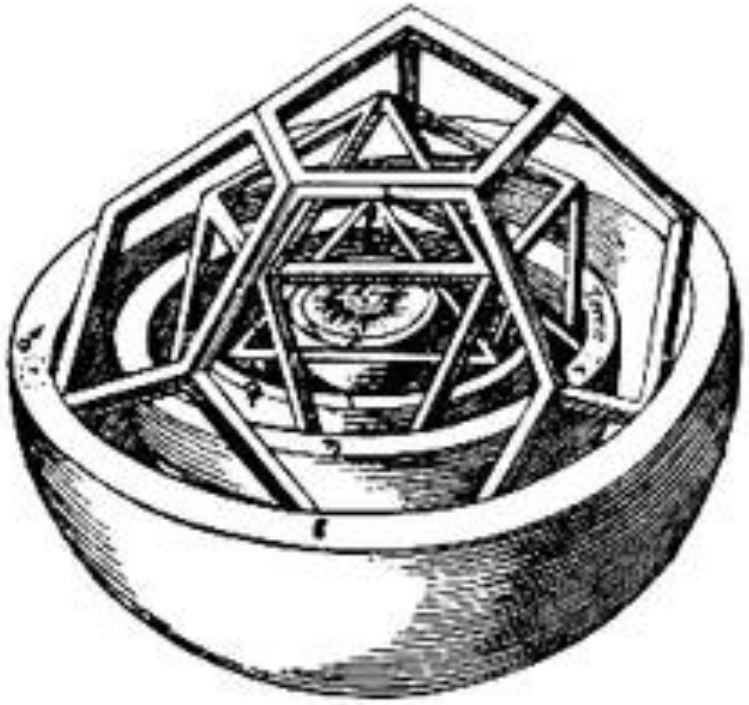
German astronomer

Laws of planetary motions:

1. Planets move in elliptic orbits
2. „area law“
3. „harmonic law“

- made his living as an astrologer
- Snowflakes
- Tycho Brahe

Mysterium Cosmographicum



Five regular solids:

Tetrahedron (4 triangles)

Cube (6 squares)

Octahedron (8 triangles)

Dodecahedron (12 pentagons)

Icosahedron (20 triangles)

„scientific community“ over the centuries

<u>Anceint and medieval world:</u>

Egyptian scribes

Library of Alexandria

House of Wisdon

Monasteries

Correspondence

…

Universities – not like ours…

<u>Early modern:</u>

Key invention: book printing

Lenses / Optics

Telescope

Observation – no longer relying only on the human eye

Learned societies

Learned men at the court

What do we want to achieve?

Harmony – easy model

- four or five elements;
- everything in small numbers
- …

Predictions

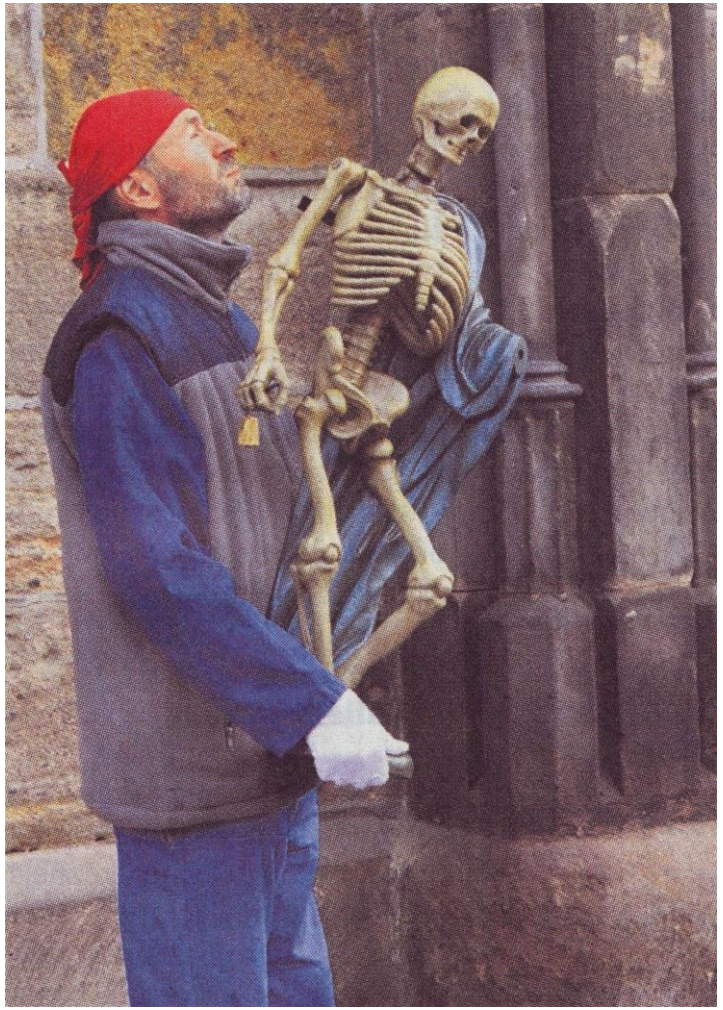
- regularities
- when will the planets be in the same position?
- predicting eclipses (lunar / solar)

