

Hands-On Observing

Check

Once Observed

Moon

Terminator (Shadow Edge)

Aristoteles – D.53mi.

Eudoxus – D.41mi.

Sea of Serenity

Sea of Tranquility

Apollo 11 –Landing Site

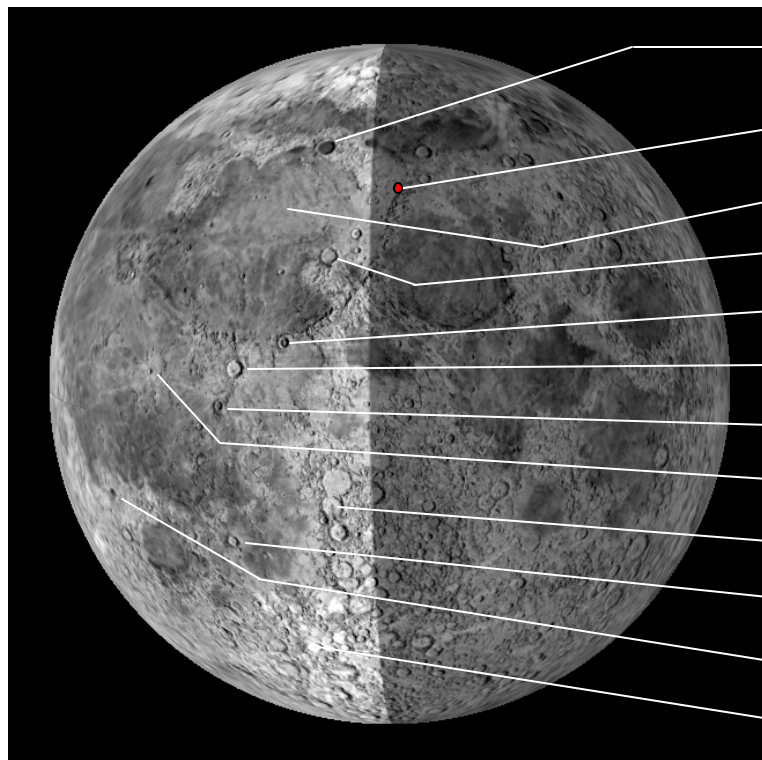
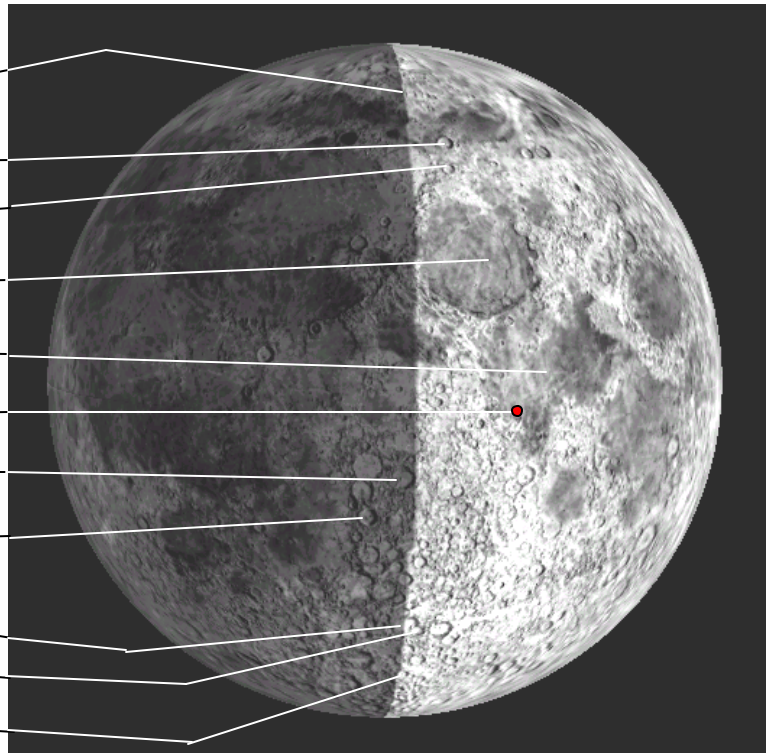
Albategnius – D.82mi.

