

U3A-GROUP ASTRONOMY (2-6-2006)

STAR GAZING HISTORY

Star gazing has been known since (at least) the Babylonians – c. 4500 years ago. Many, often very accurate, observations were made, also in China and other corners of the world, but the Ancient Greeks – later followed by the Egyptians - were the first to develop a more scientific approach, separated from gods and myths. Some famous names:

Aristotle (4th Century b C) believed the Earth to be spherical and the centre of the Universe.

Eratosthenes (3rd Century b.C.) calculated fairly correctly size and distance of the Moon and the Sun.

Aristarchus (3rd Century b.C.) developed a model with the Sun in the centre of a much larger Universe than was assumed until then. Nobody believed him.

Ptolemaeus (or Ptolemy; Egyptian astronomer, 2nd Century AD) developed a model in which the Moon, Sun + 5 planets orbit the Earth, with beyond this the sphere of the fixed stars.

This model remained the basis for Astronomy for almost 1500 years - with an interval in the *Dark Ages*, when everything was forgotten until the rediscovery of Greek ideas around AD 1000.

By the year 1500 new ideas started to develop:

First Revolution: Nicolas Copernicus (Polish; 1473-1543) stated that the Earth rotates around its axis and orbits the Sun – just like the other planets. He did not have many followers; most of his colleagues stuck to Ptolemy's model.

But then Galileo Galilei (1564-1642) improved the telescope and with it discovered 4 moons orbiting Jupiter: Definitive proof that not everything orbits the Earth! Gradually the idea of a Sun-centred Universe took hold (despite fierce protest from the Church!).

Second Revolution: It started to become clear that the Sun is just one of many stars, which together form the *Milky Way* Galaxy. William Herschel (German/British; 1738-1822) described the shape of the Milky Way and suggested the possible existence of many more similar galaxies.

Third Revolution: Edwin Hubble (American; 1889-1953) discovered many more galaxies and found that they are all moving away from us: the Universe appeared not to be stable and constant, but moving and growing.

Logical conclusion: Universe must have been much smaller in the distant past and perhaps started from 'nothing': first *Big Bang* ideas in 1920's, 'proven' in 1992.

(Frederick) William / Friedrich Wilhelm HERSCHEL

Born in Hanover in 1738. Came to England as a young, promising musician (organist and later *Director of Music* in Bath).

From the age of approx. 35 he devoted more and more time to Astronomy - his old hobby – together with his sister Caroline (a professional singer, who, apart from assisting her brother, became a renowned astronomer in her own right).

In 1781 they discovered the planet Uranus, which doubled the size of the Solar System.

Herschel also discovered many new galaxies and nebulae, saw that many stars are in fact double-stars, and drew the first 3-dimensional maps of (parts of) the Universe.

He married in 1788 and had a son – John – who continued his father's work both in music and astronomy. William was knighted in 1816 and died in 1822.

In 1978 the *William Herschel Society* was founded and the house in Bath, where he and Caroline did most of their astronomical work and discovered Uranus (19 New King Street) was made into a museum.