Another take on cosmology

- Spheres
- „cloud nine“
- Heaven beyond these spheres

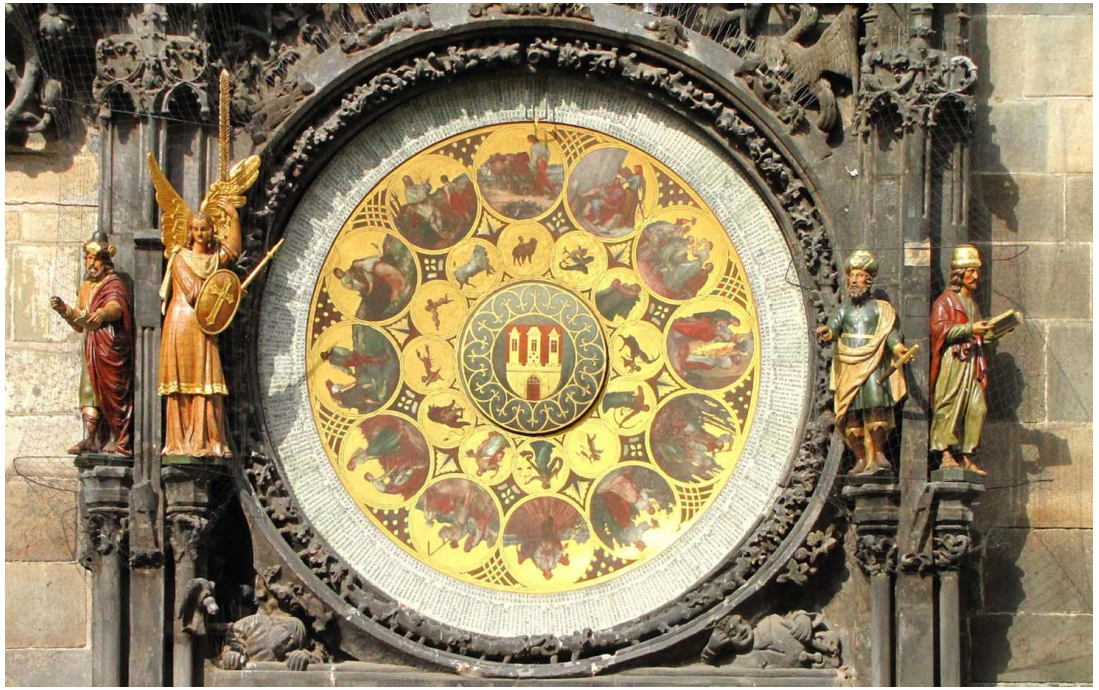
Going beyond the sphere

Prague astronomical clock (courtesy Ant. Vrba)

