

The Landgrave in Kassel and Tycho Brahe on Hven

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Antiquity and Middle Ages



Ptolemy ca. 150 AD:
Catalogue of 1028 stars



**God as the architect of
the world**
Bible ca. 1250

Muslim astronomy

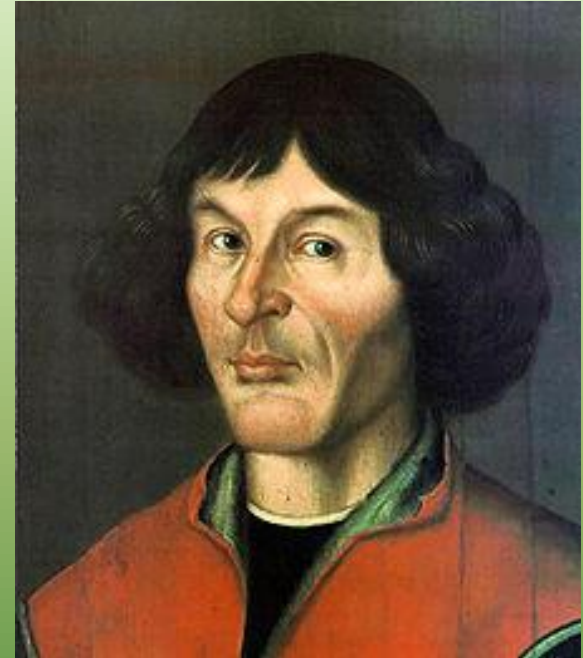


Harun al Rashid 800:
House of wisdom in Baghdad –
translation and research



Ulugh Beg 1437:
Catalogue of 1028 stars
But unknown in Europe
until 1665

16th century: Luther and Copernicus



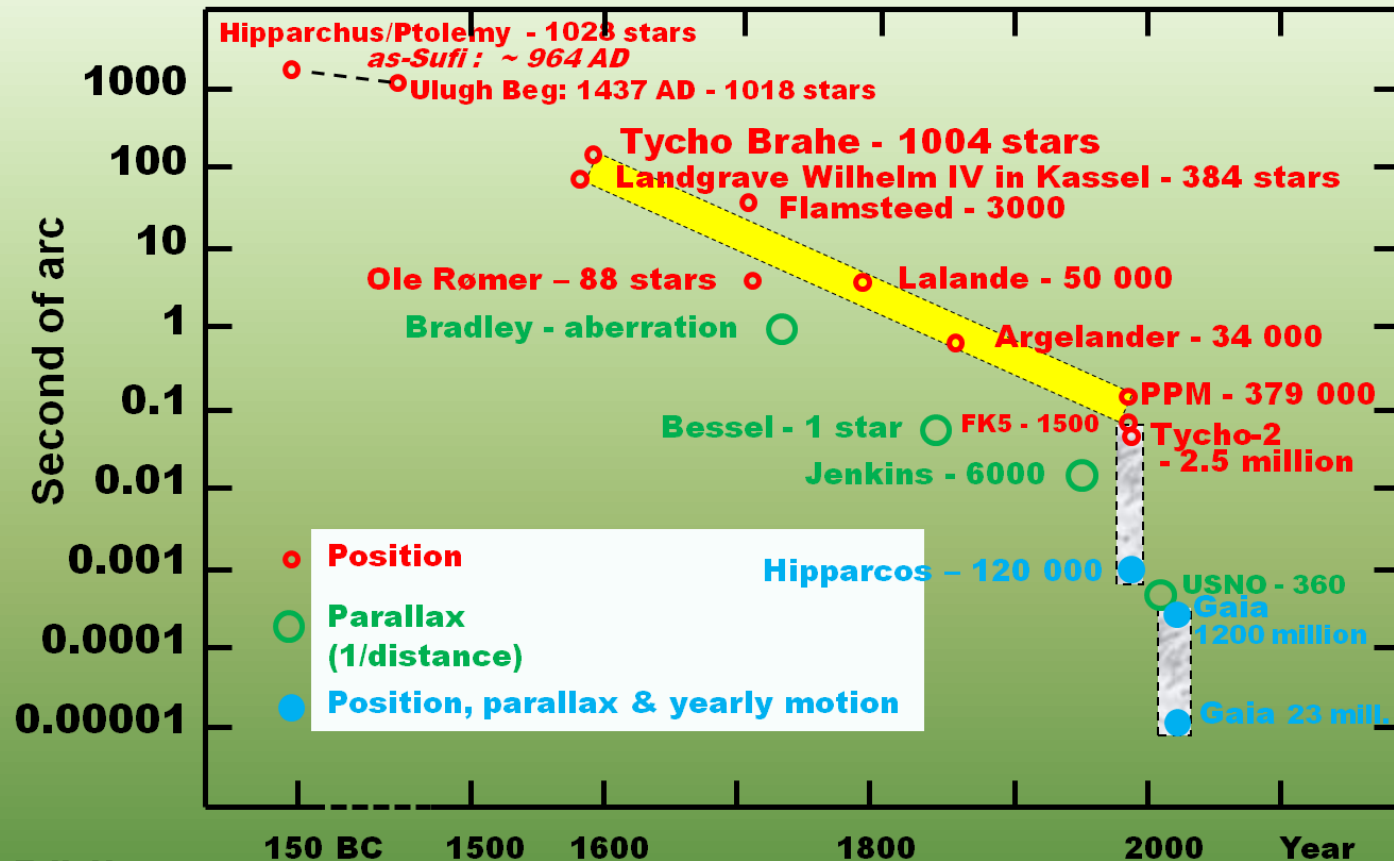
Martin Luther 1517:

**Trust what you read in the Bible –
not the words of the Pope**

Nicolaus Copernicus 1543:

**The Earth and all planets
circle the Sun**

Astrometric Accuracy during 2000 Years



Erik Høg
1995/2016

Wilhelm IV and Tycho Brahe improved the accuracy by a factor 20
 The next 400 years brought a factor of 1000
 Hipparcos improved by a factor of 100 and Gaia will do the same

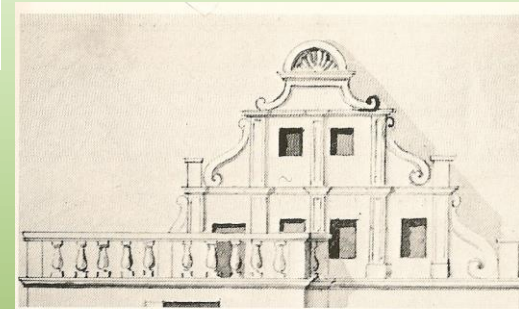
Landgrave Wilhelm IV in Kassel

Marburg 1529: Luther and Zwingli discussed

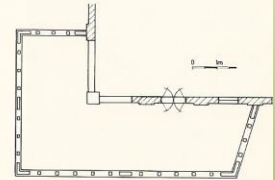


Wilhelm IV observed accurate positions of stars from 1560 at his observatory, the first in Europe

