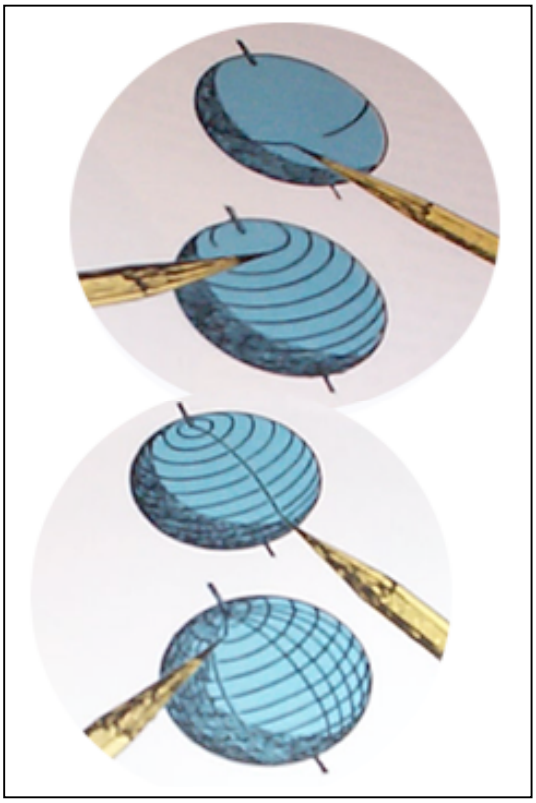
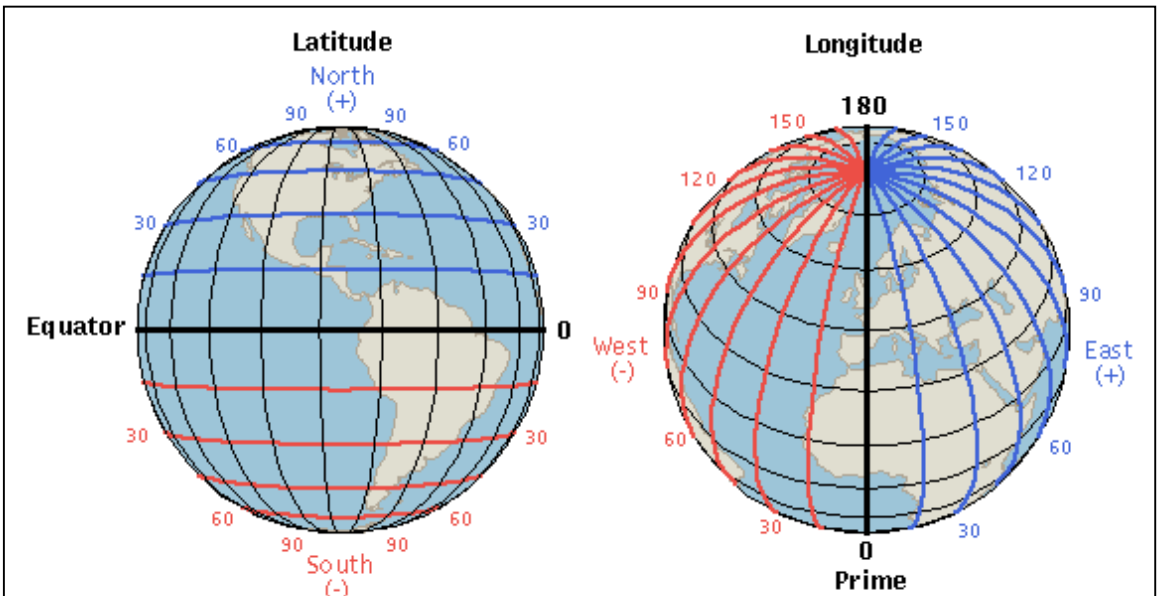
Latitude & Longitude:

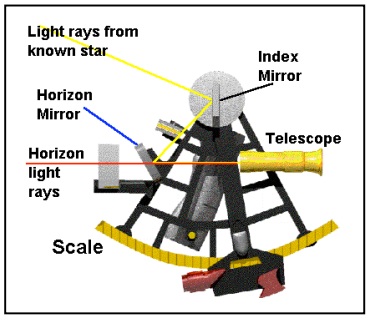
Because the world is round, a simple grid is hard to draw.