Arzachel – D.59mi.

Stofler – D.76mi.

Faraday – D.42mi.

Maurolycus – D.69mi.



Plato – D.61 mi.

Apollo 15 Landing Site

Mare Imbrium – D.42mi

Archimedes – D.50mi.

Eratosthenes – D. 35mi.

Copernicus – D.56mi.

Reinhold – D.29mi.

Kepler – D.19mi.

Alphonsus – D.71mi.

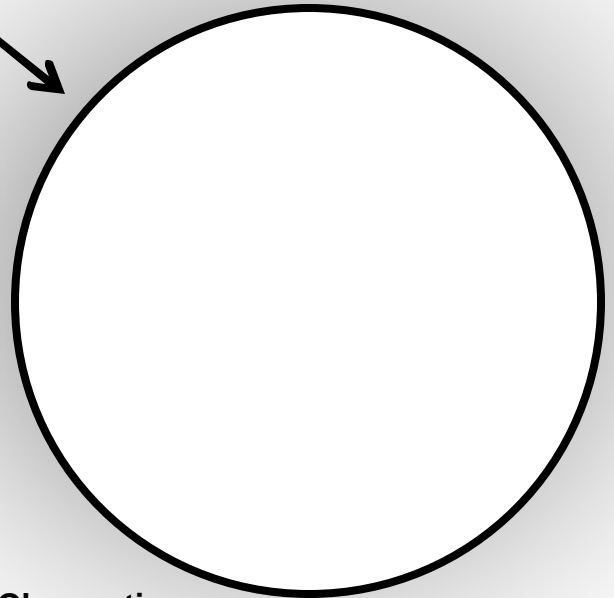
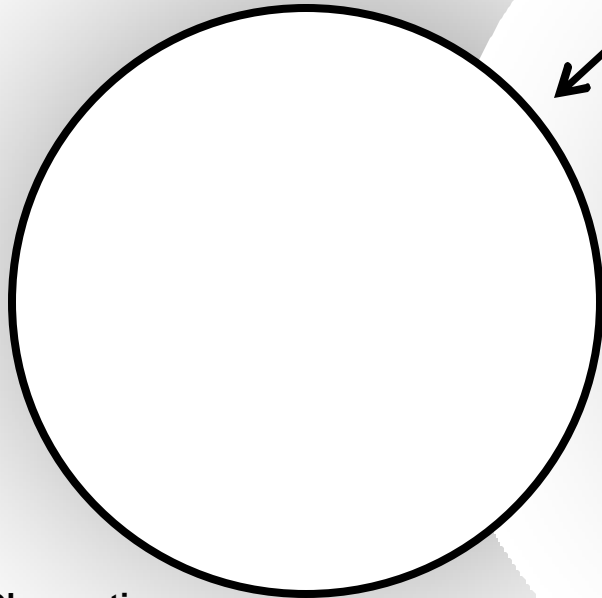
Bullialdus – D.37mi.

Billy – D.28mi.

Tycho – D.52mi.

Draw your observations

Eyepiece Views



Observation

Observation

Planets

- Saturn – dis: 8au ~ 748,650,000mi
- Saturn – *Space between Planet & Rings*
- Saturn Moon – *Titan*
- Jupiter – dis: 4.5au ~ 424,080,000mi
- Jupiter – *Darker Cloud Bands*
- Jupiter Moons – *All 4: Io, Europa, Callisto, Ganymede*

Miscellaneous

- Pleiades – *Open Cluster*
- Orion Nebula – *New stars being born (1600 ly)*
- Galaxy: _____ – _____ *million light years*