An accuracy of 1.1 arcmin was reached in 1587 in a catalogue of 384 stars

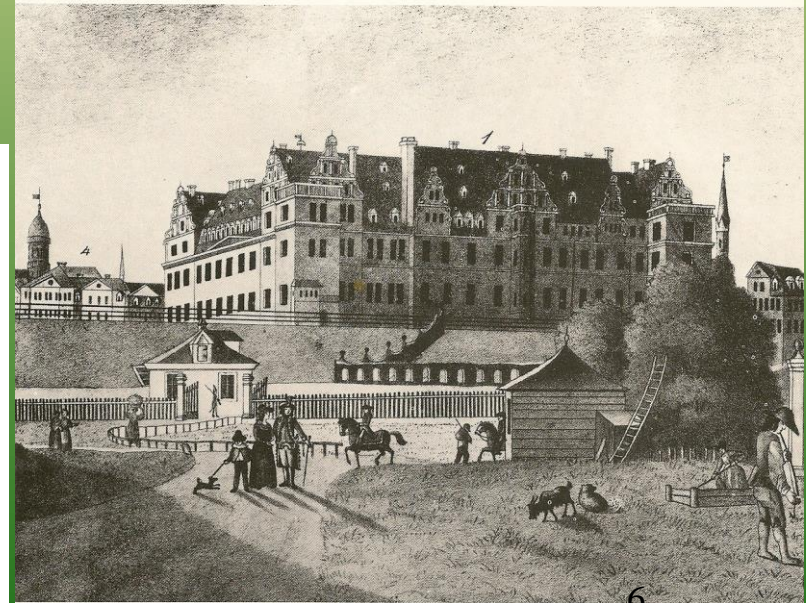


2 Südwestliche Schloß-Altane für die erste Sternwarte 1560 in Kassel errichtet. Bauaufnahme-Zeichnung um 1812, Detail; Hess. Staatsarchiv Marburg.



1 Das alte, 1811 abgebrannte Landgrafen-schloß in Kassel mit den beiden Sternwar-ten-Altanen an den Ecken der Südfront zur Fulda. Detail einer Lithographie von A. Specht, 1793, nach Kobold. Graphische Sammlung, Staatliche Kunstsammlungen Kassel.

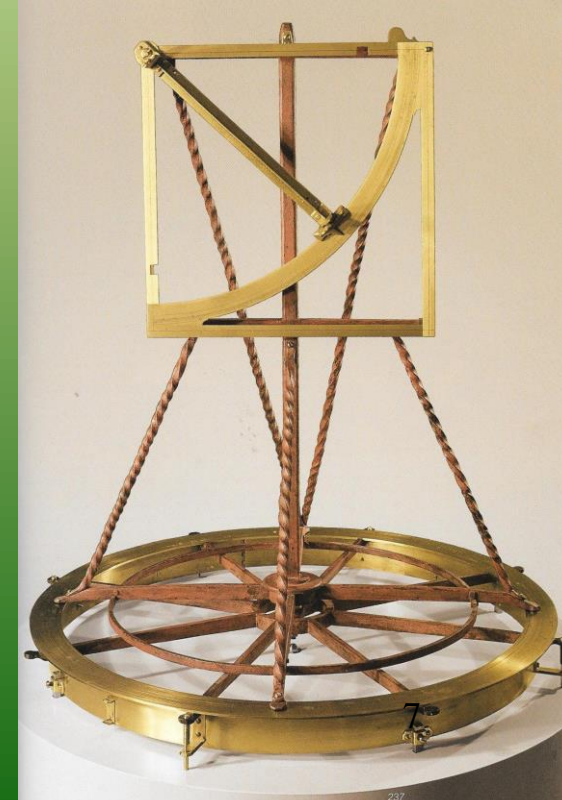
3 Grundriß der südwestlichen Sternwar-ten-Altane. Rekonstruktion vom Verfasser