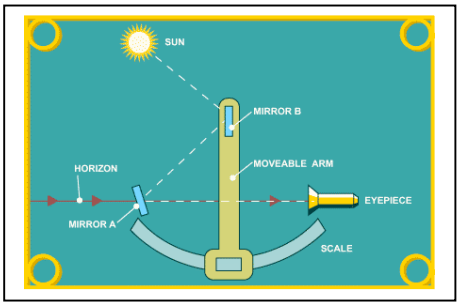


Using the rotation about the poles, we draw a line to make *equal* halves (the equator). Latitude lines are parallel to it. We draw a line from pole to pole and divide the world into meridians (lines of longitude). The reference lines were the date line (Prime Meridian) & the equator.



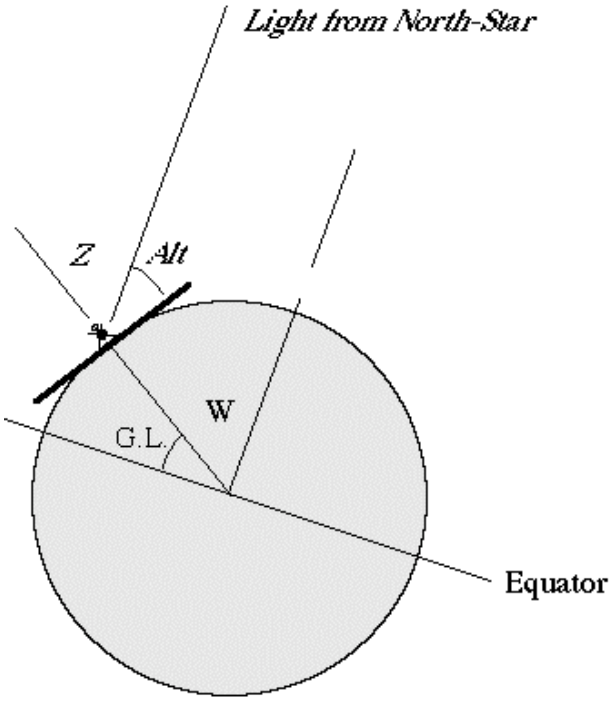
LATITUDE: a measure of your location North or South of the equator…
-determined by using a sextant sighted on a star.





In the North…….Polaris
(the North Star)
In the South…Sigma
Octantis

Degrees of latitude were equated to the angle read off of the sextant…if the sextant read 32°, you were at 32° N (if sighting Polaris).
Notice how this method relies on geometry…parallel lines from the light of the star and tangent to Earth (the altitude or latitude):



