

# The Summer Constellations



Culpeper Astronomy Club  
July 26, 2021



*Facing east around midnight in late May*

# Overview

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- Morning Calm Observatory (MCO)
- Astrophotography MCO
- The Search for Pluto
- Summer Constellations
- August Events

# Introducing “Morning Calm Observatory (MCO)”

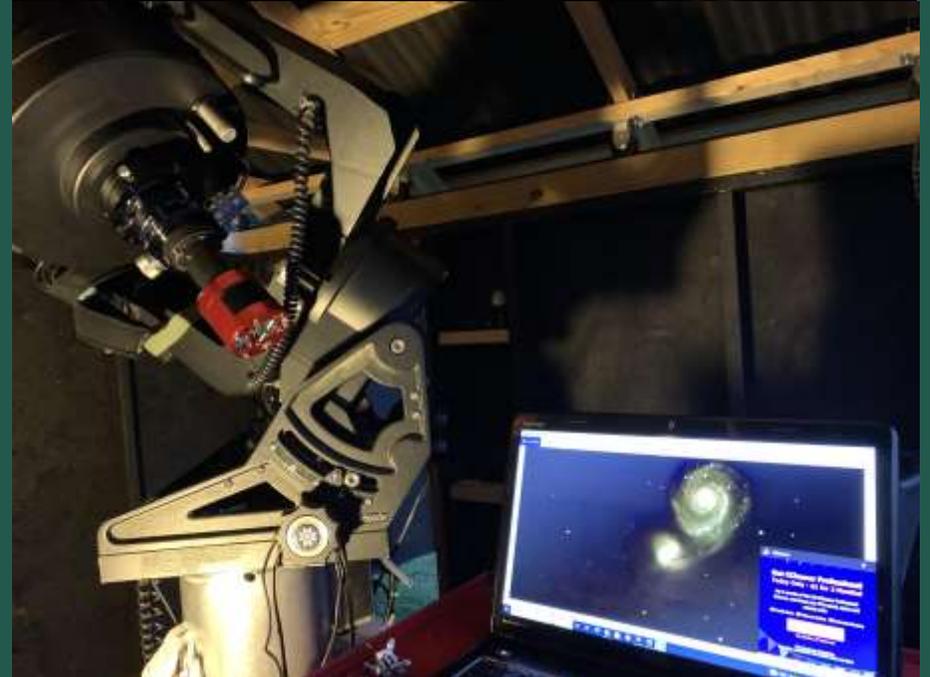
- Owner: Donovan Brock
- Location: Reva, VA
- Main Scope: 30” Dobsonian
- Secondary Scope: 12” SCT



# Astrophotography 101

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- Location: Morning Calm Observatory
- Equipment:
  - 12 inch Meade LX200 SCT
  - CCD Camera
- Process
  - Stacking software
  - Provides Near-real time visualization



