

The Depth of the Heavens

Belief and knowledge during 2500 years

*The visible universe is a million billion times larger than Tycho Brahe believed
It has grown most quickly during the recent 100 years*

Erik Høg, Copenhagen University Observatory

Table 1 : *Historical and Contemporary Distances –
The visible universe is a million billion times larger than Tycho Brahe believed.
(The unit 1 light-year = 1.49 billion Earth radii) Ptolemy is far from being the
first to give distances to planets and stars, but his distances gained the status of the
highest authority during the following 1500 years. He had his values for the Earth
radius and distances to Moon and Sun from astronomers working between the years
300 and 100 B.C. Their value for the Sun was 20 times too small, and not even Tycho
Brahe knew better. After his time doubts arose, first for Johannes Kepler in 1617. But
it took 150 years before the distance to the Sun was safely known from new
observations, namely from Venus transits of the solar disc.*

Distance to	Ptolemy (~AD 150) Dante and Tycho Brahe	True distance
Centre of Earth	1 Earth radius = ~ 6000 km	1 Earth radius = 6370 km
Moon	33 – 64 Earth radii	60 Earth radii
Sun	1210 Earth radii	25 000 Earth radii since 1770
Stars	20 000 Earth radii = 0.000 014 light-years	Over 10 light-years since 1838
Most distant stars in the Milky Way	-	30 000 light-years in year 1900
Most distant galaxies observable by 1960	-	2 billion light-years in year 1960
Extreme of the visible universe	Stars: 20 000 Earth radii = 0.000 014 light-years	13.7 billion light-years in year 2003
God and the angels	-	-