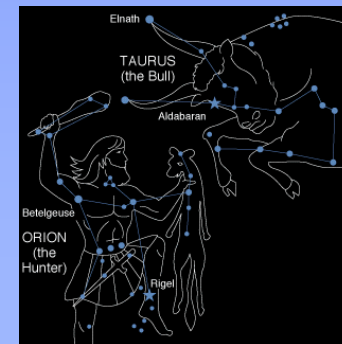


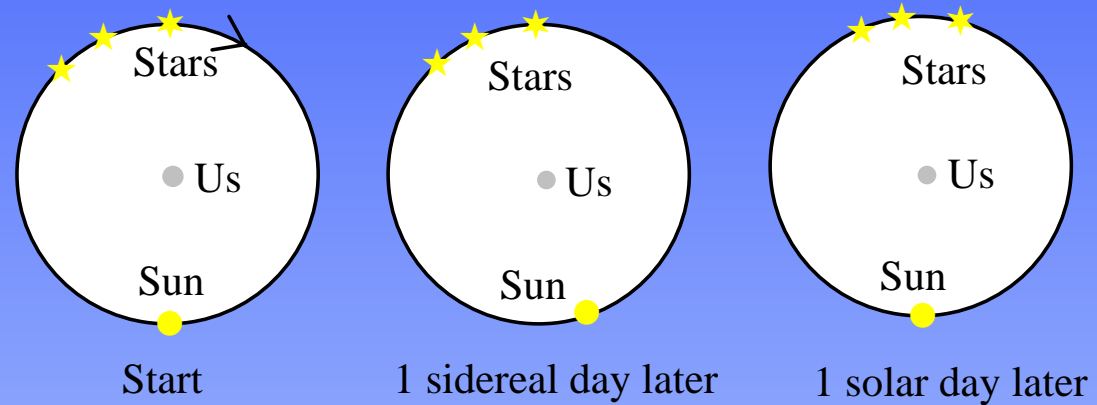
Earth-centred Universe

- ★ The *fixed stars* appear on the *celestial sphere*
 - ☼ Earth rotates in one *sidereal day*
- ★ The *solar day* is longer by about 4 minutes →
 - ☼ scattered sunlight obscures the stars by day
- ★ The *constellations* are historical
 - ☼ learn to recognise: *Ursa Major*, *Ursa Minor*, *Cassiopeia*, *Pegasus*, *Auriga*, *Gemini*, *Orion*, *Taurus*



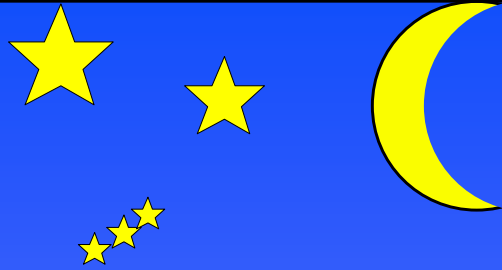
Sun's Motion in the Sky

★ The Sun moves West to East against the background of stars



★ Compared to the stars, the Sun takes on average 3 min 56.5 sec **extra** to go round once

★ The Sun does not travel quite at a constant speed, making the actual length of a solar day vary throughout the year