M8, Lagoon Nebula, Sagittarius



M20, Trifid Nebula, Sagittarius



M22, Globular Cluster, Sagittarius



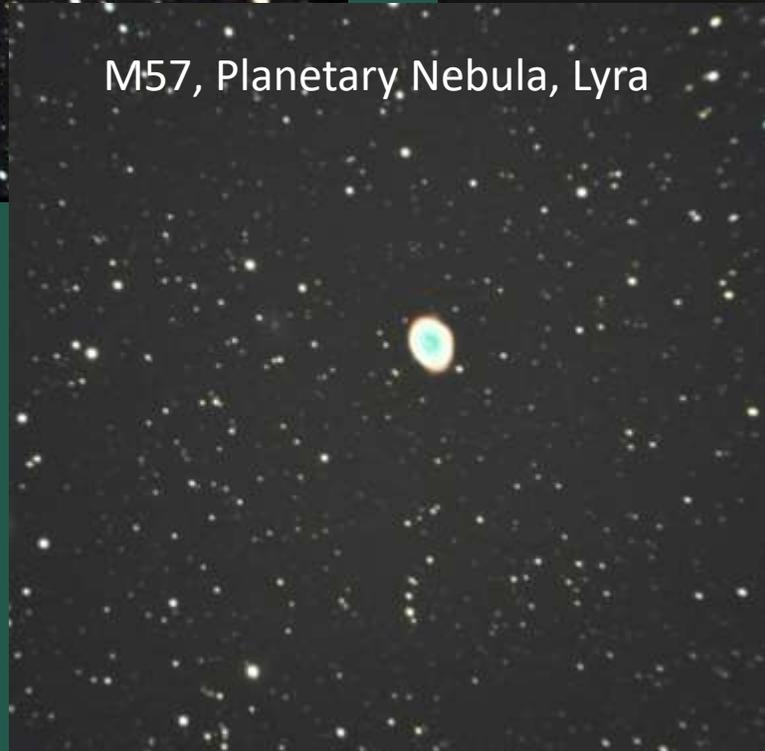
M27, Planetary Nebula, Vulpecula



M51, Spiral Galaxy, Canes Venatici

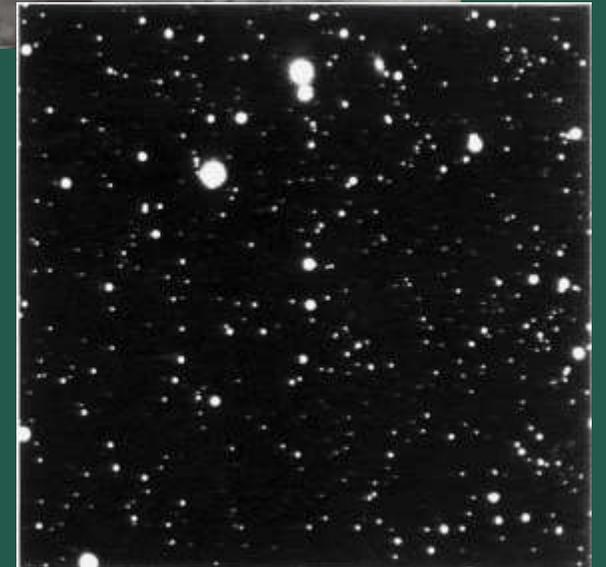


M57, Planetary Nebula, Lyra



# Pluto – The Planet

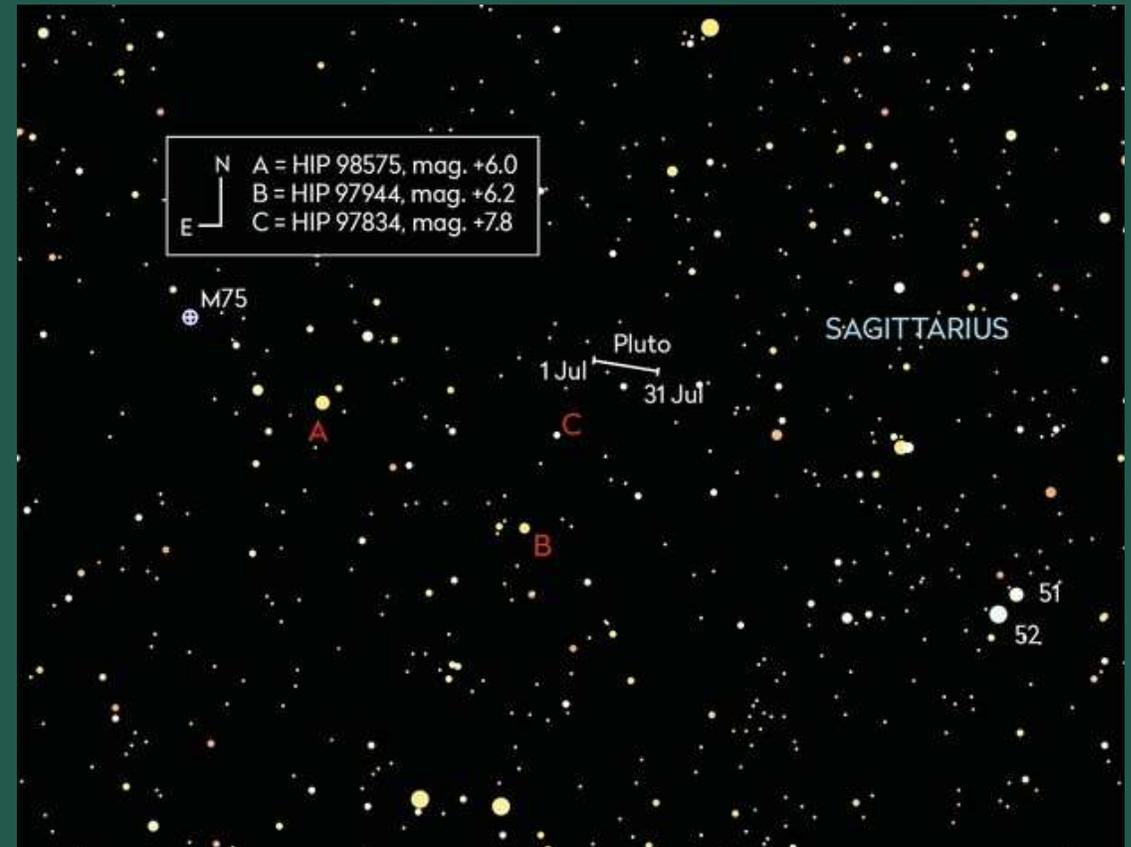
- Suspected discrepancy in orbit of Uranus
- Percival Lowell made calculations about its location
- Clyde Tombaugh hired to do the research in 1929
  - Self taught, 23 year old astronomer
- Tombaugh spent 7000 hours at the blink comparator before he found Pluto in 1930
- He found it after he had searched only a small part of the sky



# Pluto – Our Search

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- Pluto reached opposition on 17 July
  - Distance – Avg 3.7B miles
  - Still 14.3 mag
- Percival Lowell theorized that wobbles in the orbits of Uranus and Neptune were caused by an unknown planetary body
- Identification ensured only with sequential viewing
  - Normally documented with sketches or images