Wilhelm's instruments - 1

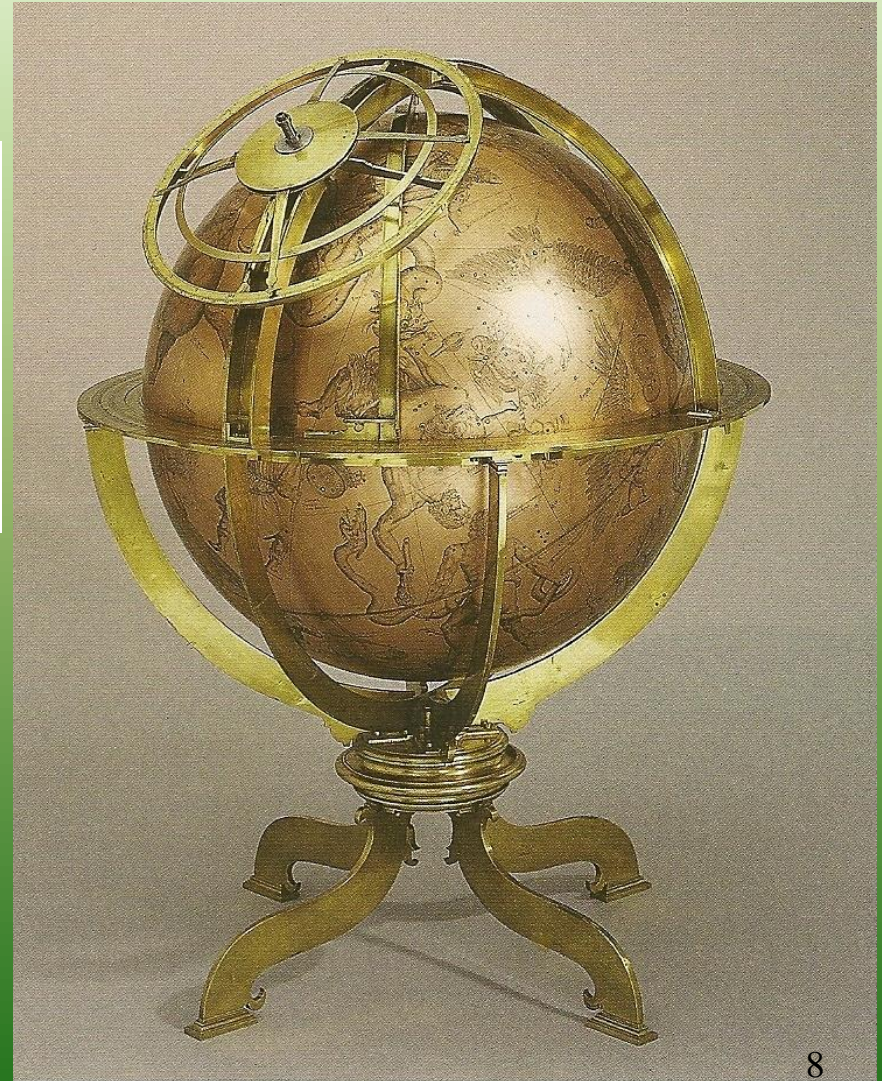
Wilhelm observed positions from 1560 with a torquetum and an azimuth quadrant

The original "Wilhelm-quadrant" from 1560, 40 cm radius - *now in Kassel*



Wilhelm's instruments - 2

Globe from 1561-1562
for calculation and plotting of
stars, 72 cm diameter - *now*
in Kassel



Tycho Brahe visits Kassel 1575

Tycho Brahe saw the new star in 1572:

“Stella Nova - the greatest miracle since the creation of the world”

Tycho, 29 year old and already famous, visited Wilhelm IV in 1575

Wilhelm then recommended the Danish king **Frederik II** to support the ingenious Tycho

Tycho had chosen Basel as the best place for him to settle



Tycho builds Uraniborg 1580 and Stellanburgis 1585



Tycho was given the island Hven where he observed stars and planets during 20 years with a large team