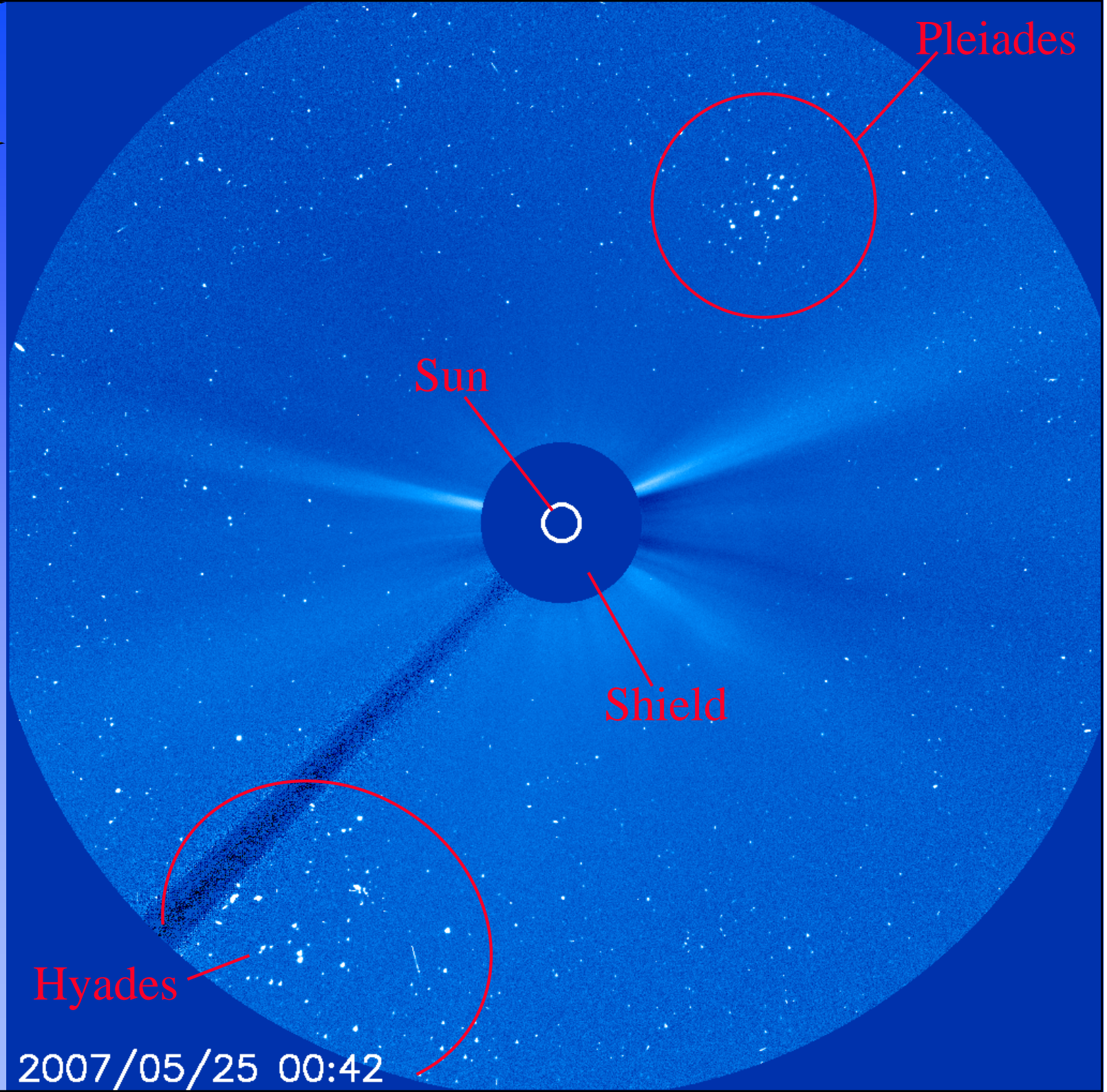


★ Above the atmosphere:
stars seen
near the Sun
by the SOHO probe

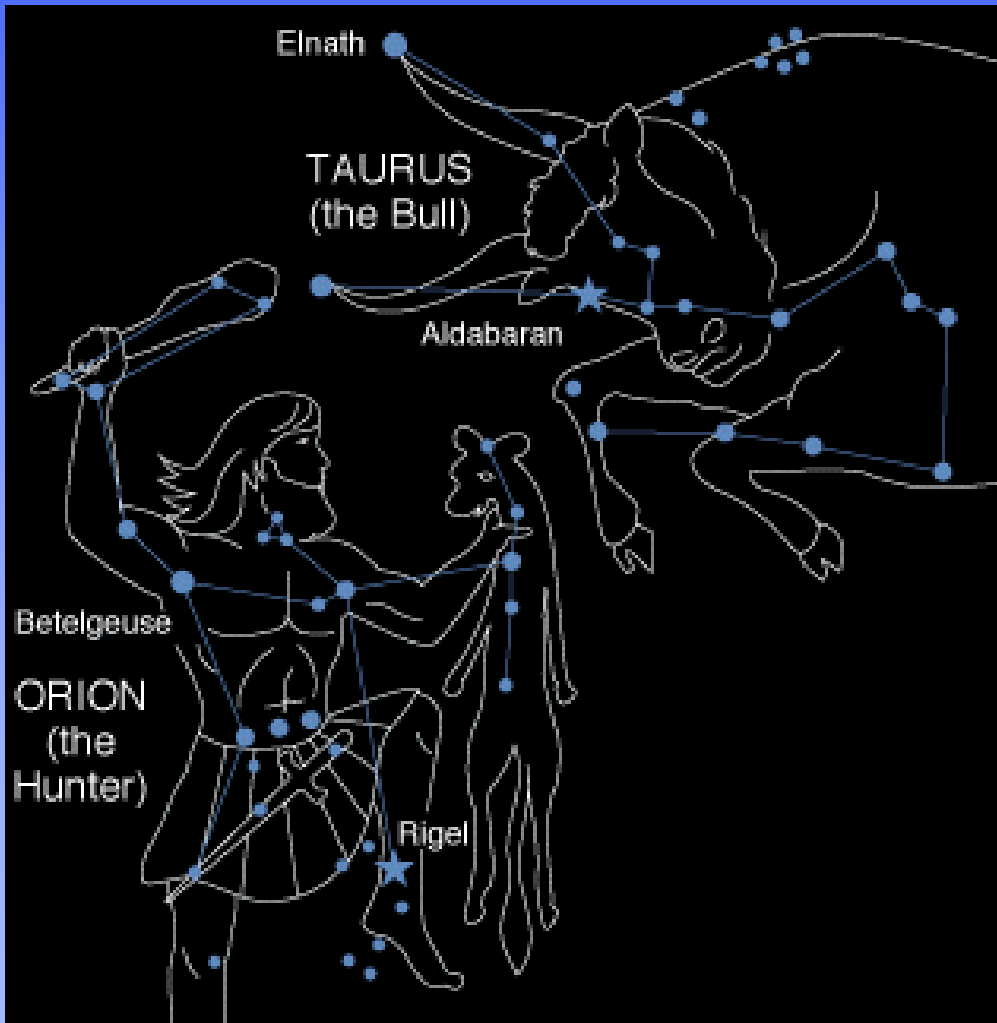
★ Sun in Taurus

Image:

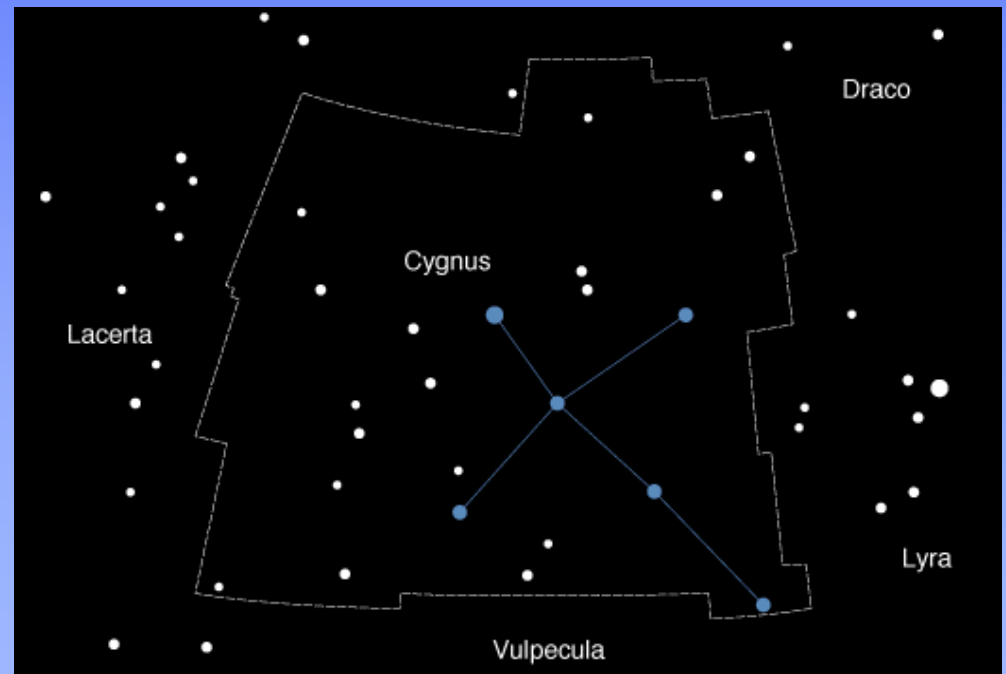
http://sohowww.nascom.nasa.gov/data/realtime/javagif/gifs/20070525_0042_c3.gif