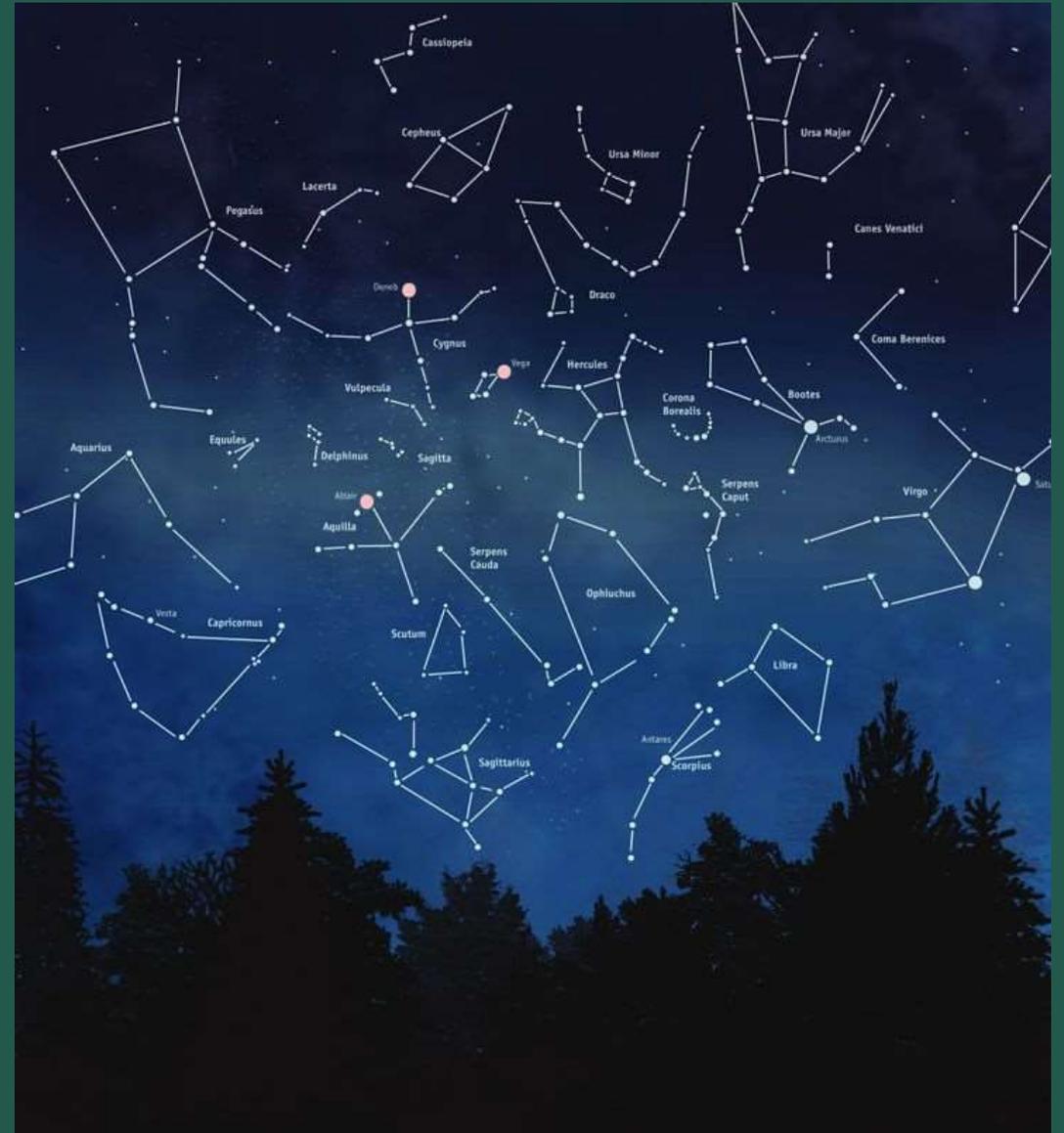


# Pluto – Our Search



# Constellations

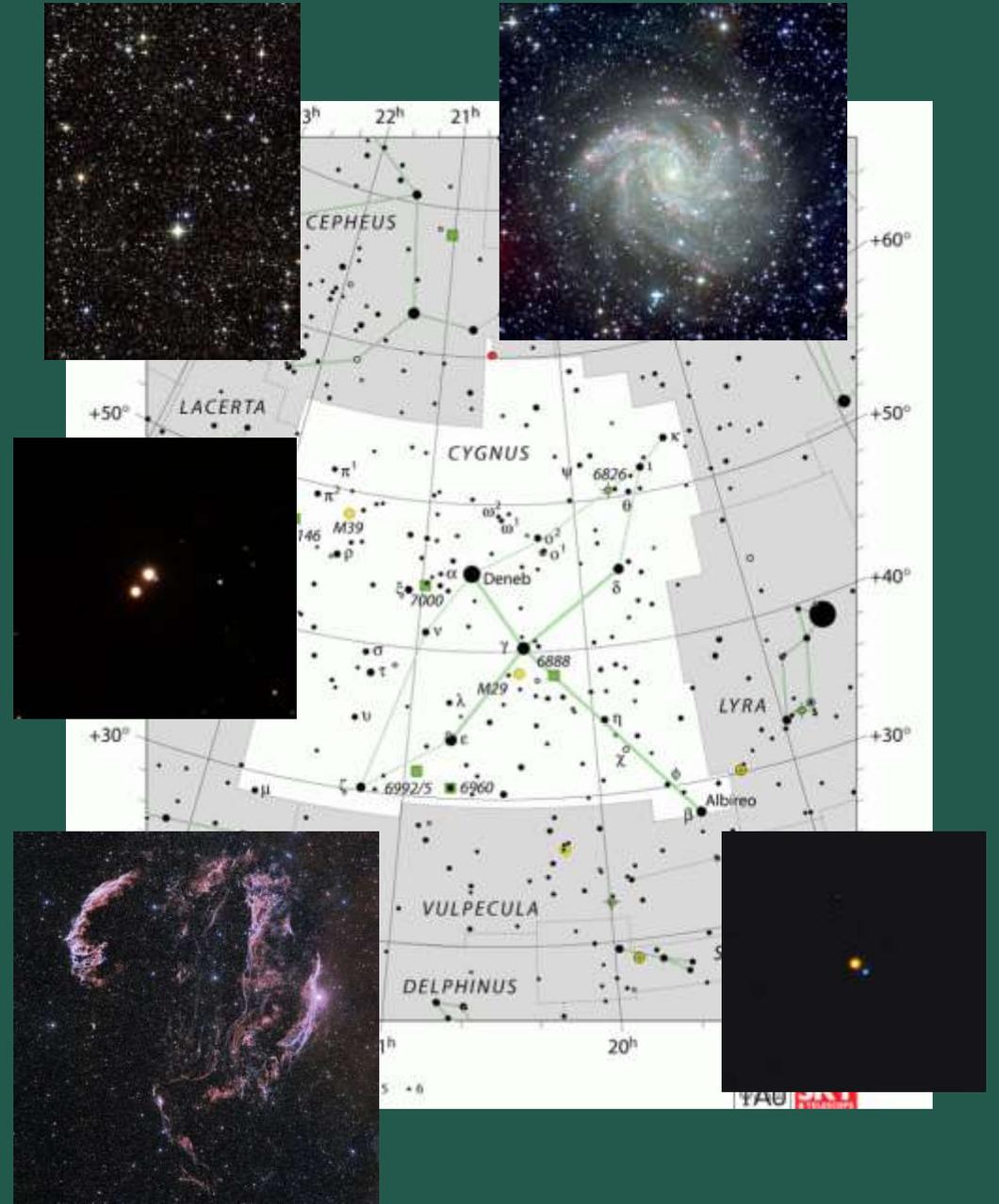
- The Summer Triangle
- Hercules: The Hero
- Scorpius: The Scorpion
- Sagittarius: The Archer





