Lecture 7: September 8, 2010

- How many grains of sand are there on all the beaches of the world combined?

Announcements:

First homework is Due Friday.

Will meet at Fiske Planetarium on Friday, 9/17

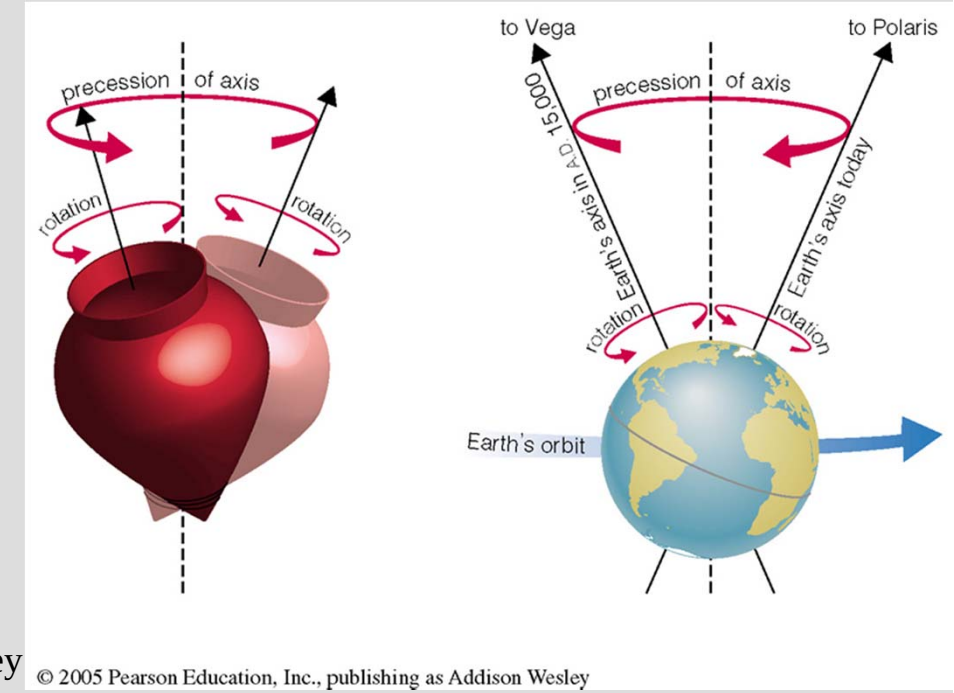
Precession of the Equinoxes (IF 2.19)

• The Earth's axis precesses (wobbles) like a top, once about every 26,000 years.

• Precession changes the positions in the sky of the celestial poles and the equinoxes.

⇒ *Polaris* won't always be the north star.

⇒ The spring equinox, seen by ancient Greeks in *Aries*, moves westward and is now in *Pisces*!



Navigation
The Simple Version

- Review Latitude and Longitude
- Review Declination and Right Ascension

- Finding Latitude
- Finding Longitude

- Trick is to understand. Don’t memorize!

Finding Latitude with the Sun

- Measure angle from horizon to Sun at maximum – while on the meridian.
- Subtract Declination of Sun on that date
- Subtract from 90 degrees

- Note use southern horizon in northern hemisphere and vice versa

Finding Latitude with the Stars

- Measure angle from horizon to star at maximum – while on the meridian.
- Subtract Declination of star
  - Use negative declination if star is in southern sky
- Subtract from 90 degrees

- Note use southern horizon in northern hemisphere and vice versa
- Watch for sign change in Southern Hemisphere

Finding Longitude with the Sun

- Must have clock and have it calibrated to a known time zone.
- Calculate time in Greenwich (Universal Time)
- Measure what time (UT) Sun crosses your meridian
- Subtract 12 from measured UT (military time)
- Multiply by 15
- Positive=West, Negative= East

Finding Longitude with the Stars

- Must have clock and have it calibrated to a known time zone. Must know date
- Calculate time in Greenwich (Universal Time)
- Measure what time (UT) star crosses your meridian
- Calculate or look up RA of Sun on that date
- Calculate when Sun will cross the meridian
  - Subtract RA of star from RA of Sun
  - Add that number of hours to star crossing time
- Subtract 12 from measured UT (military time)
- Multiply by 15
- Positive=West, Negative= East