Constellations



Figures courtesy: K & K



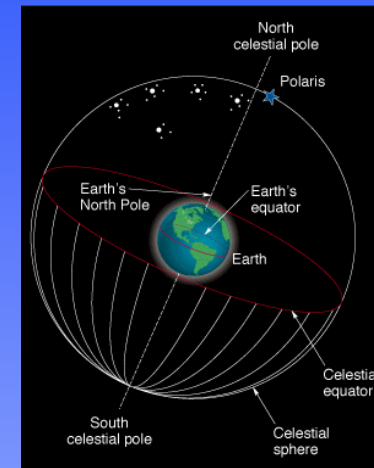


From *The
Beauty of
the Heavens*
by C. F.
Blunt
(1842)



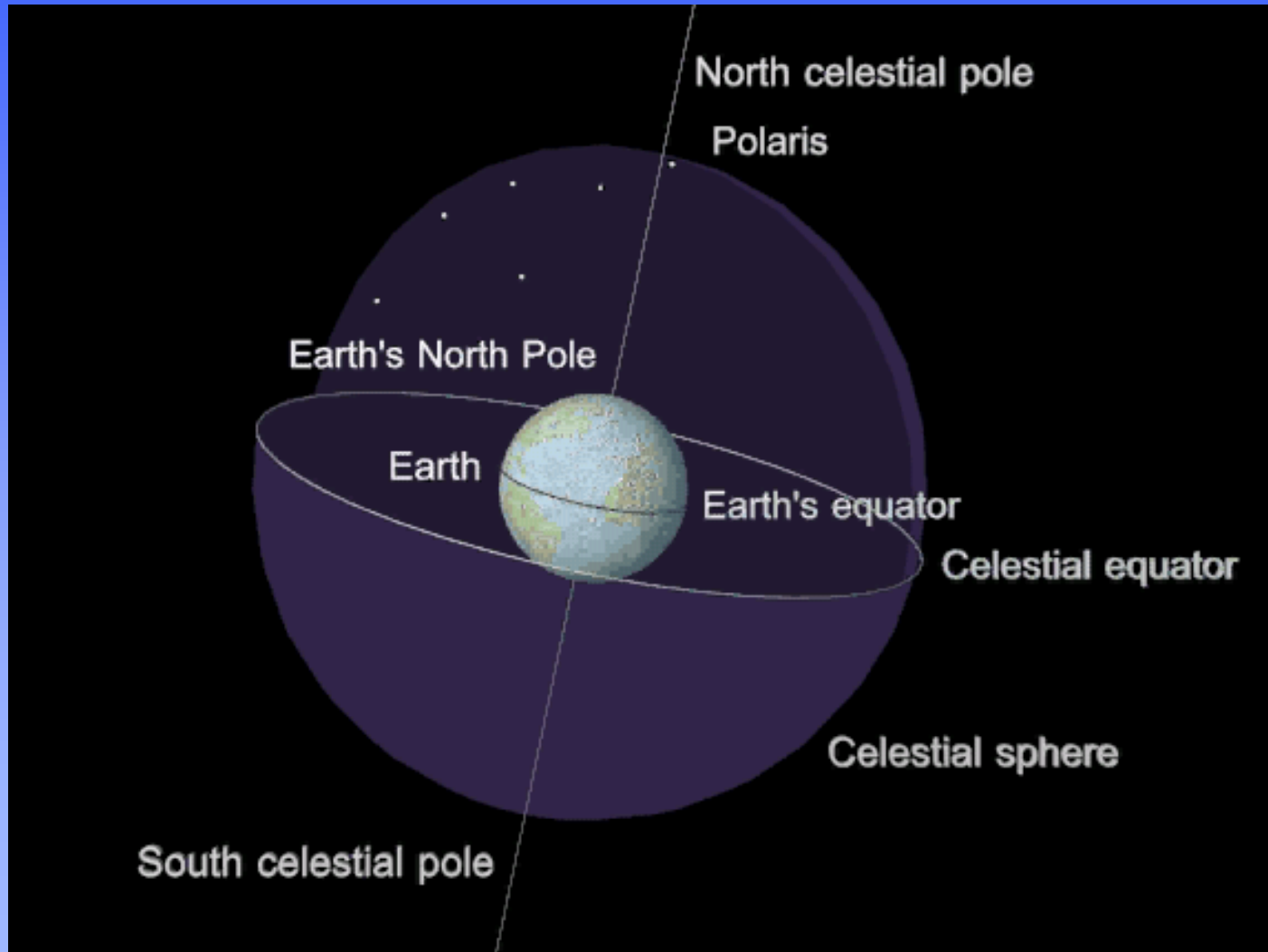
The Celestial Sphere

- ★ The celestial sphere rotates anti-clockwise looking north
- ★ Its fixed points are the *north celestial pole* and the *south celestial pole*
- ★ All the stars on the *celestial equator* are above the Earth's equator
- ★ How high in the sky is the pole star? It is as high as your latitude on the Earth