Constellations

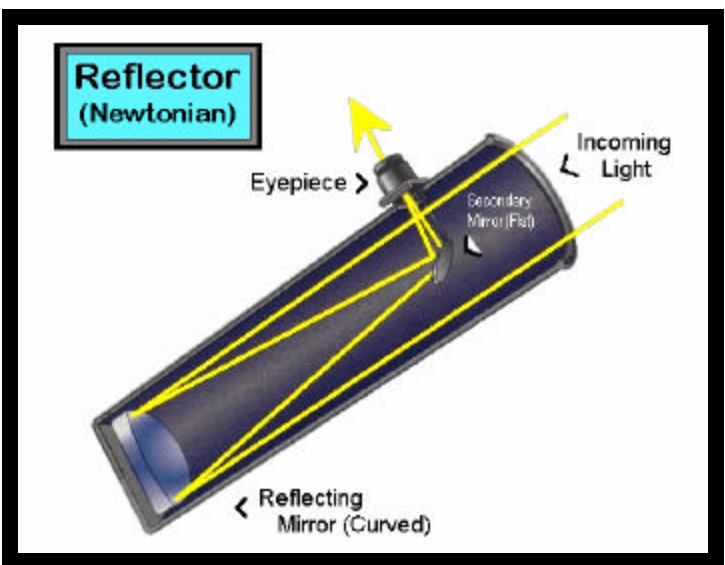
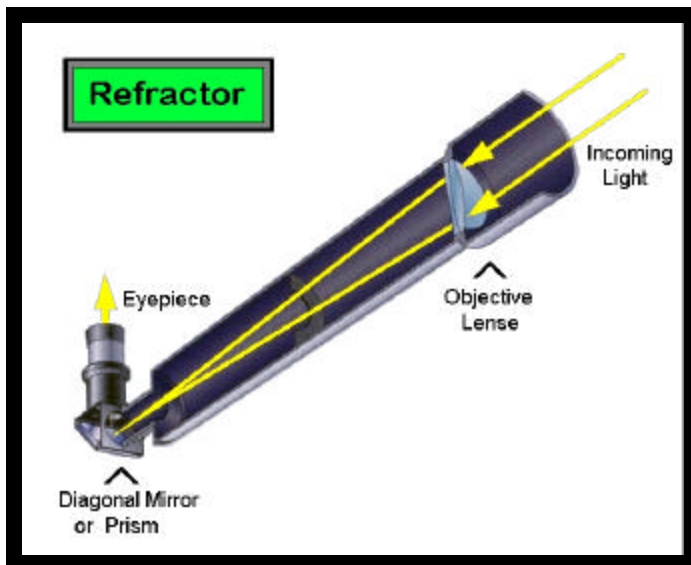
- Orion
- Big Dipper
- Cassiopeia
- Square of Pegasus
- Summer Triangle
- Northern Cross

Other

- _____
- _____
- _____

Amateur Astronomy

So-called “amateurs” discover comets, analyze light spectra from the elements in stars, discover planets around other stars, discover new binary stars, photograph everything from unseen gas clouds to the fly-over of the International Space Station in front of a rare eclipse. Some amateurs, however, just gaze at the beautiful night sky and look at stars and familiar constellations. Some of the most important and rewarding work is being done by amateur astronomers. The really neat thing is that *anyone can be an amateur astronomer*.