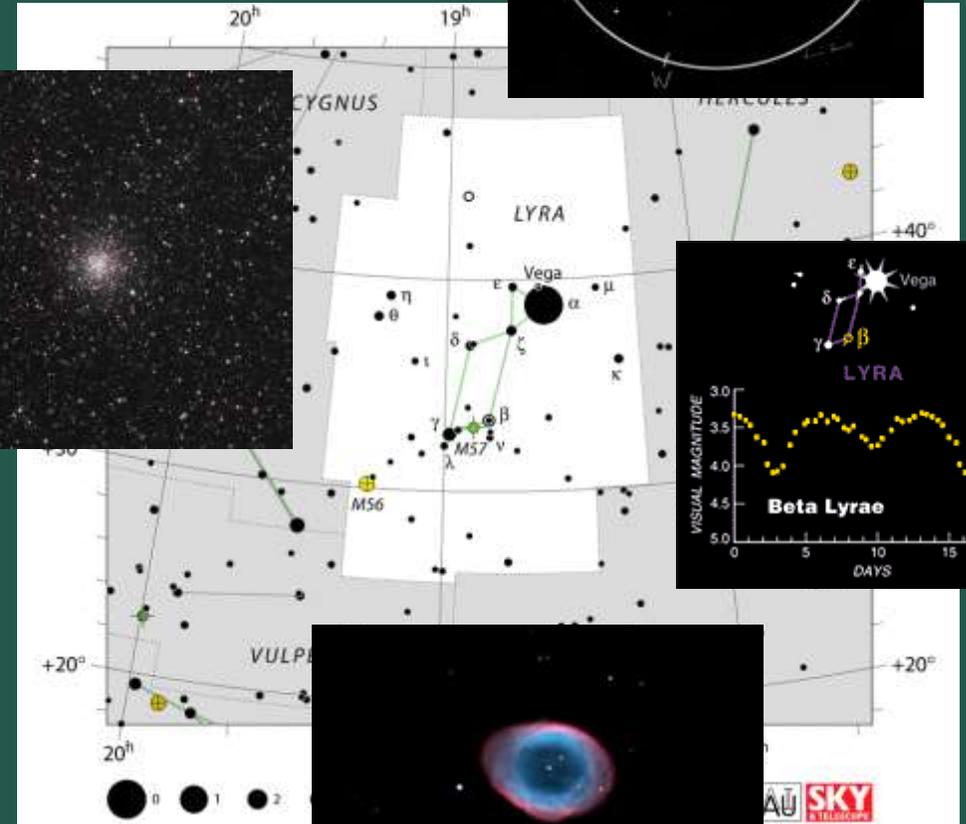
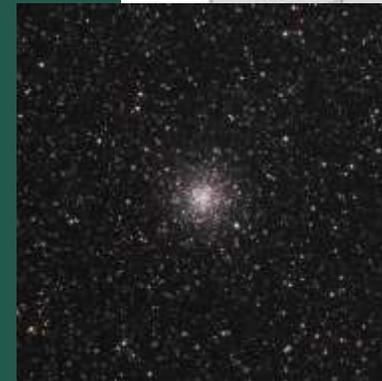
# Cygnus – “The Swan”

- Cygnus: Easy to find as it features a well-known asterism known as the Northern Cross
- Double Stars
  - Albireo: Marks the head of the swan; also known as “the beak star”; yellow primary-blue companion
  - 61 Cygni: “Bessel’s Star”; composed of a pair of two dwarfs; first star to be measured
- Deep Sky Objects
  - “Veil Nebula” - (NGC6990/2/5)
  - “Fireworks” Galaxy – NGC 6946
  - M39 – Open Star Cluster



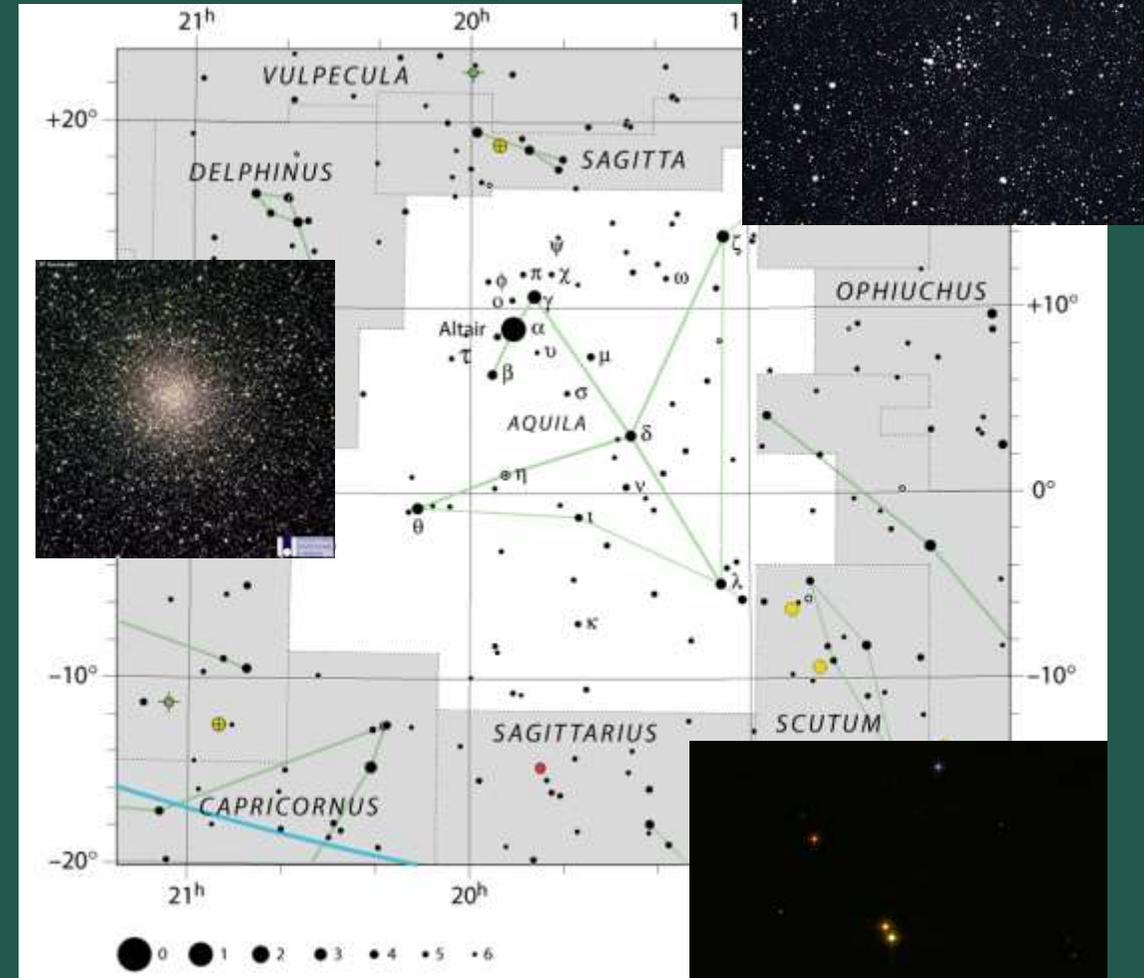
# Lyra – “The Lyre”

- Lyra represents the lyre of Orpheus, the musician and poet in Greek mythology
- Epsilon Lyrae, The “Double Double”
  - Multiple star system about 162 LY distant
  - Apparent visual magnitude - 4.7
  - Can be resolved into two binaries when observed through a telescope
- Beta Lyrae, Eclipsing Double
  - Pair of stars in a very tight orbit
  - Light varies gently and continuously over its 12.9-day period
- Deep Sky Objects:
  - M57 – Planetary Nebula
  - M56 – Globular Star Cluster



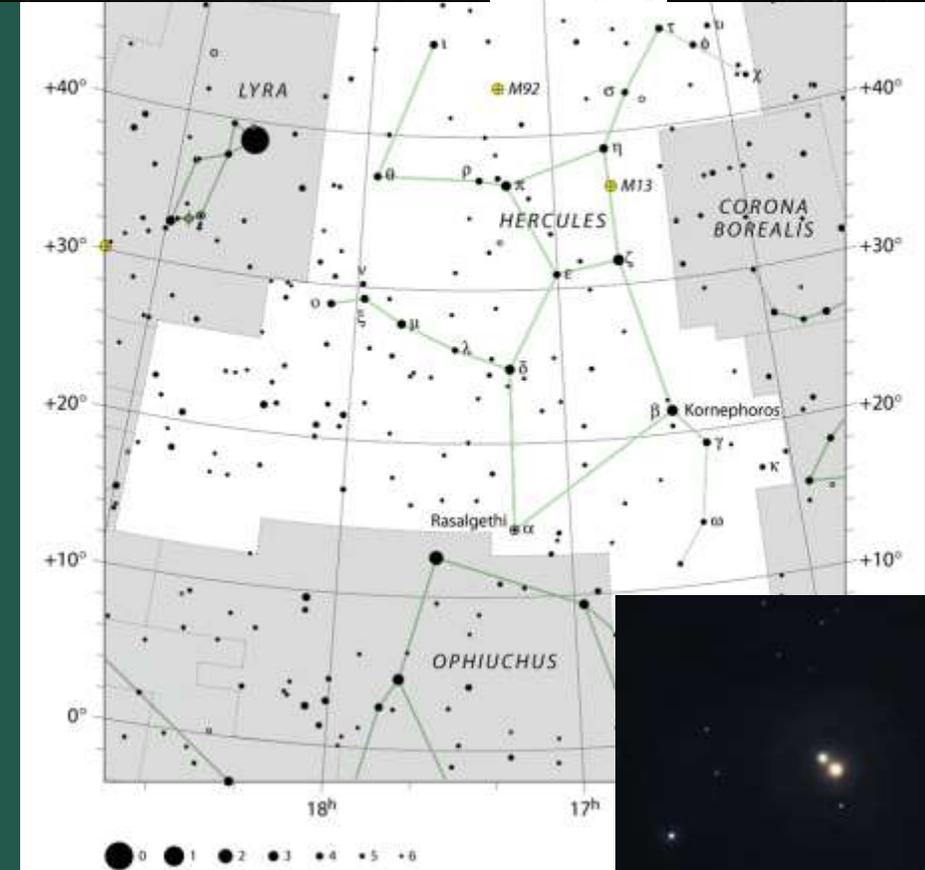
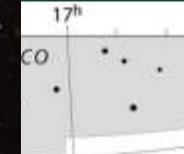
# Aquila- “The Eagle”

- Aquila is identified as the eagle that carried Zeus’ thunderbolts
  - Altair: “flying eagle” or “vulture”; one of the three stars that form the Summer Triangle
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- Double Stars:
  - 15 Aquilae: binary star; 5 mag yellow star and 7 mag companion
- Deep Sky Objects:
  - NGC 6709: Open Star Cluster; stars are loosely arranged into a diamond-like shape
  - NGC 6760: Globular Cluster



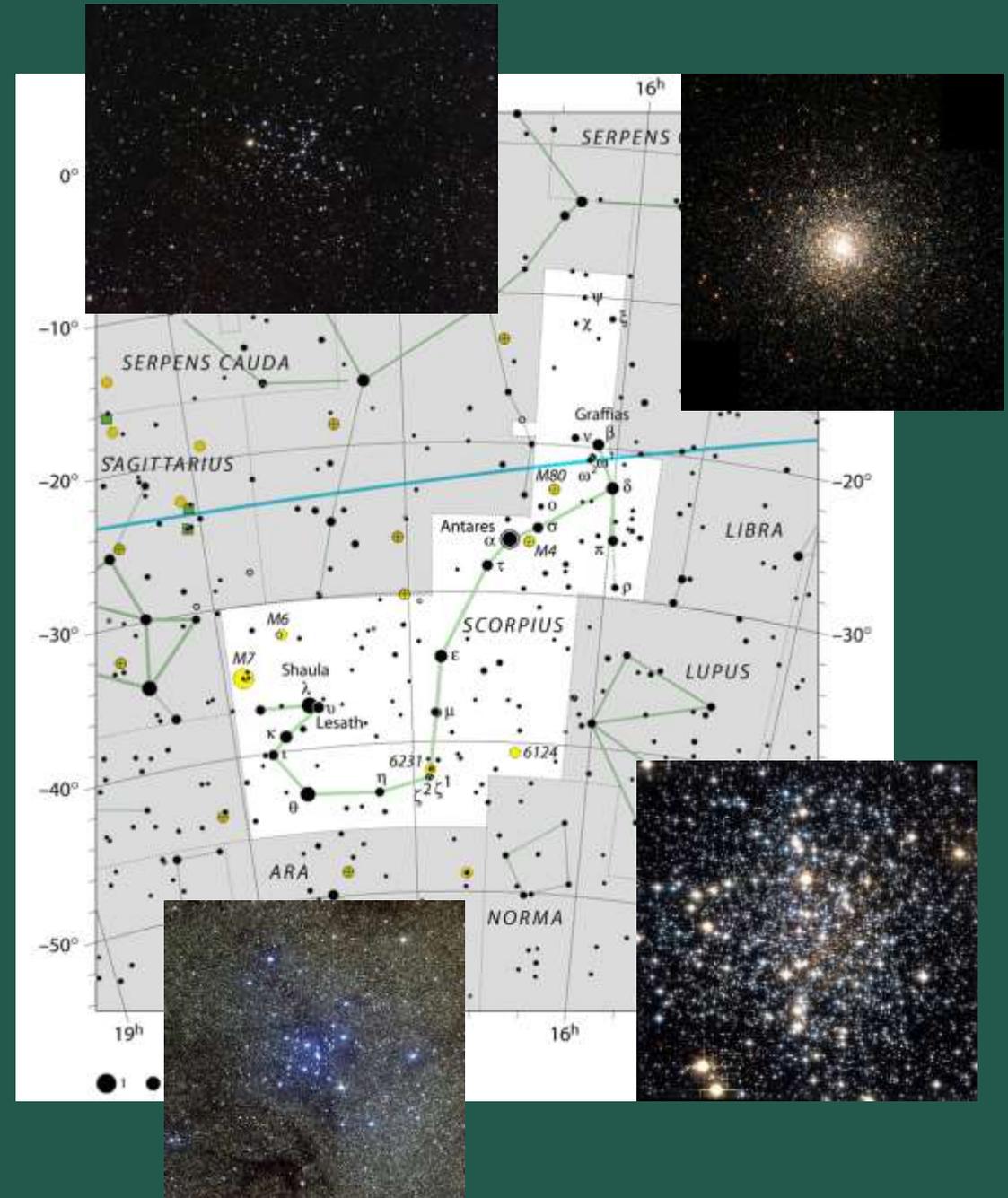
# Hercules – “The Hero”

- The fifth largest constellation in the sky; has no first magnitude stars
- Rasalgethi: (Alpha Herculis)
  - Multiple star system 360 LY Distant
  - Primary star is a red giant; 400X Sun
  - Orange-Green Pair
- Hercules contains two Messier objects:
  - Messier 13 (M13, NGC 6205) – Globular Star Cluster
  - Messier 92 (M92, NGC 6341) - Globular Star Cluster



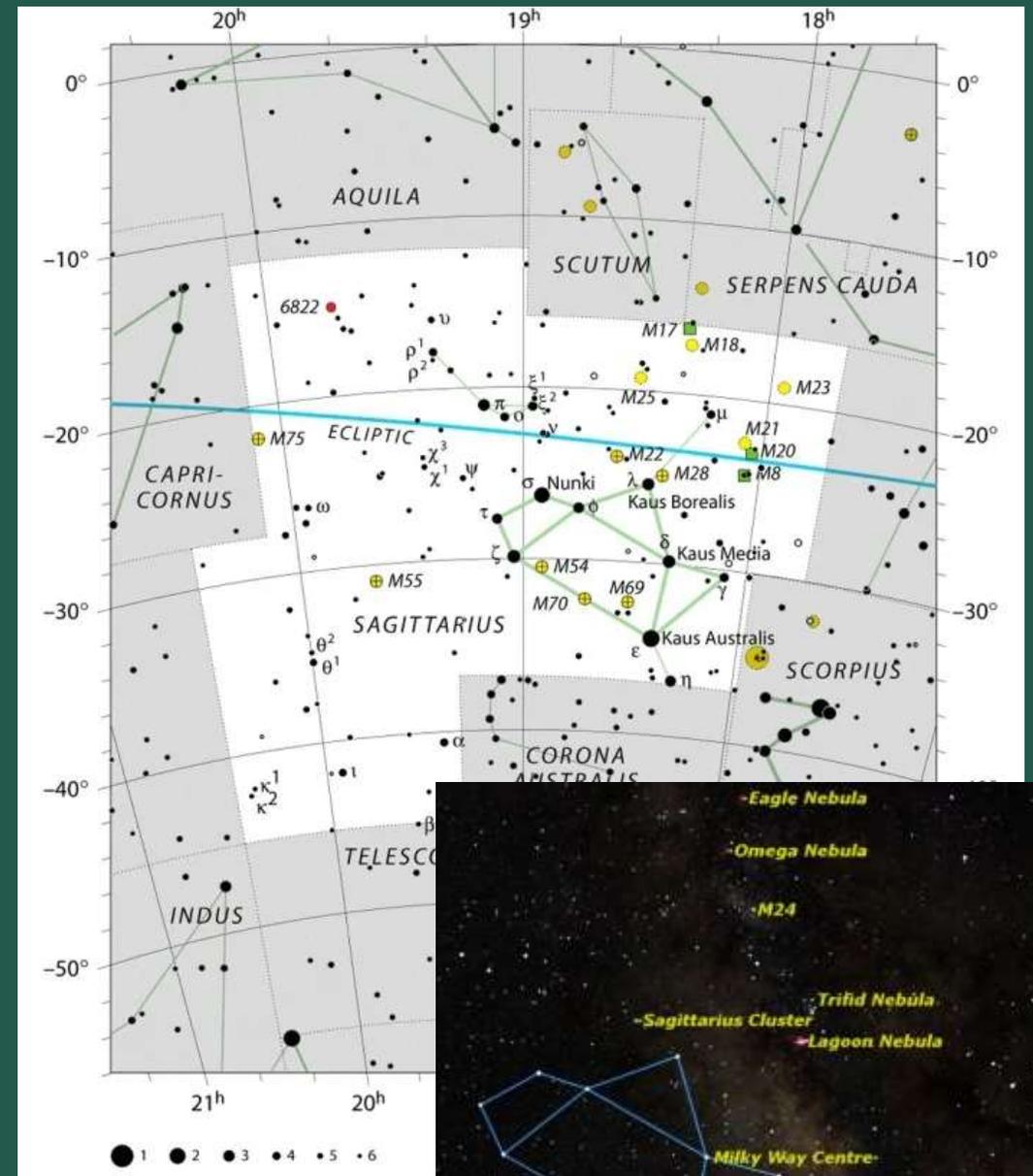
# Scorpius- “The Scorpion”

- In Greek mythology, the constellation Scorpius was identified with the scorpion that killed Orion, the mythical hunter
- Beta Scorpii is a binary star separated by 13.5 arc sec
  - Primary is binary star with an orbital period of 610 years and its own brighter component is a spectroscopic binary, with components separated by only 1.42 miliarcsec and orbiting each other every 6.82 days
- Pi Scorpii is a triple star system with a combined visual magnitude of 2.9; 590 light years distant
- Deep Sky Objects include:
  - Two Clusters (M6 and M7), and two Globular Cluster (M4, and M80)



# Sagittarius – “The Archer”

- Represents a centaur, a half human, half horse creature with the torso of a man and the body and four legs of a horse; aiming an arrow toward the heart of the constellation Scorpius
- Deep Sky Objects include:
  - Many famous DSO's and 15 Messier objects, among them the Sagittarius Star Cloud (Messier 24), the Omega Nebula (Messier 17), Messier 18, the Lagoon Nebula (Messier 8), and the Trifid Nebula (Messier 20)