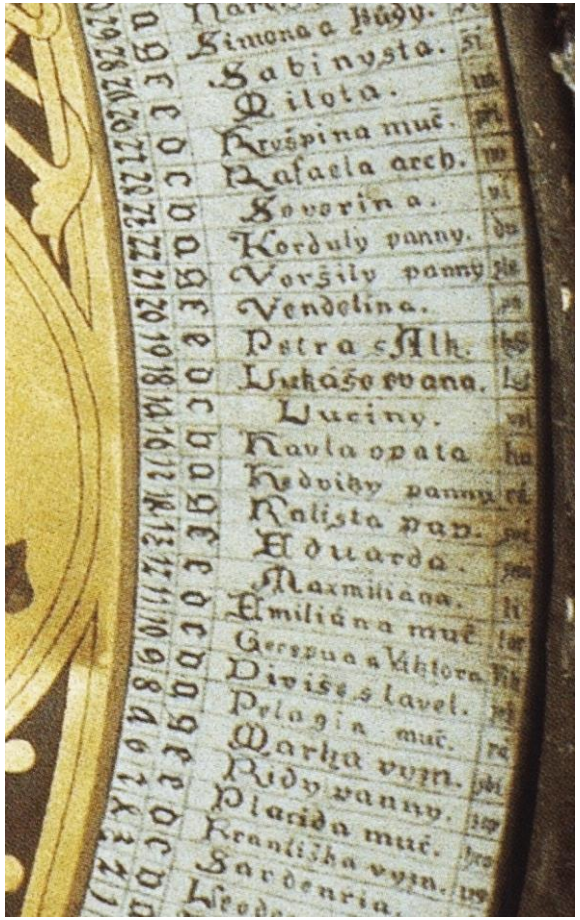


Prague astronomical clock: the whole

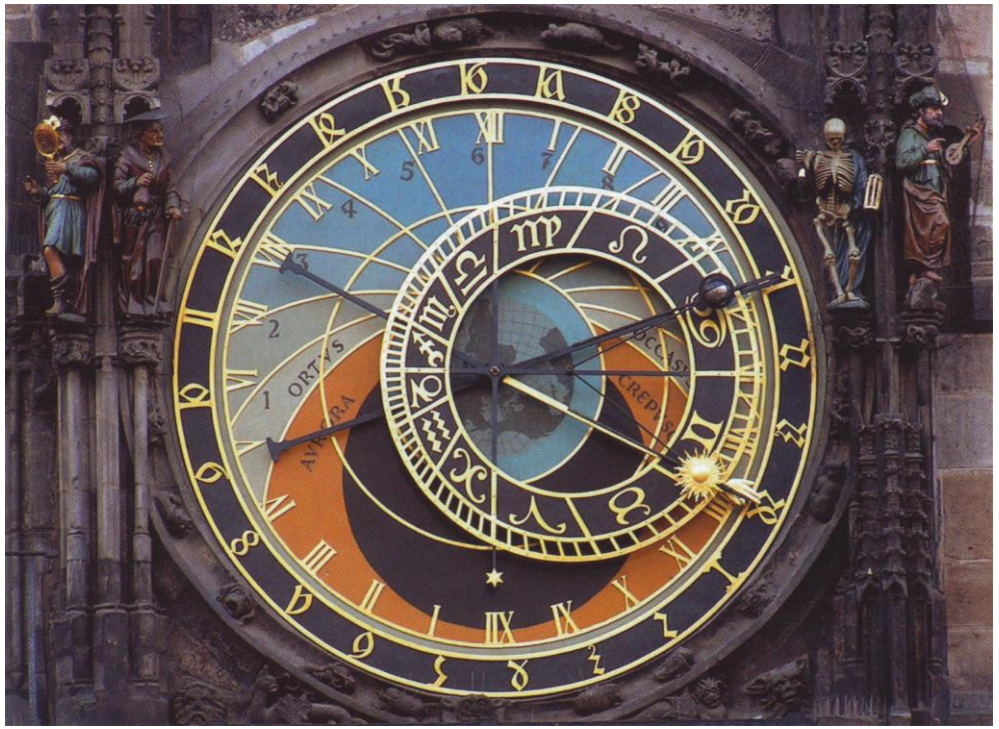
Calendarium: pictorial represenation (Oct.)