Motion of the Sky

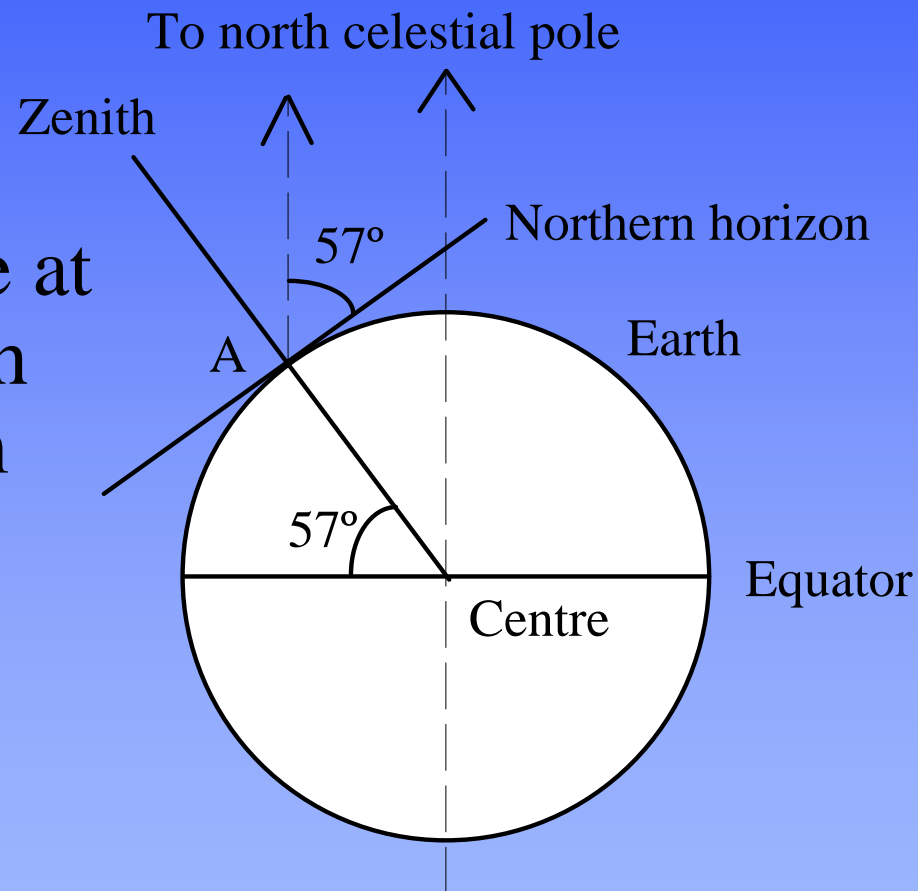
(animated)



Courtesy: K & K

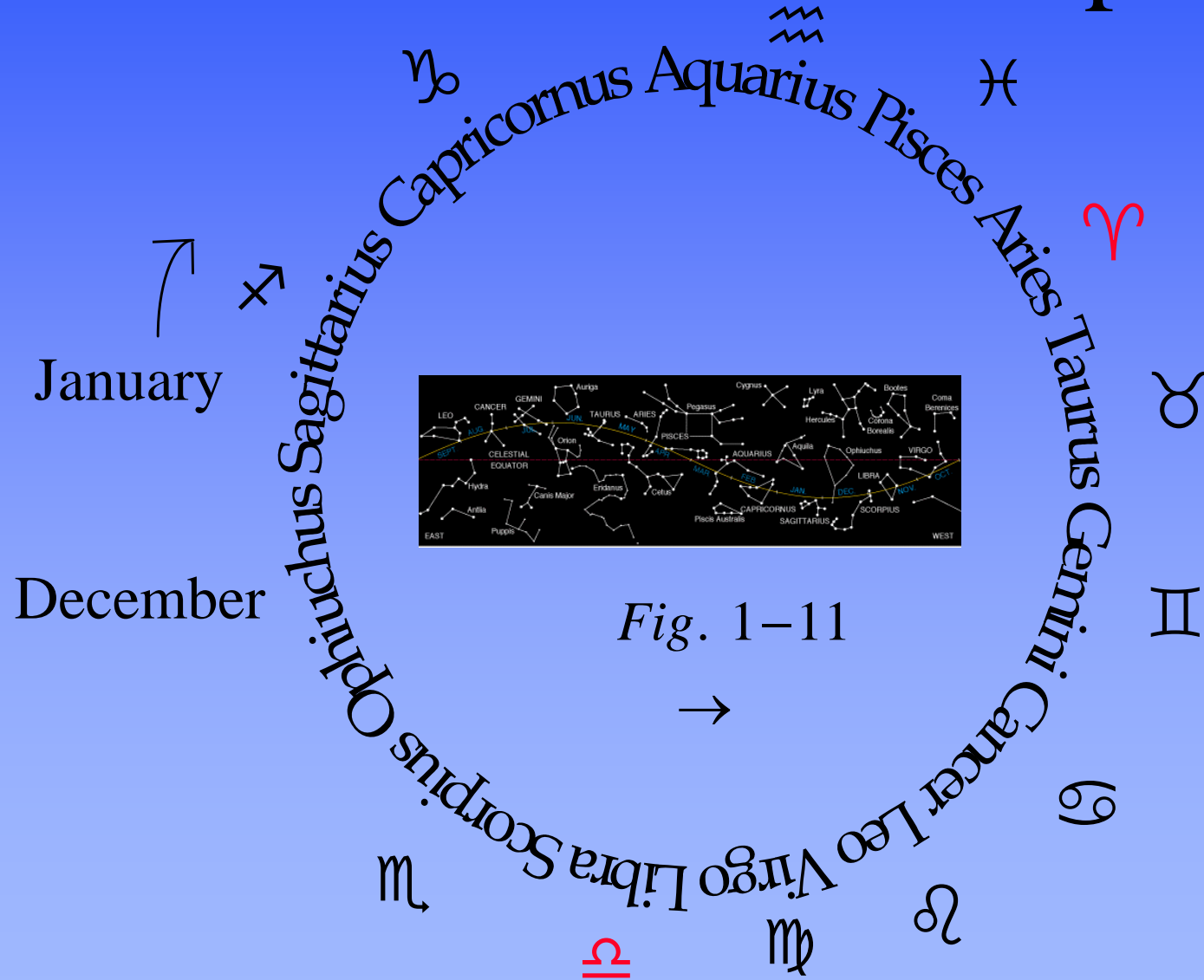
Pole Star above the Horizon

- ★ The **latitude** of Aberdeen is the angle at the centre of the Earth shown in the diagram as 57°



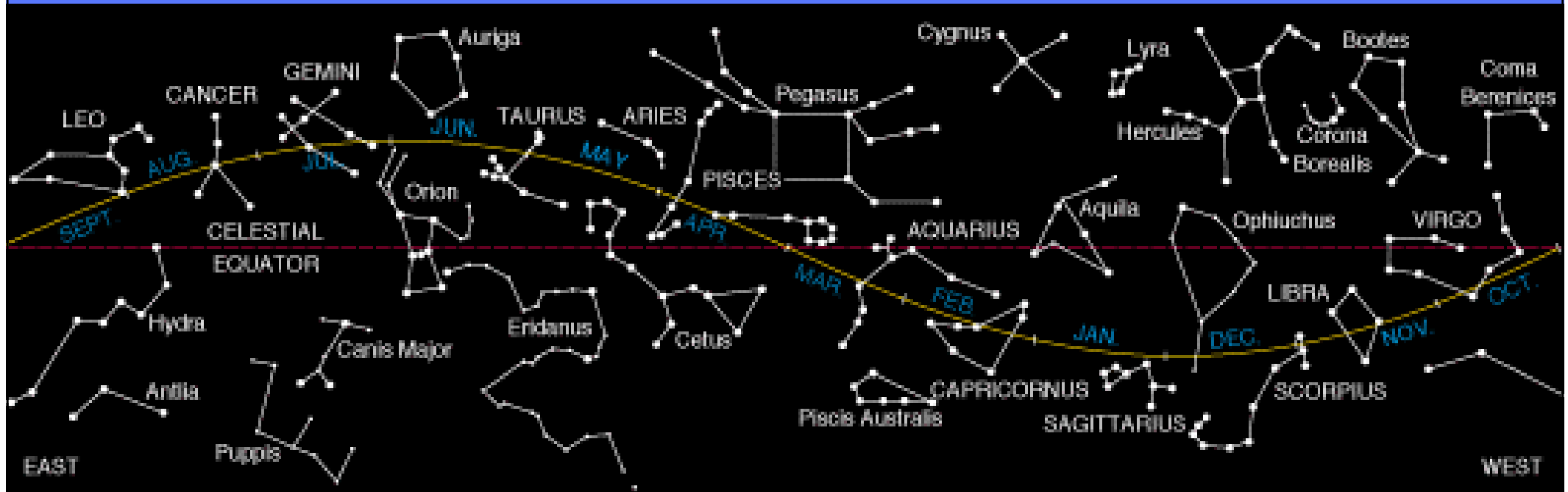
- ★ The **pole star** is the same angle above the northern horizon as your latitude. Sketch for Aberdeen

Constellations on the Ecliptic



*The Sun moves around a circular path across the stars called the **ecliptic***

Constellations of the Zodiac



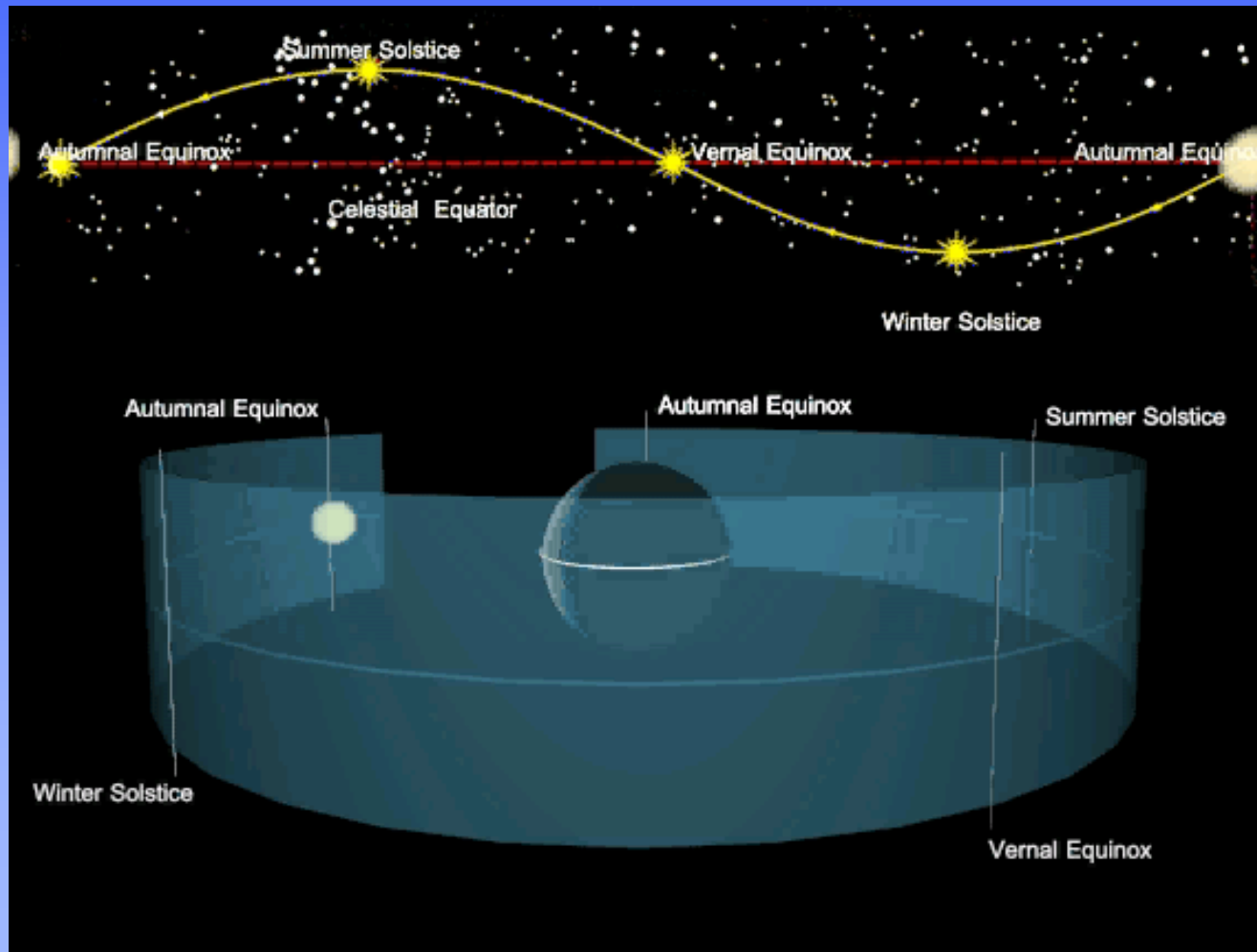
Courtesy: K & K

The Zodiac

animation →

Sun's Path along the Ecliptic

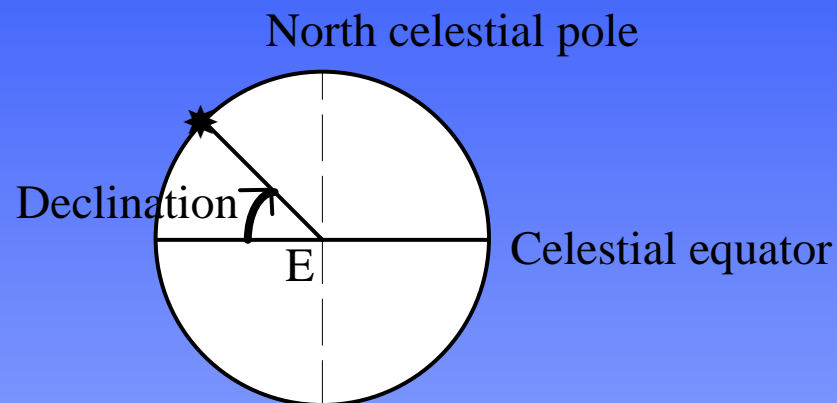
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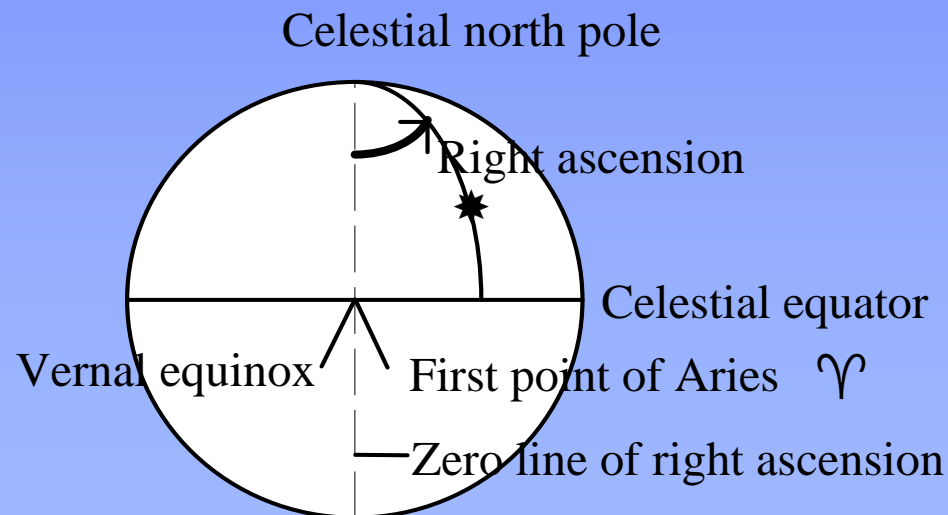
Courtesy: K & K

Locating Heavenly Bodies

★ Celestial latitude is called DECLINATION
(e.g. Sirius $-16^{\circ} 41'$ decl)



★ Celestial longitude EAST is called RIGHT ASCENSION
(e.g. Sirius 06h 44m RA)



Claudius Ptolemy (about 150 AD)

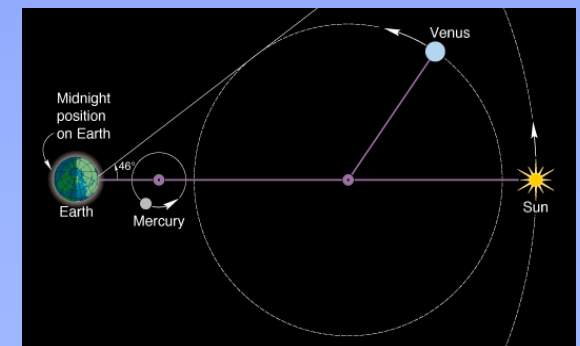


★ In the *Almagest* he described a refined geocentric model based on the Greek view of the heavens

★ the purpose of this model was to account for the positions of all the heavenly bodies

★ The Sun, Moon and 5 planets went round uniformly in circular orbits, called **epicycles**, whose centres moved uniformly around large circles (called deferents) centred on the Earth

★ The underlying ideas were incorporated into Christian theology

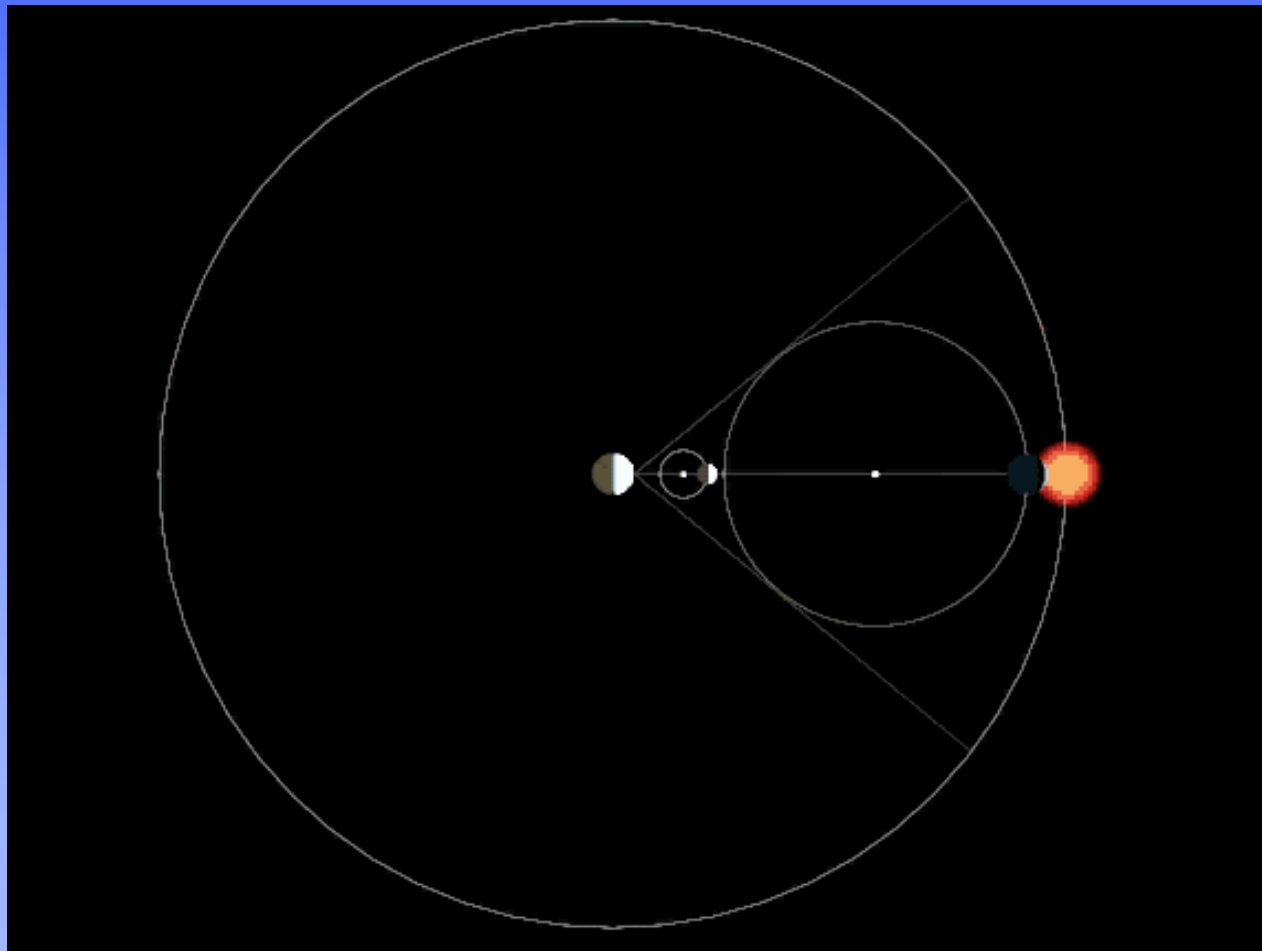


Animation →

Epicycles for Mercury & Venus

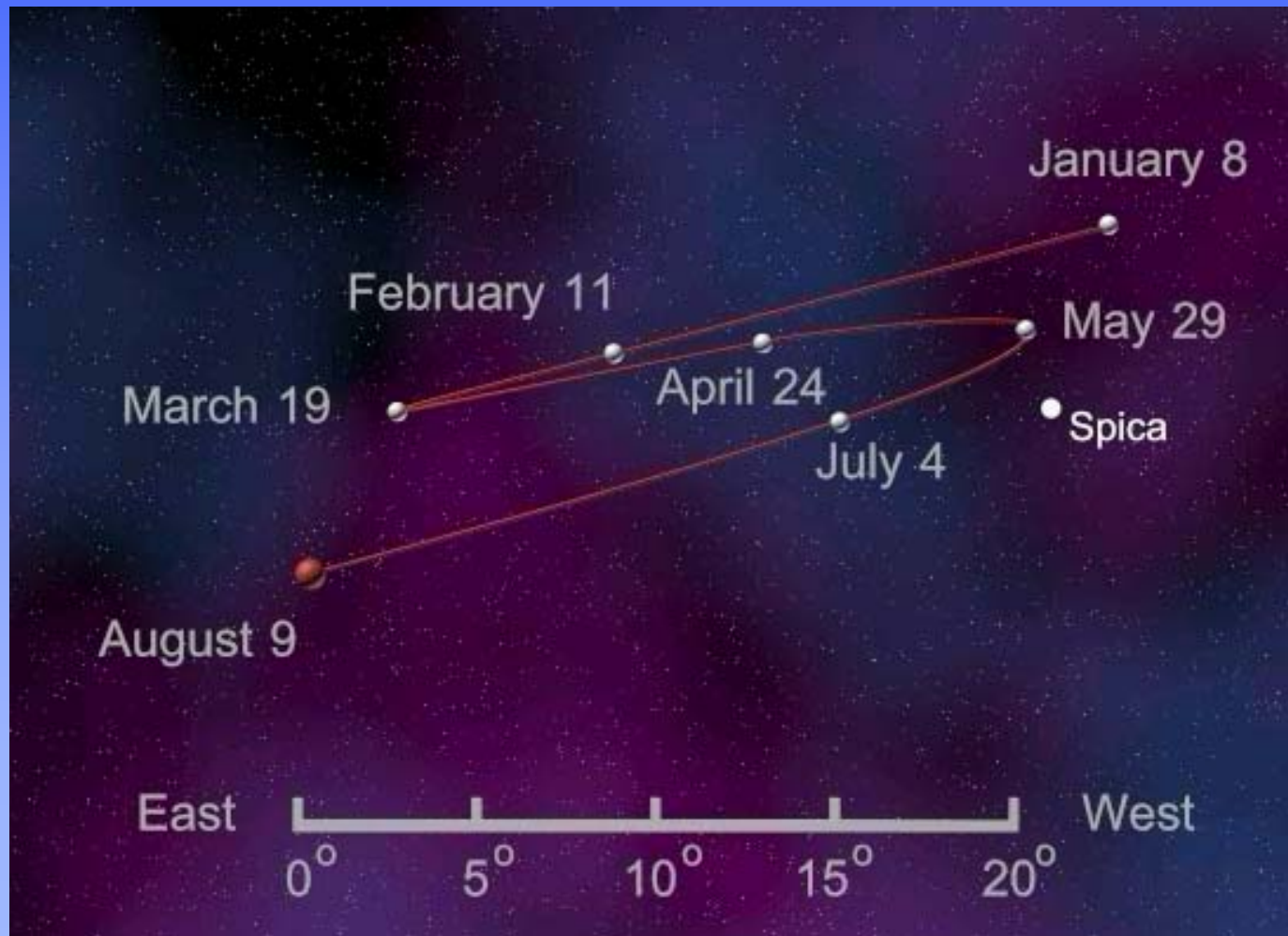
(animated)