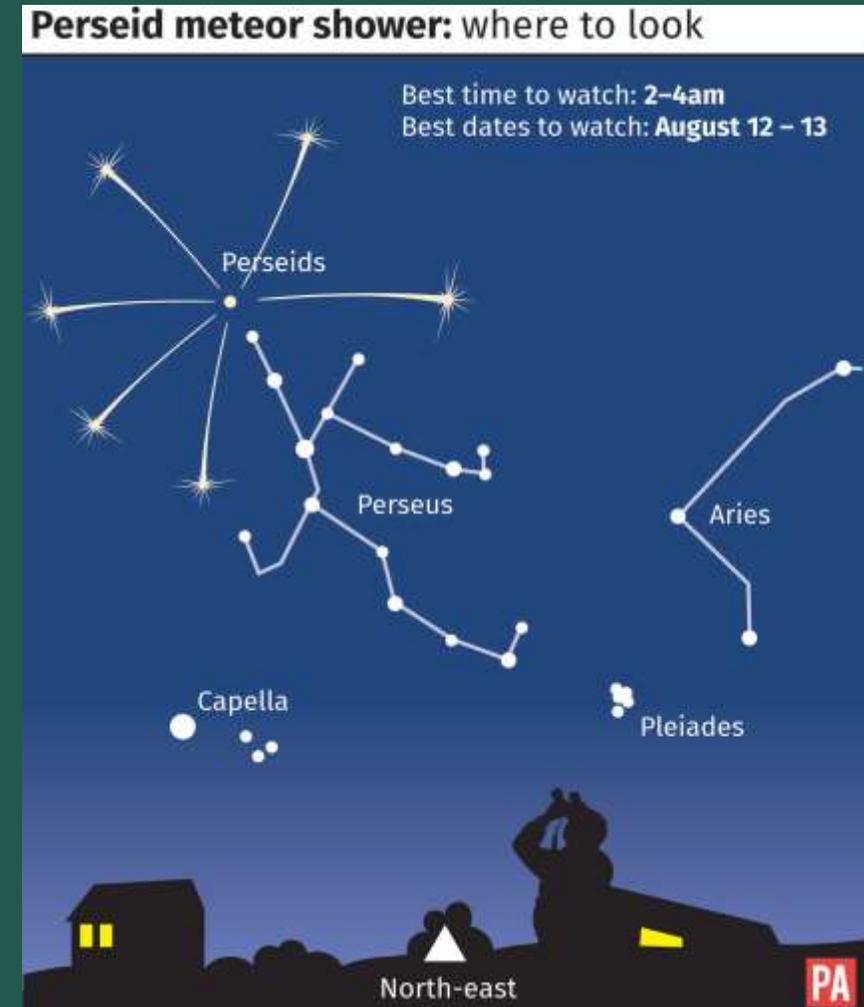
# Meteor Showers

- Some of the best are listed below along with dates when the most meteors are visible
  - Quadrantids, January 3-4 (Comet 2003 EH1)
  - Lyrids, April 22-23 (Comet Thatcher)
  - Perseids, August 12-13 (Comet Swift-Tuttle)
  - Orionids, October 20-21 (Halley's Comet)
  - Leonids, November 17-18 (Comet Tempel-Tuttle)
  - Geminids, December 13-14 (Asteroid 3200 Phaethon)
  - Ursids, December 23-24 (Comet 8P/Tuttle)
- The name of each shower refers to the constellation to which the meteors trace their apparent paths



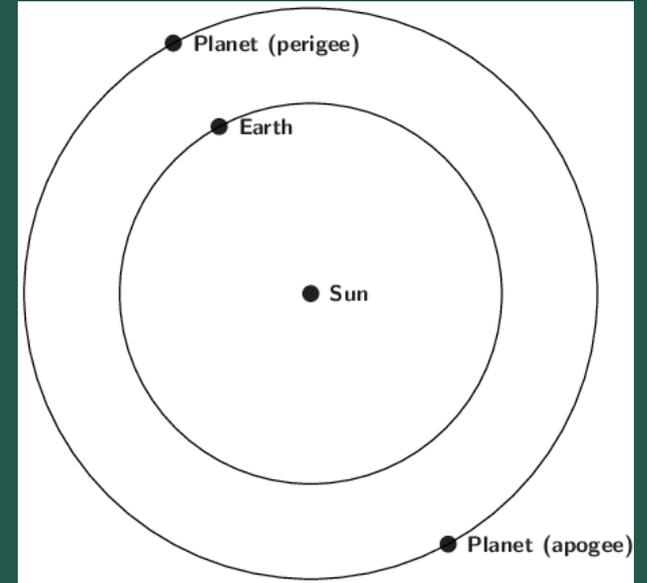
# Perseid Meteor Shower

- One of the brighter meteor showers of the year; peak pre-dawn August 11-12
- Made of debris from Comet Swift-Tuttle
- Named after the constellation Perseus because the direction, or radiant, from which the shower seems to come in the sky lies in the same direction as Perseus
- Can see 60 to 100 meteors in an hour from a dark place
- The Perseids' peak comes just a few days after a new moon; leaving dark skies and perfect stargazing conditions



# Jupiter/Saturn Oppositions

- At opposition, the planet lies on the same side of the Sun as the Earth
- At this time, the planet makes its perigee, or closest approach to the Earth
  - Provides best view and most details of planet
- Both planets reach opposition in August
  - Saturn on August 2
  - Jupiter on August 19



# Jupiter – Its Moons

- Galileo was the first to observe Jupiter's moons
  - observed them to change position with respect to Jupiter over the course of a few nights
  - From this observation he realized that the moons were orbiting the planet; supported Copernican Heliocentric Theory
- Jupiter is surrounded by 53 confirmed moons, as well as 16 provisional ones — for a possible total of 69 moons
- Scientists are most interested in the Galilean satellites — the four largest moons discovered by Galileo Galilei in 1610: Europa, Callisto, Ganymede and Io



# Upcoming Events

- Next Meeting: August 23, at 6:30-7:30 p.m.
  - Topic: TBD
- Perseid Meteor Shower: August 11-12

# Resources

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- Sky and Telescope website: <http://www.skyandtelescope.com/>
- Stellarium software application: [www.Stellarium.org](http://www.Stellarium.org)
- Suggested books:

