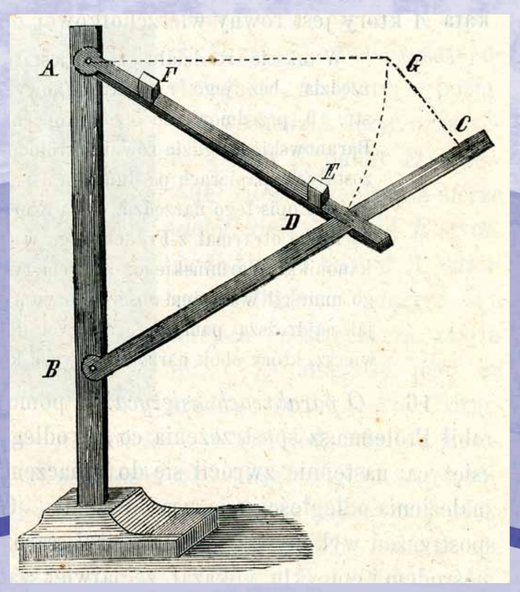
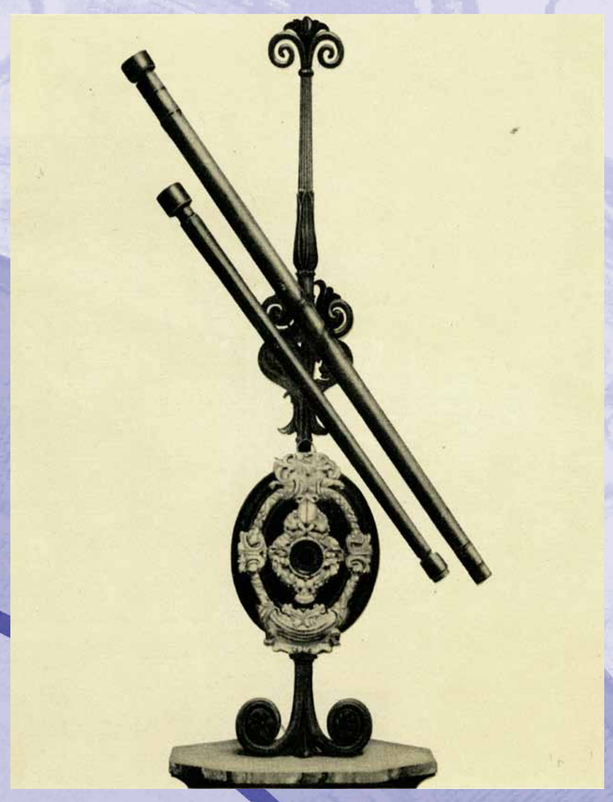
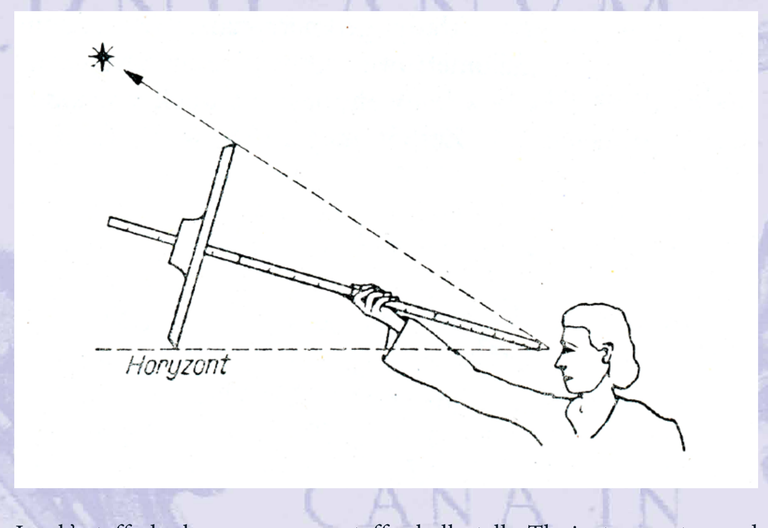


Parallactic ruler or triquetrum (3 arms making up a triangle) determining the parallax of the Moon – the apparent change in its position resulting from the movement of the observer staying on Earth



Galileo's telescopes; lenses were known from the 10th century in China, and from late 13th century they were in use in Europe; Galileo used his telescope in his observations between 1609 and 1611

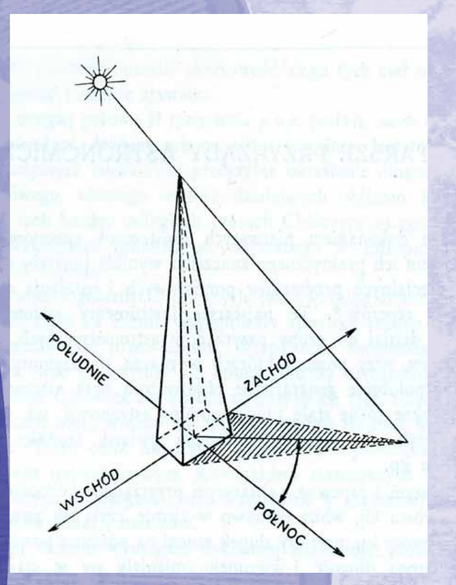


Jacob's staff, also known as cross-staff or ballastella. The instrument served to measure heights and angular distances of celestial objects, measure the height of mountains or towers and navigate at sea and consisted of a pole or staff along which a cross-piece slid; the position of the cross-piece was marked on the main staff

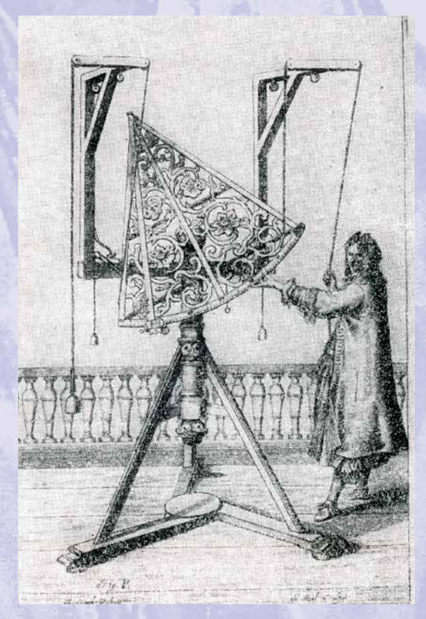
FIRST ASTRONOMIC INSTRUMENTS

Since the beginning of mankind people have been fascinated by the sky. They looked up into it to explain day and night, the seasons, the path of the Sun, the rainy and dry seasons, the sowing seasons and harvests. Time was measured based on the position of the Sun and the phases of the Moon. Thus, astronomy was a response to the practical needs of mankind. Astronomers observed the Moon, the Sun and planets and calculated tables that described their movements. As early as three thousand years B.C., people were able to determine directions on the horizon and knew how to calculate points of reference on land (benchmarks) and to measure astronomic time, coordinates of the stars and diameters of the Sun and the Moon.

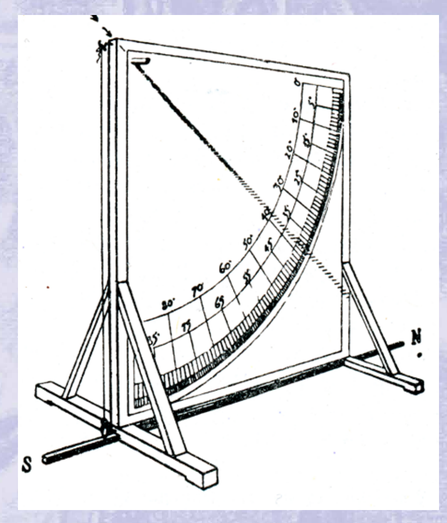
Copernicus thought highly of ancient astronomers. Instead of mediaeval instruments, he used apparatuses he himself made of fir wood, modelling them on those designed, among others, by Eratosthenes (276–194 BC), Hipparchus (190–125 BC) or Ptolemy (100–168 AD). With his amazing eyesight, he was able to achieve an extraordinary precision of measurement, up to 1 minute of time or arc, while the average of those times was 3–5 minutes. Even opponents of Copernicus' heliocentric theory appreciated his observations, calculations and tables.



Gnomon was the simplest astronomic instrument. It was a rode placed vertically in the ground, casting shadow which allowed to establish geographical directions, time or the height of the sun above the horizon; longer observations were used to identify solstice, equinox, the length of solar year or latitude



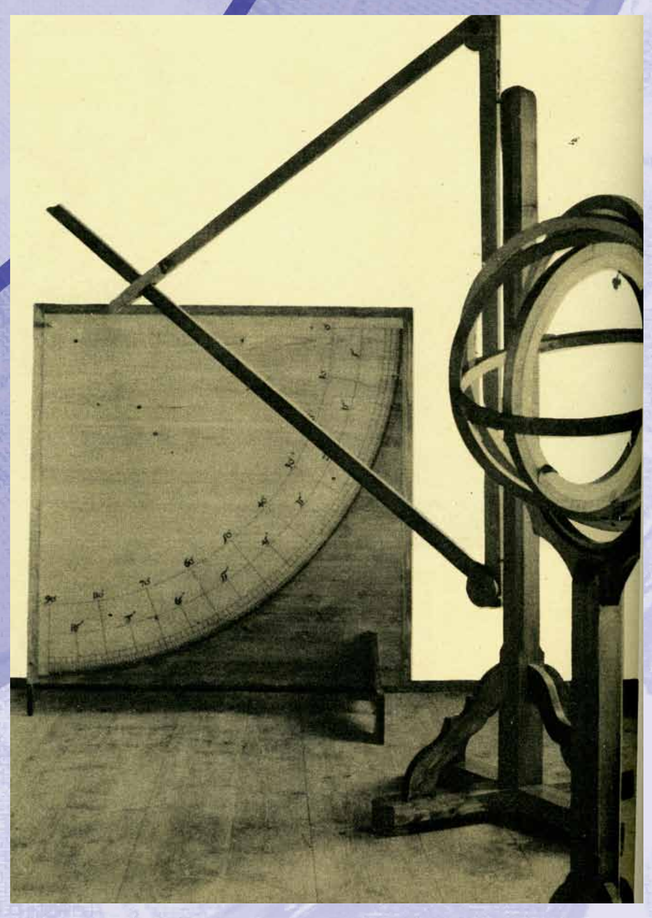
Johannes Hevelius' sextant



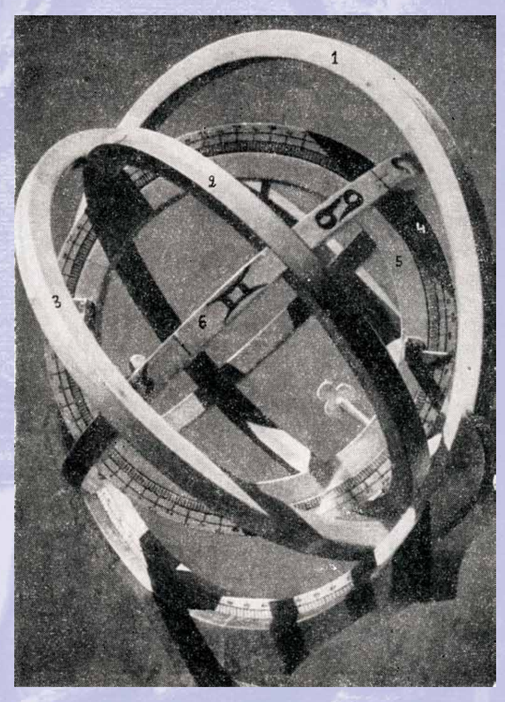
Quadrant, used for measuring the level of the Sun and the inclination of the ecliptic – Earth's orbit – to the celestial equator

Stonehenge megaliths; series or groups of megaliths forming simple geometric shapes also served as gnomons, e.g. in Crozon (France) or Stonehenge (England)

Collection of sundials from 18th–19th century in Przypkowscy Museum in Jędrzejów (Jedrzejow Collection is the world third, after the Chicago Planetarium and Oxford Science Museum); sundials, derivatives of gnomons, were widely used across civilisations – from China through Greece to the Incas, Mayas or Aztecs



Copernicus' instrumentarium – reconstruction



Spherical astrolabe, the most sophisticated ancient astronomic instrument used to determine ecliptic or equatorial coordinates of celestial bodies