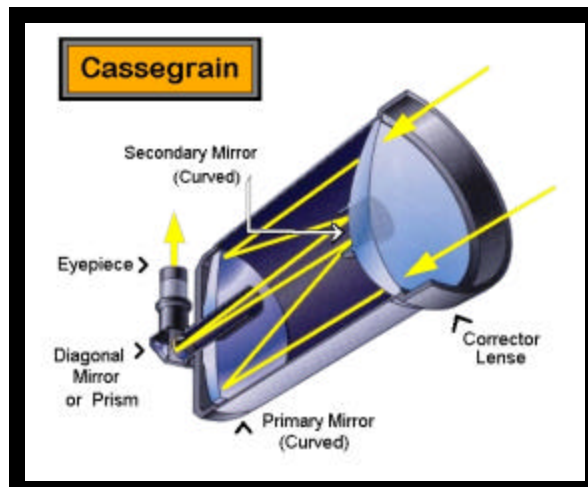
Refractor vs. Reflector

Sharper images,
Closed tubes,
Smaller apertures,
More expensive.
No obstruction

Larger apertures,
Cheaper,
Center obstruction,
Giant sizes possible



**Dr. Galloway uses a
Schmidt Cassegrain
Design**



Large aperture and
Long focal length in
Short tube.
Closed tubes

How far is Far ?

How big is Big ?

Earth – Moon...240,000 Miles (Light in 1.5 sec.)

Earth – Sun93,000,000 Mi (1 AU *astronomical unit*) (8 min.)

Sun – Pluto.....3.7 Billion Mi (40 AU) (5.5 hrs.)

1 LY .. *Light Year* ~ 6 Trillion Miles = 6,000,000,000,000

... looking back in time to 1 year ago..... ***or more...***

Distances

Proxima Centauri (Closest Star)..... 4.2 LY

Sirius (Brightest Star) 8.6 LY

Polaris (North Star)..... 432 LY

Orion Nebula 1600 LY

Galaxy Center 30,000 LY

Diameter of Milky Way 100,000 LY

Andromeda Galaxy (M31) (*closest*)..... 2.2 Million LY

Whirlpool Galaxy (M51) 15 Million LY

Size / Age of Universe..... 14 Billion Years Old

ASTEROIDS

- The total asteroid belt mass ~ .05 moon.
- More than 8,700 numbered asteroids.
- Apollo asteroids = Earth-crossing orbits... 240 known
- *It is believed that there are...*
 - 230 objects > 100 km.
 - 2000 Earth-crossers > 1 km
 - 100,000 > a football stadium
 - 70-80 million > a typical house

933 Eros

Discovered: Aug 13, 1898
by Gustav Witt, director of the
Urania Observatory in Berlin

- 18 1/2 miles wide
- moving at twice the speed of a bullet.
- 300 mil kilo distant... 3 years to reach it.
... Like hitting the point/end of a Human hair at 100 meters.
- We Landed a probe (NEAR) on the asteroid on February 12, 2001



Shoemaker-Levy 9

Discovered: March 24, 1993

- Because of Jupiter's gravity,
it broke up into 22 large pieces > 1 mi. wide
- July 16 - July 22, 1994 ... the **Fragments hit Jupiter.**
- Each impact produced a cloud as big as our planet.
- 36 miles per second
- 120 *Million* - Megatons
- Each impact was like a Hiroshima bomb
going off **every second for 13 years.**



Impact Craters on Earth



**Wolfe Creek Crater
Australia**

**Diameter: 0.87 km
Age: 300,000 years**

Well-preserved partly buried under wind blown sand in the flat desert plains of north-central Australia.

**Its crater rim rises ~25 m (82 ft).
Crater floor is ~50 (164 ft) below rim.**

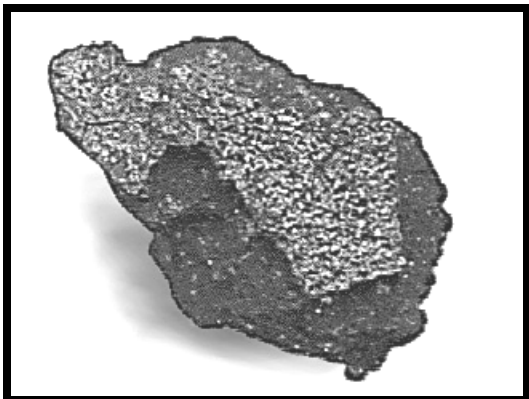
- 50,000 yrs old
- 570 ft. deep
- 1 mi. wide

The Meteor...

- Nickel-Iron
- 150 ft. dia.
- 300,000 tons
- 40,000 m.p.h.