The peasants had to work for Tycho

Two kings visit Tycho on Hven



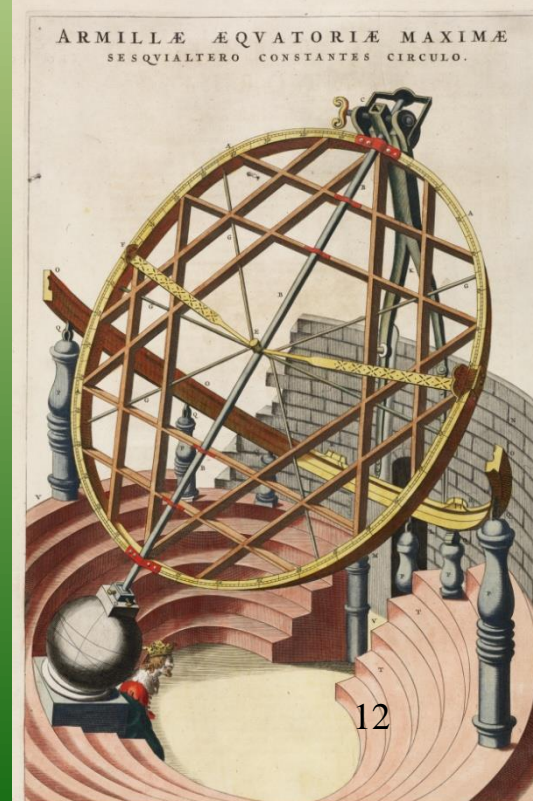
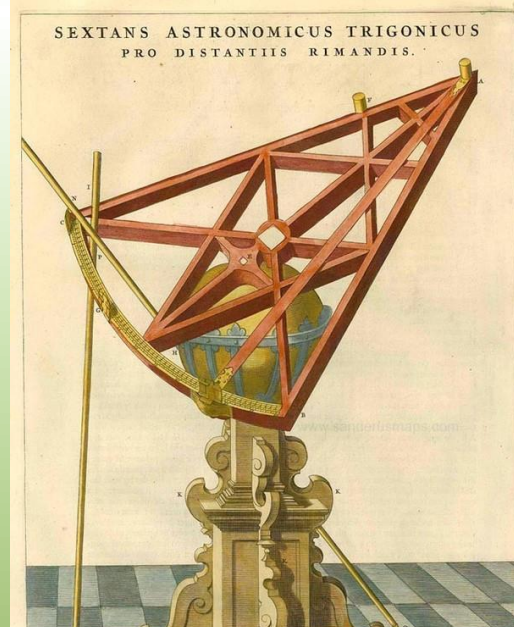
James VI of Scotland in 1590

Christian IV of Denmark in 1592

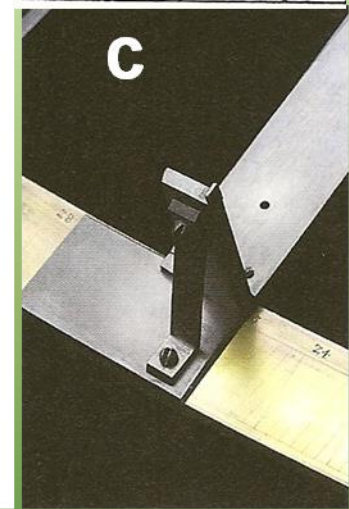
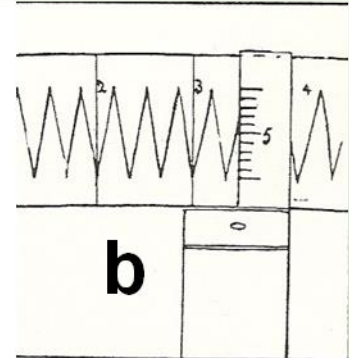
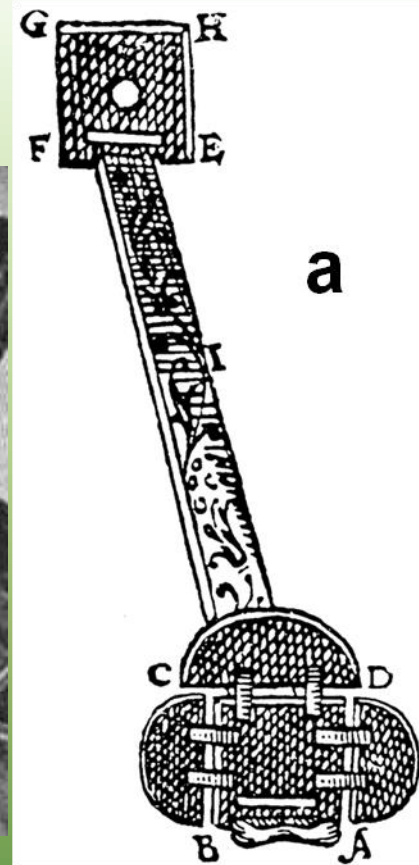
Tycho's instruments I

Tycho invented the sextant in 1569

Observations were made with a sextant of 150 cm radius, an armilla etc. - 22 instruments in total