Courtesy: K & K



Mars Retrograde Motion

(animated)

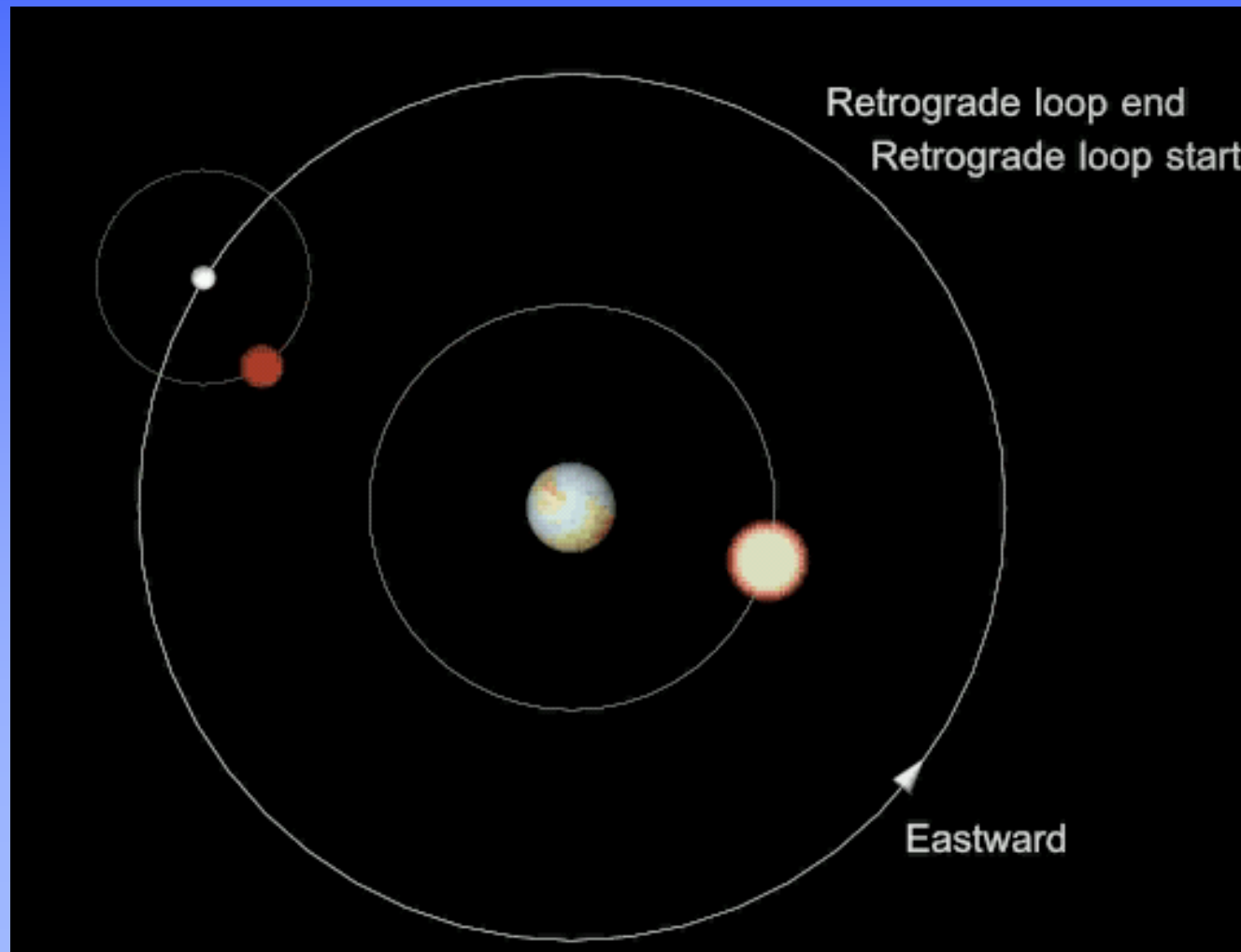


Courtesy: K & K

Epicyclic Explanation

(animated)

Courtesy: K & K



An Everyday Astrological Relic

★ Place the 7 'wanderers' in the sky around a circle in order of their supposed increasing distance from Earth

★ Superimpose the lines of the mystic heptagram

★ Follow the lines and you have the order of the days of the week