Dates and astrolabium

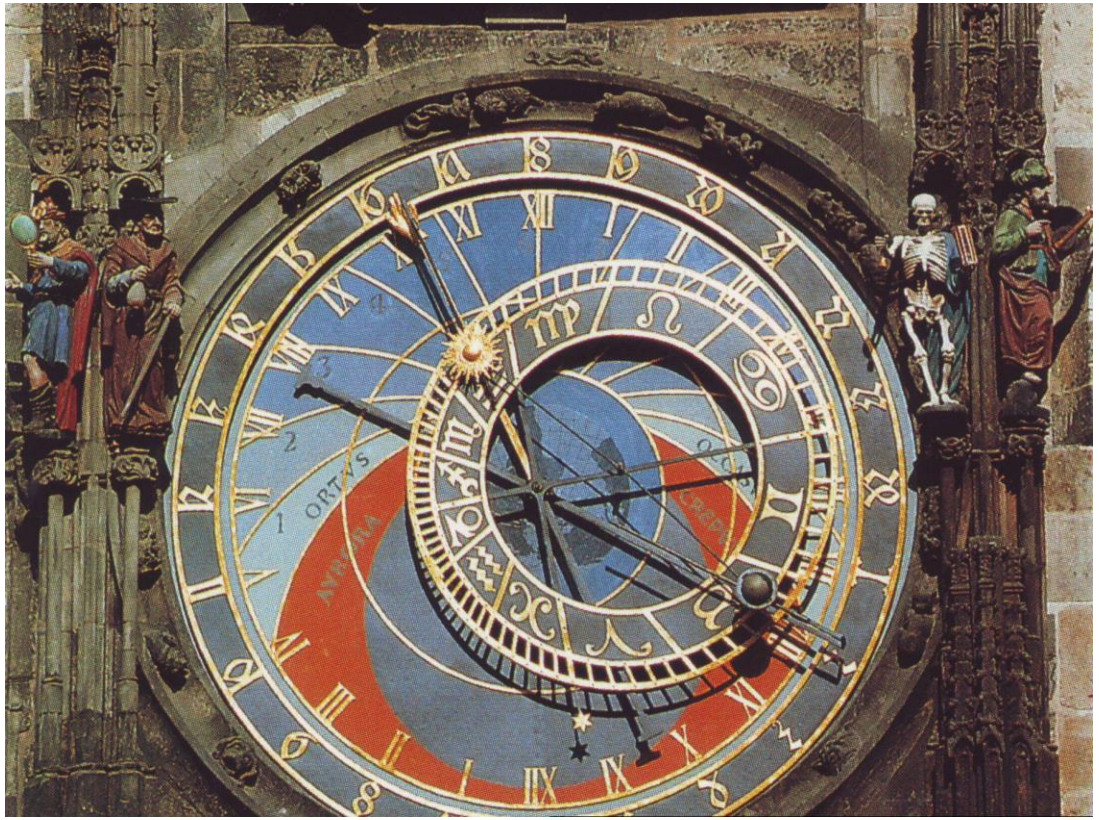


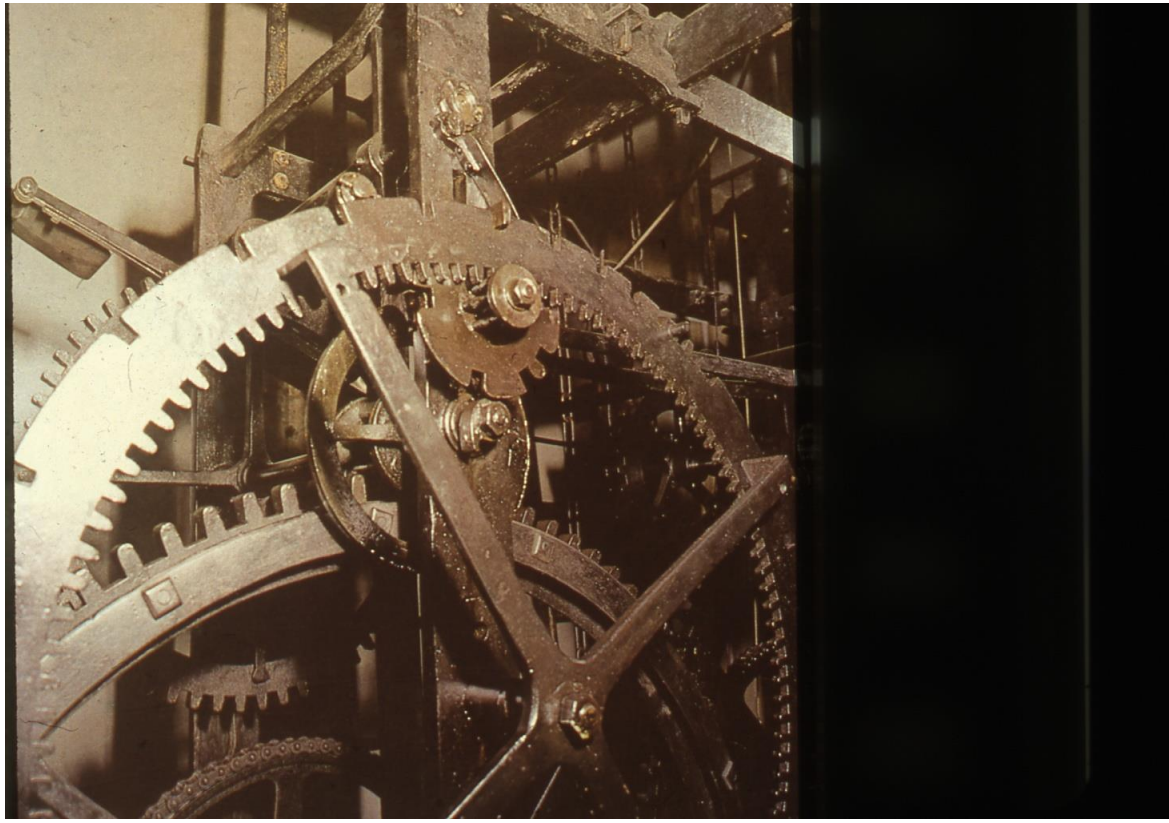
New design - astrolabium



Positions of the clock hands on the clock face

What time is it?





European horologia

Padua, 1344(1571

(Jacopo de‘Dondi)

Missing: the sign Libra in Zodiac

(perhaps he was not paid enough?)