Tycho's instruments II

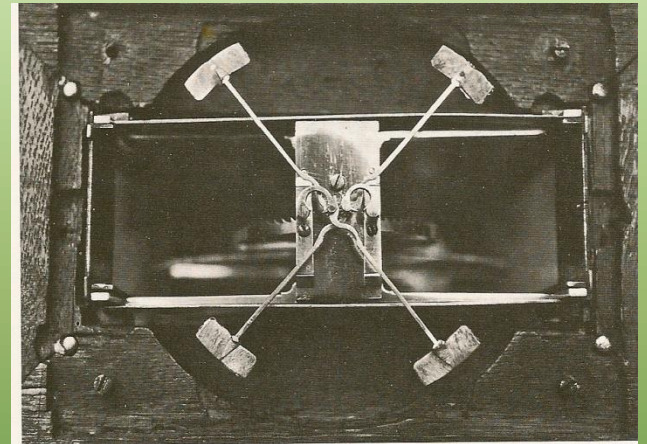


Tycho improved instruments

Paul Wittich visited Hven 1580 and
and brought knowledge to
Kassel 1584

New activity in Kassel after Tycho's visit in 1575

Joost Bürgi in Kassel from 1579



**Bürgi an excellent clock maker,
instrument builder and astronomer**

Wilhelm's instruments - 3

From 1582 larger instruments were used: an azimuth quadrant and a sextant of 1.1 m radius

Improvements in 1584 through **Paul Wittich!!!** He was honoured by the Landgrave with a golden chain



Christoph Rothmann in Kassel

**Rothmann an excellent mathematician
and astronomer**

**Observations with Bürgi 1585-1590 of
384 stars – accuracy 1.1 arcsecond**

**The catalogue was finished 1587 but
not printed before 1666...**

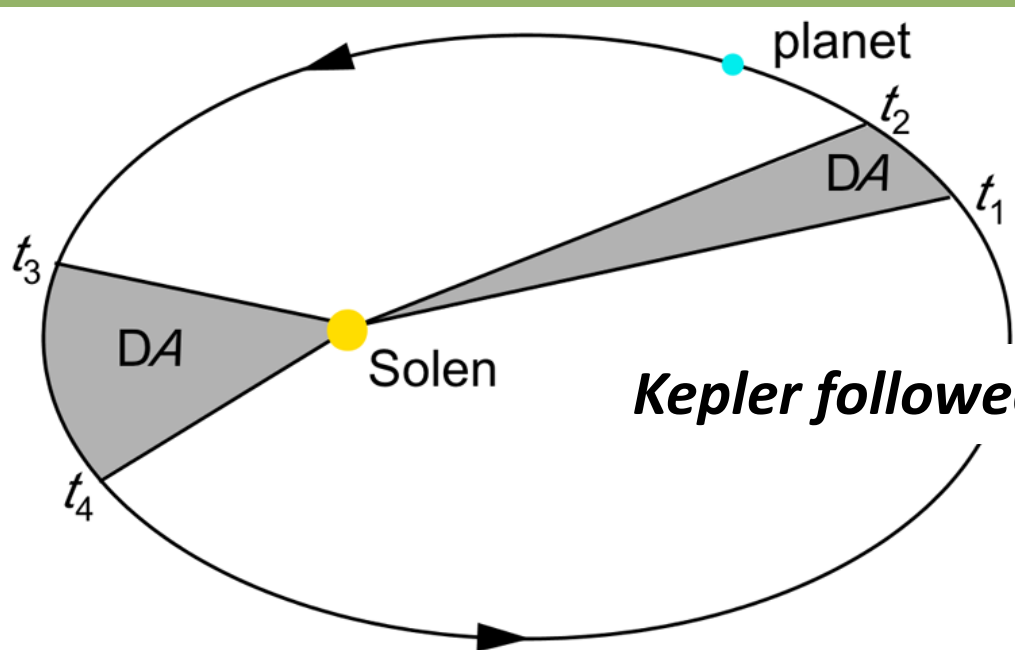
Kepler and Newton use Tycho's results

Results:

A catalogue in 1596 of 1004 stars, positions of the five planets, the Sun and the Moon during 20 years observations on Hven

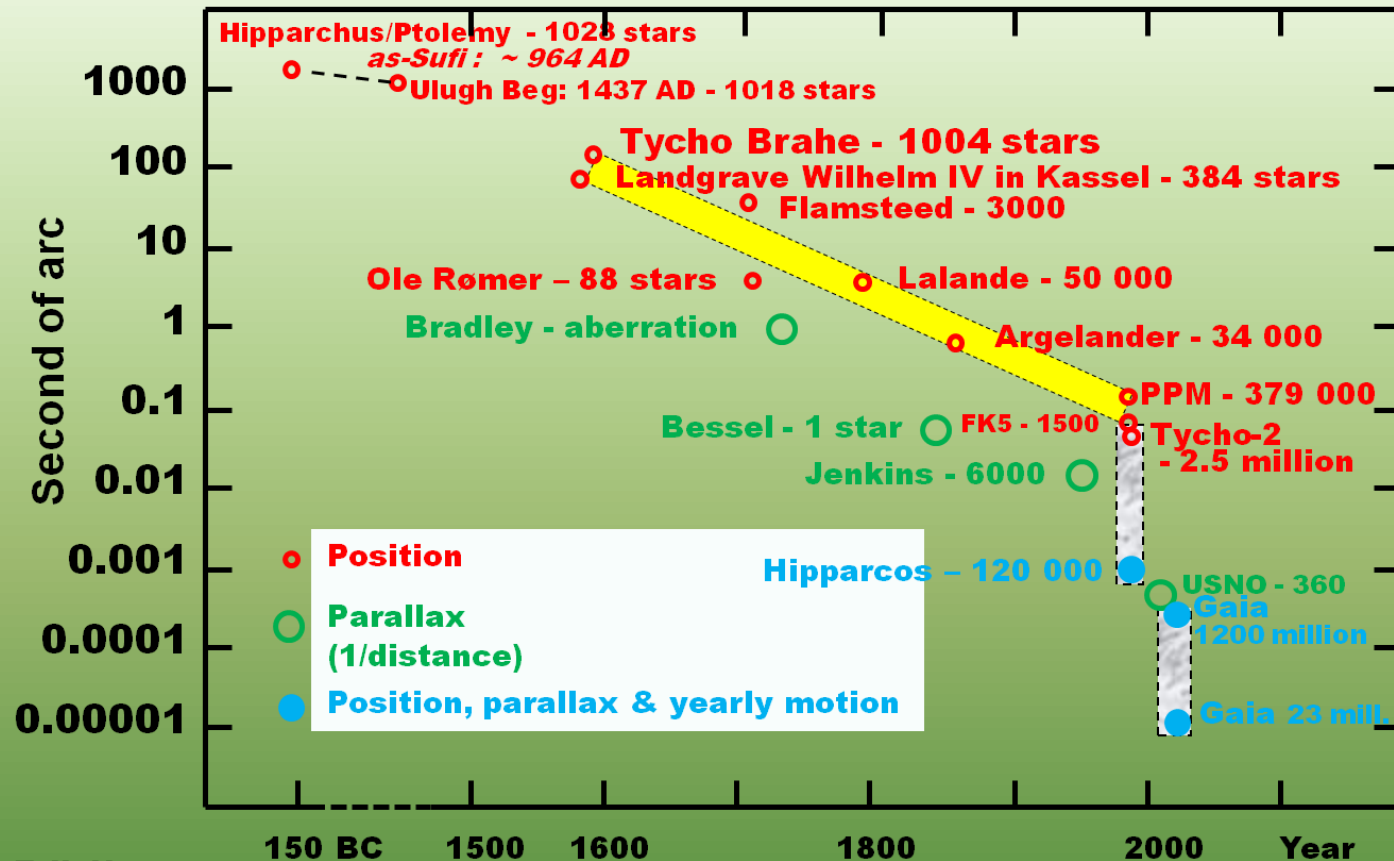
Johannes Kepler derived the 3 laws of planetary motion 1609-1619

Isaac Newton published the laws of physical motion and universal gravitation in 1687 - **basis for the technical revolution**



Kepler followed Aristotle!

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