Z = W

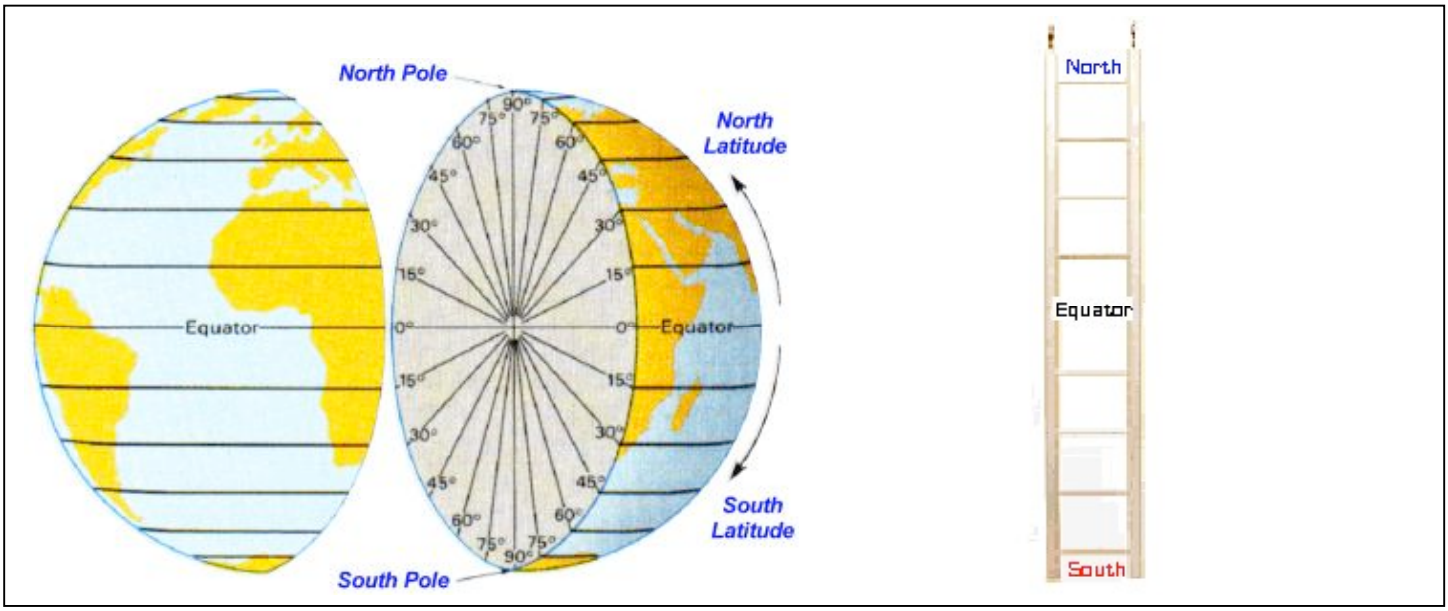
giving

90 - Z = 90 - W

- which gives

Alt = Geographical Latitude

The Altitude of Polaris above the horizon is equal to the observers' Geographical Latitude.

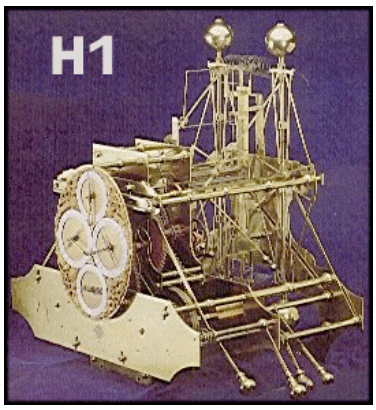


Longitude: a measure of your location East or West of a zero line (Prime Meridian…in Greenwich, England)

Problem: Earth rotates, so no fixed star for longitude…it has the issue of TIME!!!

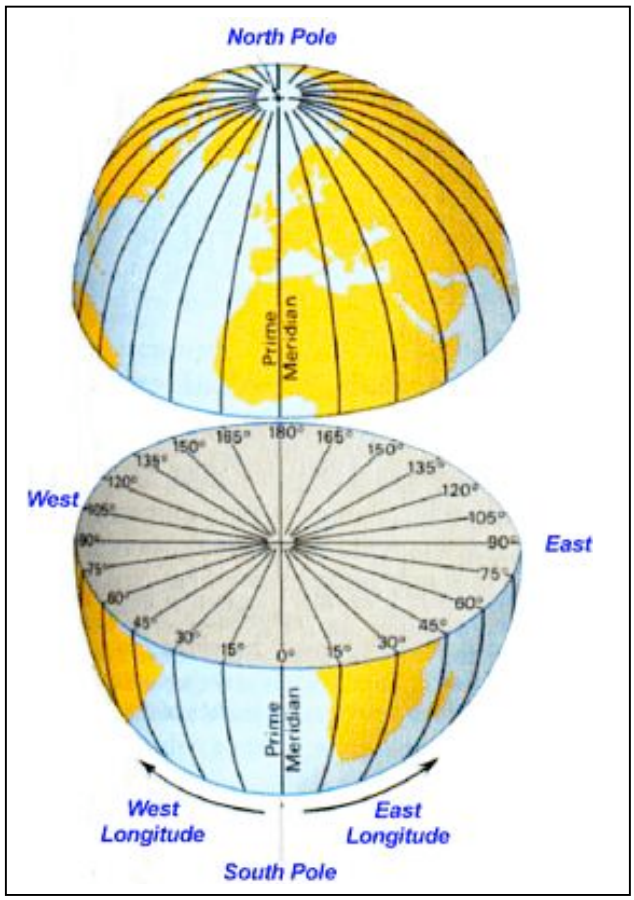
The Earth rotates one complete time every 24 hours…so, it goes 360° in 60 minutes.
It goes 15° in one hour, and it takes 4 minutes to go 1°. Before an accurate measurement of longitude could be taken, a very accurate time piece needed to exist, one that could keep time even with the rocking of a boat.

William Harrison developed several versions H1 was his first…A copy of H4 (K1)was used by Captain Cook on his voyages of discovery.



To determine one's longitude, it is important to know how long one has traveled from Greenwich. Greenwich Mean Time is the

comparison. If it is 12:00 p.m. local time and it would be 3:00 p.m. in Greenwich (GMT), you are 3 hours different and therefore 45° East of the Prime Meridian.



There are 180° for degrees of longitude. A cheat method for finding longitude it the following wheel…start at GMT…move the shortest way possible to Local Time…not the direction…calculate the time difference and multiply times the number of degrees per hour…per minute...etc