Barringer Crater, Arizona



Tagish Lake, Canada – Jan. 18, 2000

- Meteorite was light weight & airy.
- Spin speed correlated with density.
slow = light weight fast = dense

**• Asteroid 1950DA
Near pass or impact in year: 2880**

ASTRONOMY LECTURE SERIES

Royal Caribbean Cruise Lines

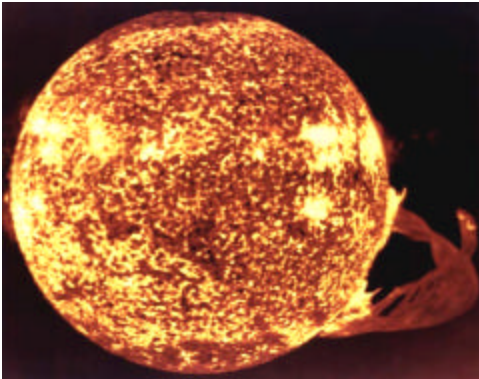
Dr. Jerry P. Galloway

astro@jerrygalloway.com

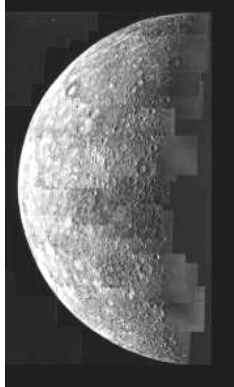
<http://www.jerrygalloway.com/astro/>

PLANETS

1	2	3	4	5	6	7	8	9	10
Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto	<i>Undecided</i>



Sun



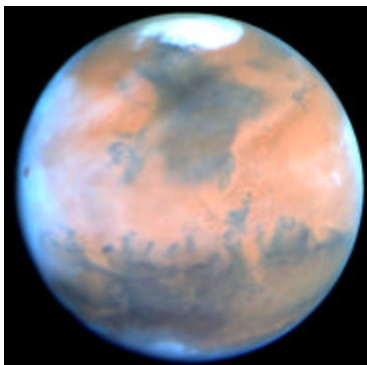
Mercury



Venus



Earth



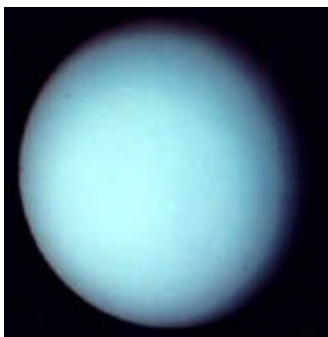
Mars



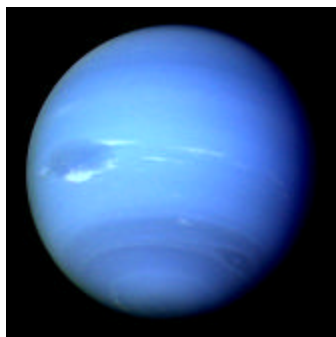
Jupiter



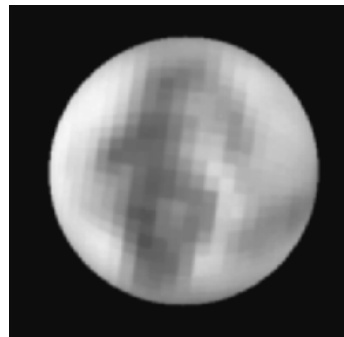
Saturn



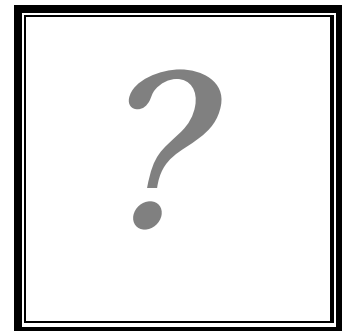
Uranus



Neptune



Pluto



Several Choices

Images from Hubble, Voyager and more.

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Notes – Drawings – Etc.: