

# Summer Constellations and DSOs (Jun-Aug)

## Summer Constellations

\*Sagittarius \*Scorpius \*Libra \*Serpens Caput \*Ophiuchus \*Serpens Cauda  
\*Hercules \*Corona Borealis \*Boötes \*Lyra \*Cygnus \*Aquila \*Delphinus  
\*Sagitta \*Scutum \*Vulpecula \*Capricornus \*Canes Venatici \*Draco \*Ursa  
Major \*Ursa Minor \*Cassiopeia *Leaving: \*Virgo \*Leo*

- *Delta Aquarids Meteor Shower: Late July (28th) Early August*
- *Perseids Meteor Shower: August 11, 12, and 13*

## Star and Constellation Pointers

- *To find Vega and Deneb: Draw a line from the back two bowl stars of Big Dipper up and across the sky. The line will pass through head of Draco and split the two stars Vega and Deneb.*
- *To find Altair, drop straight down from Vega to the south to Altair.*
- *To find Corona Borealis and Hercules, draw a line from Arcturus to Vega.*
- *To find Corona Borealis, look to the side of Bootes.*
- *To find Antares, look to the south for a bright red star. You can also go from Deneb along the length of the swan and keep going to the south.*
- *To find Ophiucus, look between Hercules and Scorpius.*
- *To find Capricornus, go from Vega to Altair and continue 30 degrees, you'll find the V-shape Capricornus the Water Goat, to the east of Sagittarius.*

## Be Sure to SEE!

### Summer

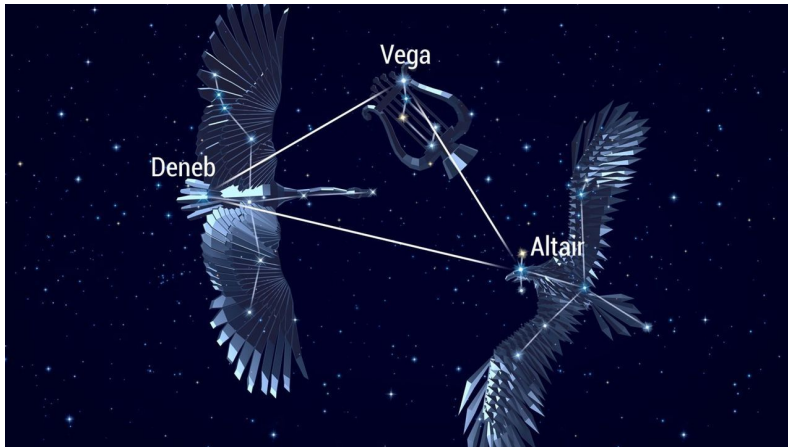
- **Epsilon Boötis** aka "**Izar**" Triple-star system famous for its contrasting colours. 203 ly. Lovely. **SAO 83500**
- **M57 (Ring pl.Nebula)** in Lyra. Red-giant that shed its outer layer, now a white dwarf. 2200 ly.
- **Scorpius Constellation is also "Maui's Fishhook"** who used it to pull the Hawaiian Islands from the sea. **Antares** means "rival of Mars"
- **M13 (Great Hercules Cluster)** 23,000 ly. Hundreds of thousands of stars. 11.7 billion y.o.

- **M22 (Glob. Cl.)**--One of the finest globular clusters, but so low to horizon for our latitude. Can easily resolve into stars (*\*To find, draw a line up the back handle of teapot and go same distance.*)
- **M4 (Glob. Cl.)** One of the best in the sky and one of the largest too. Only 7000 ly away, 3-5x closer than most globulars, easier to see individual stars. (*\*To find, it's about halfway between Antares and top claw star Graffias.*)
- **M8 (Lagoon Nebula)**--The best after the Orion nebula. Dark lane represents the lagoon. Ionized hydrogen gas given off by the 2 stars. Star nursery, enough for 1000 suns. 4000-5000 ly. (*\*To find, it sits just below Trifid Nebula*)
- **M7 (Ptolemy's Cluster)** Open Cluster, a knot of stars, bigger than M6. Good with binoculars. (*\*To find, go halfway between the front spout star of Sagittarius and bright end tail star of Scorpius*) 1500 ly
- **M27 (Dumbbell Nebula)** Dying Red-giant star that shed its outer layer, now a white dwarf. Also called the "Apple Core" nebula. Take time to let eyes adjust. Cold helium and hydrogen gas 1400 ly. (*\*To find, go from Altair to the point of Sagitta and then 1/4 distance to M27, between Sagitta and Vulpecula.*)
- **M11 (Wild Duck Cluster)**--Open cluster resembling the "V" flight of ducks. 6200 ly
- **Coathanger Cluster (Brocchi's Cluster)**--Use binoculars (*\*To find, it's about 1/3 way from Altair to Vega.*)
- **M5 (Glob Cluster)** in **Serpens Caput** 13 billion y.o. 24,000 ly
- **M27 (Dumbbell Pl. Nebula)** in **Vulpecula**. Dying Red-giant star that shed its outer layer, now a white dwarf. 1200 ly.
- **M20 (Trifid Nebula)** in **Sagittarius**. A clump of three types of Nebulae, open star cluster and a star formation merged into one. 300,000 y.o. 5200 ly.
- **M4 (Glob Cluster)** in **Scorpius** 12 billion y.o. 7200 ly (*\*To find, M4 lies just to the right of Antares.*)
- **Mizar and Alcor (double star)** in **Ursa Major**
- **M81 (Bode's Galaxy)** oval-shaped and **M82 (Cigar Galaxy)** spindle-shaped. Lovely. **Ursa Major**. 11.8 million ly (*\*To find, use diagonal ladle stars of Dipper (BL to UR go 1x distance), they point to these galaxies.*)

- **M3 (Glob Cluster)** in **Canes Venatici**. Beautiful. 34,000 ly 11.4 billion y.o. Also, **M94 (Galaxy)**
- **La Superba--Y Canes Venaticorum**. Beautiful Red Giant. 710 ly. (*\*To find, go about 1/3 distance from Cor Caroli and Megraz (top left bowl of Big Dipper) SAO 44317*)
- **M51 (Whirlpool Galaxy)** part of **Canes Venatici** 23 million ly (*\*To find, go below last star of Big Dipper's handle. Top of ladle stars point to it.)\**
- **Nu Draconis** aka "**Kuma**" Double star in head of Draco. The white eyes of the dragon. SAO 30447
- **NGC 6543 (Pl. Neb) Cat's Eye Nebula--**in Draco. Bluish-green egg. 3600 ly

### Late Spring/Early Summer (April-June)

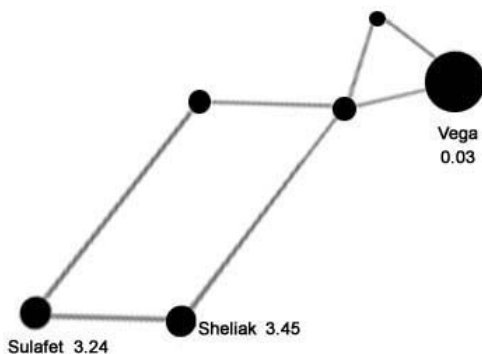
- **Spring Triangle** (stars Arcturus-Spica-Regulus)
- **Algieba** Beautiful double star in **Leo**. 130 ly. SAO 81298
- **Virgo Cluster (Galaxies)--M87, M86, and M49**
- **Leo Triplet (Galaxies)--M65, M66, and NGC 3628.**
- **M53, Black Eye Gal--Coma Berenices**
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## Summer Triangle (Vega, Deneb, and Altair)

--Myth: In China 2500 years ago, **Altair** represents a cowherd and **Vega** is a weaving girl. They are so infatuated with each other that they neglect their celestial duties, so the celestial emperor separates

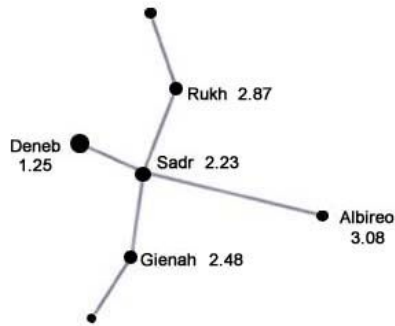
them on opposite banks of a great celestial river represented by the Milky Way. On the 7th day of the 7th month, the magpies form a bridge for them to cross the Milky Way for one night only.



**Lyra the Harp Myth:** The Lyre was invented by Mercury and given to Apollo and then to his son Orpheus, the great mortal musician of the day. When his wife Euridyce died and went to the underworld, he decided to play the Lyre and charm Pluto to get her back. Pluto agreed, under the condition that he not look back at her until they were back from the underworld. But he got worried and looked back, and she was sent back forever. When he dies, Jupiter placed the Lyre in the heavens and Orpheus joined his wife in the underworld.

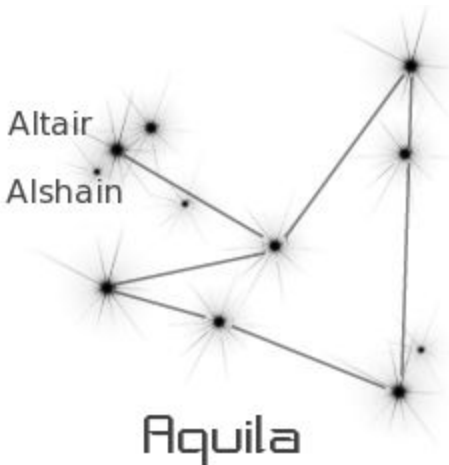
- **\*\*M57 (Ring pl.Nebula)** in Lyra. Red-giant dying star that shed its outer layer, now a white dwarf. A cloud of cold hydrogen and helium gas, **2200 ly**. Finest of all! Looks like a smoke-ring. The sun will do the same in about 6 billion years. **\*Vega--brightest of the summer stars.** (Name in Arabic means Swooping vulture). **25 ly**.
- **\*Epsilon Lyrae (the "Double-double")** two white stars, but at 100-125x, they're also double stars)

- **\*M56 (Glob. Cl.)** in Lyra. 13 billion y.o., 3x the age of solar system. Small, but pretty in rich field of Milky Way. (*\*To find, it lies halfway between bottom star of Lyra diamond (Sulafat) to Alberio.*)
- **\*Beta Lyrae "Sheliak" (multiple star)** white-blue **SAO 67451**
- **\*Vega--(blue supergiant star)** Name means "falling eagle." **25 ly.**
- **\*Struve 525 (double star)** yellow-blue **SAO 67566**



**Cygnus the Swan--Myth:** The swan is Jupiter in disguise as he tries to woo Nemesis and Venus became an eagle to chase the swan. Nemesis went to protect the swan, and Jupiter ravished her while she slept. From their union came Helen of Troy and the twins Castor and Pollux.

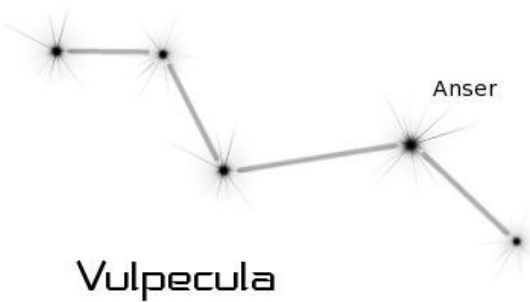
- **\*\*Alberio (gold-blue double star)** Finest in the sky! **400 ly**
- **\*M29 (Op Cl.)** near the star Sadr, the middle of the cross. Looks like a mini-Pleiades. **5000 ly**
- **\*Debeb--(blue supergiant star)** bright tail of the swan (*\*To find, draw a line from the rear bowl stars of Big Dipper (Phecda to Megrez) and go across sky to east.*) Very far away, **1425 ly** compared to Vega at 25 ly, so much much bigger. **54,000x brighter than sun.**
- **\*NGC 6826--("Blinking Planetary Nebula")** Can't see it when looking directly; have to use averted vision. Red-giant dying star that shed its outer layer, now a white dwarf. **2000 ly**
- **\*NGC 6811--("Hole in a Cluster")** Open cluster that appears to have a hole in the middle, like a donut. (*\*To find, it's about halfway between Vega and Deneb, near wing star (Ruhk) of Cygnus.*)
- **\*61 Cygni (double star)** orange-orange **SAO 70919**
- **\*16 Cygni (double star)** yellow-yellow **SAO 31899**
- **\*M39 (Op Cl.)** past Deneb, towards Cassiopeia.



**Aquila the Eagle**--Myth: The eagle of Jupiter. The eagle grabbed the boy Ganymede to be a cupbearer for the gods.

Altair--Brightest star. 16.8 ly away.

- **\*15 Aquilae (double star)**  
yellow-blue SAO 142996
- **\*V Aquilae (red carbon star) SAO 142985**
- **\*M26 (Op Cl.)** dim and small.



**Vulpecula the Little Fox**--Myth: 17th-century astronomer named it "Little Fox with Goose."

- **\*\*M27 (Dumbbell Nebula)** Dying Red-giant star that shed its outer layer, now a white dwarf. Also called the "Apple Core" nebula. Take time to let eyes adjust. Cold helium and hydrogen gas 1400 ly.

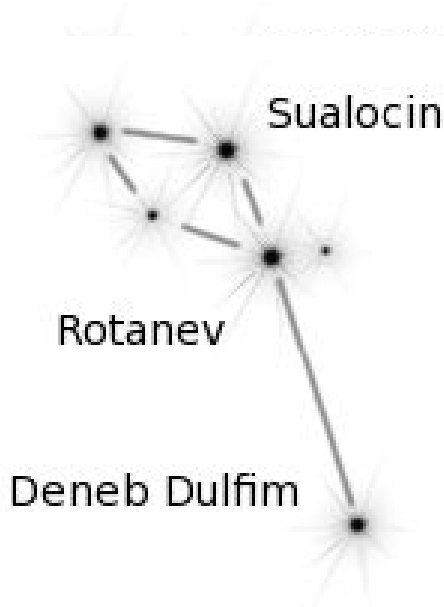
(\*To find, go from Altair to the point of Sagitta and then 1/4 distance to M27, between Sagitta and Vulpecula.)

- **\*\*Coathanger Cluster (Brocchi's Cluster)**--Use binoculars (\*To find, it's about 1/3 way from Altair to Vega.)
- **\*M71 (Glob Cl.)** Not large or bright, but graceful. 20,000 ly



**Sagitta the Arrow**--Myth: The weapon that Hercules used to kill the eagle (Aquila) that perpetually gnawed Prometheus' liver. (\*To find, draw a line between Altair and Alberio in Cygnus)

- **\*Zeta Sagittae (double star)**  
need high power to split. SAO 105298
- **\*Theta Sagittae (double star) SAO 88276**
- **\*Epsilon Sagittae (double star) SAO 10506**

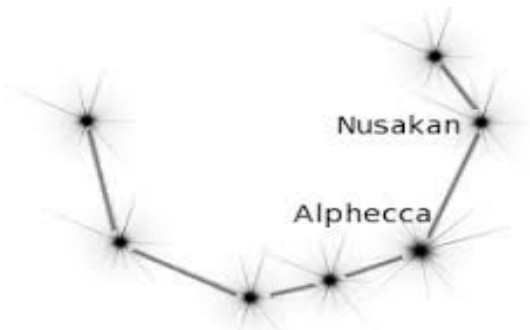


## Delphinus

### Delphinus the Dolphin Myth:

Poseidon wanted to marry Amphitrite, a beautiful nereid. He sent out several searchers, among them a certain Delphinus. Delphinus accidentally stumbled upon her and was able to persuade Amphitrite to accept Poseidon's wooing. Out of gratitude the god placed the image of a dolphin among the stars. NOte: The 4 major stars are sometimes called "Job's Coffin."

- **\*Gamma Delphini (double star)**  
orange-lime SAO 106475



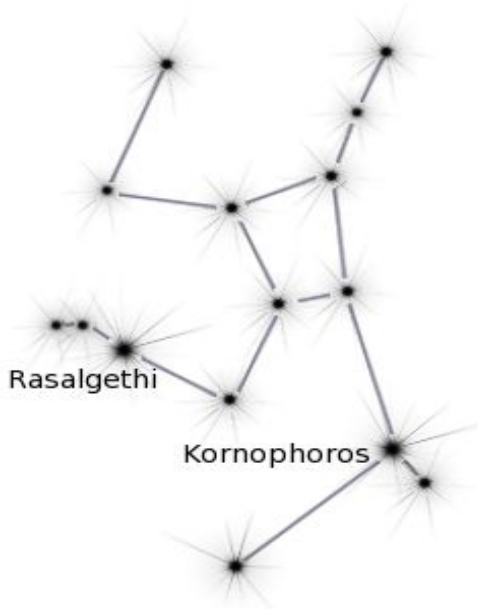
## Corona Borealis

### Corona Borealis (Northern

**Crown) Myth:** Ariadne's Crown from Dionysius or Cave of Great Bear (N. Amer) or boomerang in aboriginal Australia. Shawnee tribe of Ohio saw them as 7 maidens from the heavens. While dancing on earth, White Hawk disguised himself as a mouse and got close enough to take the most beautiful, shown as the star

Alphecca. White Hawk is represented by Arcturus.

- **\*Alphecca** aka "**Gemma**" the gem of the crown. Alphecca means the "bright star of the broken ring of stars." 75 ly SAO 83893
- **\*Nu Coronae Borealis (double star)** red-red SAO 65257
- **\*Sigma Coronae Borealis (double star)** yellow-blue SAO 65165



## Hercules

**Hercules--Myth:** Son of Zeus and mortal Alcmene. Hera enraged and made Hercules go mad and kill wife and children. Overcome with grief, he undertook 12 labors to repent. Nemean Lion (Leo); 9-headed Hydra (Hydra); Crab sent to kill him (Cancer)--all setting while Hercules is high overhead! Also he captured the Cretan Bull (Taurus) and Draco represents the dragon guarding the golden apple to be taken. Hercules foot is at the head of Draco.

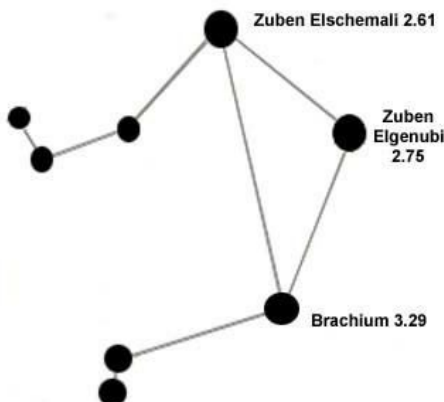
- **\*\*M13 (Great Hercules Cluster)**

25,000 ly. A million stars! 12 billion y.o.

Finest Glob. Cluster! Same age as Milky Way.

The oldest thing you will ever see. Our sun only formed 4.5 billion years ago. (*\*To find, it's on the side lined up with the side of Corona Borealis. One third distance from Eta to Zeta Herculis.*)

- **\*M92 (Glob Cluster)** Hundreds of thousands of stars. (*\*To find, it's above the keystone toward Draco head. Makes an equilateral triangle with Pi Herculis and Eta Herculis, top 2 stars of Keystone with M13 on right side.*)
- **\*Alpha Herculis aka "Rasalgethi" (double star)** red-blue supergiant *SAO 102680*
- **\*Rho Herculis (double star)** white-blue double that can be split more at higher magnification. (*\*To find, it's close to Pi Herculis, top left star of keystone nearest to Vega.*) *SAO 66001*
- **\*Kappa Herculis (double star)** orange-orange double *SAO 101952*



## Libra (Scales held by Themis the

**goddess of justice) Myth:** It is usually depicted as the scales held by the Greek goddess of justice. The ancient Babylonians saw it as the Balance of Heaven. In ancient Greece, it represented the claws of the scorpion. In ancient Egypt the three



brightest stars formed a constellation that was viewed as a boat. To the early Romans, it was the golden chariot of Pluto, god of the Underworld.

- **\*Alpha Librae aka "Zuben Elgenubi" (double star)** blue-yellow  
Name means "southern claw" *SAO 158840*
- **\*Sigma Librae "Bracchium" (red star)** *SAO 183139*



### Scorpius the Scorpion--Myth:

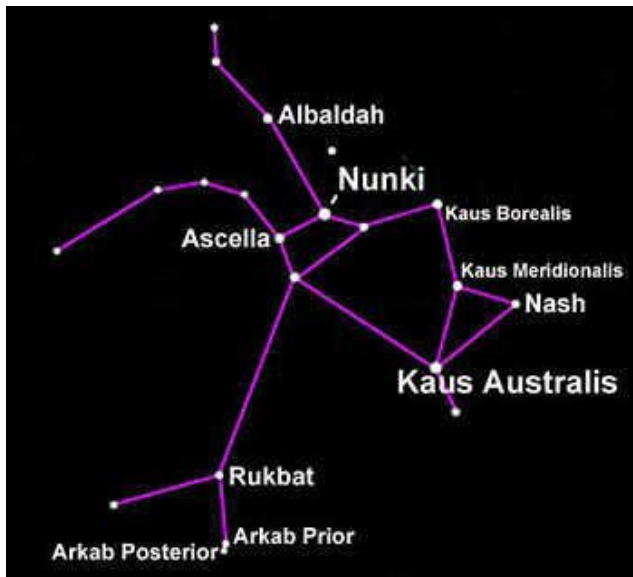
Artemis, the hunting goddess, sent the scorpion to sting Orion after he boasted that he could kill any animal alive. Orion and Scorpius are never in the sky at the same time.

- **\*\*Antares (red supergiant star)** The heart of the scorpion. Name means "like Ares" or Mars. It's so large, it would swallow the inner planets if placed at the sun. **550 ly**
- **\*\*M4 (Glob. Cl.)** One of the best in the sky and one of the largest too. Only **7000 ly** away, 3-5x closer than most globulars, easier to see individual stars.

*(\*To find, it's about halfway between Antares and top claw star Graffias.)*

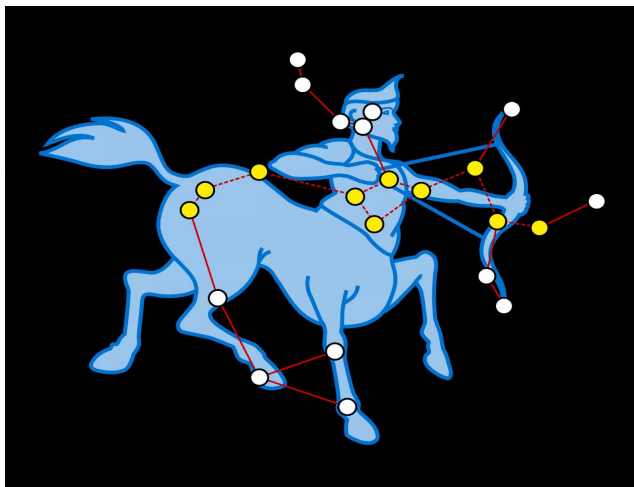
- **\*\*M80 (Glob. Cl.)** Small but bright. Hard to resolve individual stars. **32,000 ly** away *(\*To find, it's adjacent to Antares, just to the right of it. 10,000 stars.)*
- **\*\*M6 ("Butterfly Cluster)** Open Cluster with 50 stars. Fantastic in small telescope. *(\*To find, go  $\frac{1}{4}$  distance between the front spout star of Sagittarius and the middle star of Scorpius, bright star under Antares.)*
- **\*\*M7 (Ptolemy's Cluster)** Open Cluster, a knot of stars, bigger than M6. Good with binoculars. *(\*To find, go halfway between the front spout star of Sagittarius and bright end tail star of Scorpius) 1500 ly*
- **\*Beta Scorpii or "Graffias" (double star)** yellow-blue *SAO 159682*
- **\*Xi Scorpii (triple star)** yellow-yellow-orange double *SAO 159665*
- **\*Nu Scorpii "Jabbah" (double-double)** blue-blue *SAO 159764*

- **\*Struve 1999 (double star)** yellow-yellow-orange double *SAO 159668?*
- **\*Xi Lupi (double star in Lupus)** (under claw of Scorpius) blue-blue double *SAO 207145*
- **\*Eta Lupi (triple star in Lupus)** (under claw of Scorpius) blue-blue-blue *SAO 207208*
- **\*RR Scorpii (red star)** no *SAO HD 152783*
- **NGC 6231 "False Comet Cluster"**



## Sagittarius (the Centaur)

**Myth:** Chiron, "son of Titan Cronus, he's half man, half horse. Others have it that it is a satyr "Crotus," son of Pan riding a horse and being an archer. It's at the center of the solar system. After the Orion nebula, the best star forming regions are found in Sagittarius. (\*to find, look for the teapot asterism to the east of Scorpius)



**\*\*M20 (Trifid Nebula)--**North and West of M8. Clouds of ionized gas. Star nursery. Spectacular in dark skies, bigger scope. Dark lanes divides it into 3 parts. **4000-5000 ly** (\*To find, left and center stars of teapot top, draw a line same distance to the right. Or, draw a line from bottom spout star and go between the two top spout stars, 1x distance. It sits above Lagoon Nebula and the *Op. Cl. M21*)

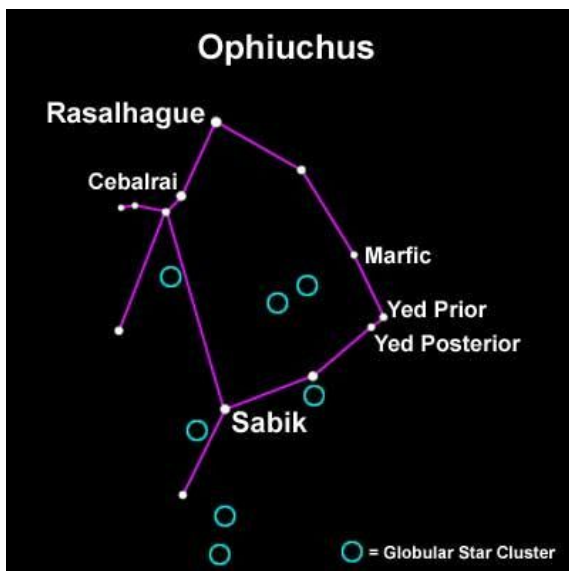
**\*\*M8 (Lagoon Nebula)--**The best

after the Orion nebula. Dark lane represents the lagoon. Ionized hydrogen gas given off by the 2 stars. Star nursery, enough for 1000 suns.

**4000-5000 ly.** (\*To find, it sits just below Trifid Nebula)

- **\*Graffias (Acrab) double star--**top claw of Scorpius

- **\*NGC 6530 (Op. Cl.)** Near M8. Very young stars, only a few million y.o.
- **\*M17 (Swan or Omega Nebula)**--Looks like a "U" in a telescope, or "checkmark" bar. Star nursery, clouds of hydrogen and helium gas. Thousands of stars, only a million years old. Fainter, looks like a Swan. (*\*To find, look just below Trifid.*) **4000-5000 ly**
- **\*M22 (Glob. Cl.)**--One of the finest globular clusters, but so low to horizon for our latitude. Can easily resolve into stars (*\*To find, draw a line up the back handle of teapot and go same distance.*)
- **\*M28 (Glob. Cl.)**--Much smaller than M22. Hard to resolve. Looks like an out-of-focus star (*\*To find, look just above top of Teapot*)
- **\*M54 (Glob. Cl.)**--Compact. Hard to resolve. Looks like an out-of-focus star (*\*To find, look near handle of the Teapot*) **50,000 ly**
- **\*M55 (Glob. Cl.)**--Larger and closer than M54. Loosely bound. (*\*To find, look near the handle of Teapot*) **30,000 ly**
- **\*M24 (Sagittarius Star Cloud)** beautiful in binoculars!
- **\*M23 (Open Cl.)** pretty in a small telescope at low power. Loose collection **4000 ly**
- **\*M25 (Open Cl.)** Smaller, more compact, about 100 stars. **2000 ly**
- **\*M18 (Open Cl.)** small, inconspicuous. Near **M23, M24, and M25**

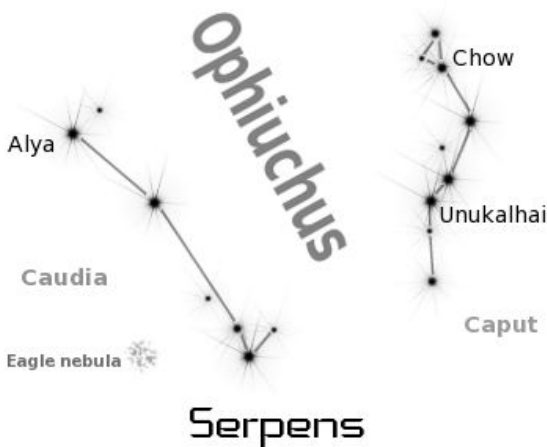


## Ophiuchus (the "Serpent Bearer")

**Myth:** Ophiuchus (the healer Aesculapius) saves Orion from death, and the sky shows the scorpion being trampled underfoot by foot of Ophiuchus. He holds two serpents to aid in his healing powers.

- **\*M10 (Glob Cluster)** smaller and brighter than M12. 13 billion y.o, a million stars, and **20,000 ly**
- **\*M12 (Glob Cluster)** "Gumball Globular" larger and dimmer than M10. Clump of stars trailing helps differentiate the two. **20,000 ly**
- **\*M19 (Glob Cluster)** oval-shaped. Located near the center of our galaxy. **30,000 ly**
- **\*M62 (Glob Cluster)** grainy, dimmer, looks off-center. **25,000 ly**

- **\*IC 4665 (Summer Beehive)** Open Cluster that looks like the word "HI."
- **\*Omicron Ophiuchi (double star)** orange-blue double *SAO 185238*
- **\*36 Ophiuchi (double star)** orange-blue double *SAO 185198*
- **\*24 Ophiuchi (double star)** orange-blue double *SAO 160006*



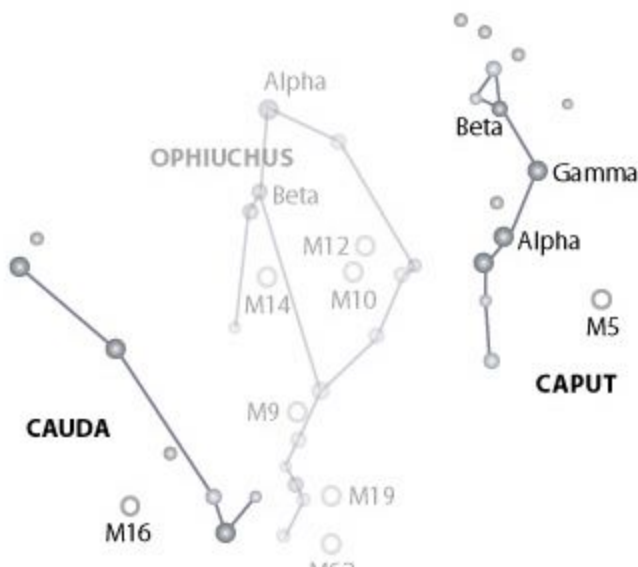
### Serpens Caput (Serpent's Head)

(\*to find, look directly under the bowl (south) of Corona Borealis)

- **\*\*M5 (Glob Cluster)** 13 billion y.o, a million stars, and **24,000 ly** (\*To find, it's a good two fist-widths to the southeast of Arcturus. Also, halfway between Arcturus and Graffias, the top CLAW star of Scorpius.

- **\*Unukalhai. 74 ly** Red giant star 15x bigger than sun. **SAO 121157**

- **\*5 Sepentis (double star)** yellow orange (\*To find, it's  $\frac{1}{2}$  degree southwest of M5.) **SAO 120946.**

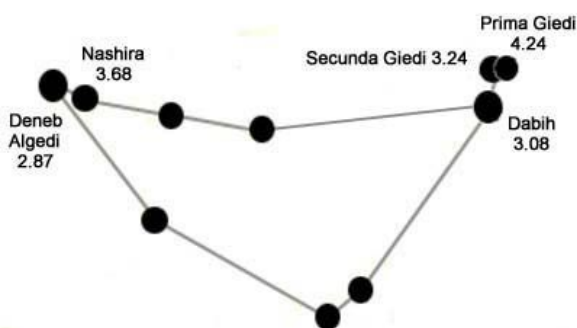


### Serpens Cauda (Serpent's Tail)

- **\*\*M16 (Eagle Nebula)** --Fainter. Pillars of Creation here. (\*To find, go halfway between Altair and Antares. Using the bottom stars of Scutum, it will point you to M16.)

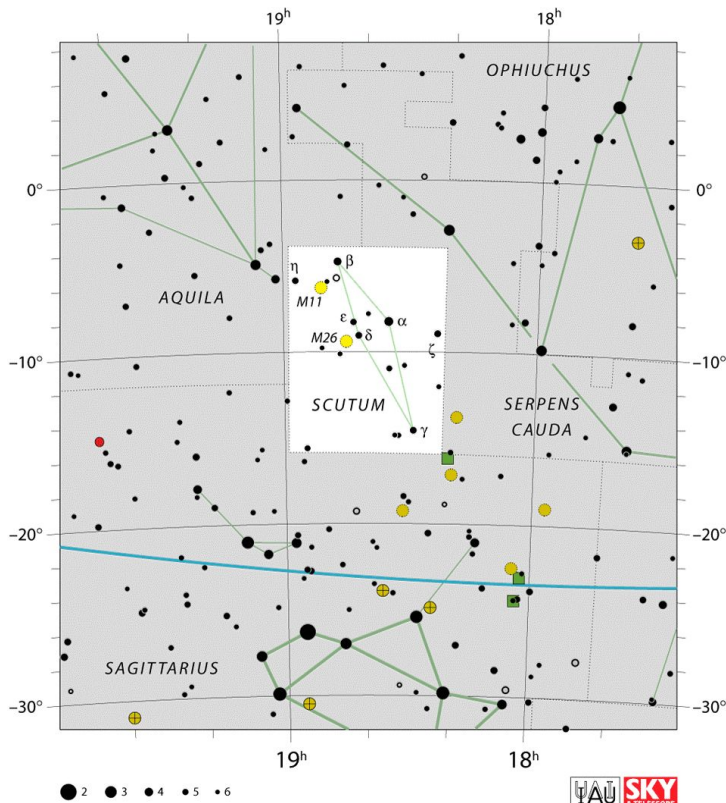
### Capricornus (the Sea-Goat)

**Myth:** The Greeks associated the constellation with the forest deity Pan, who had the legs and horns of a goat. In



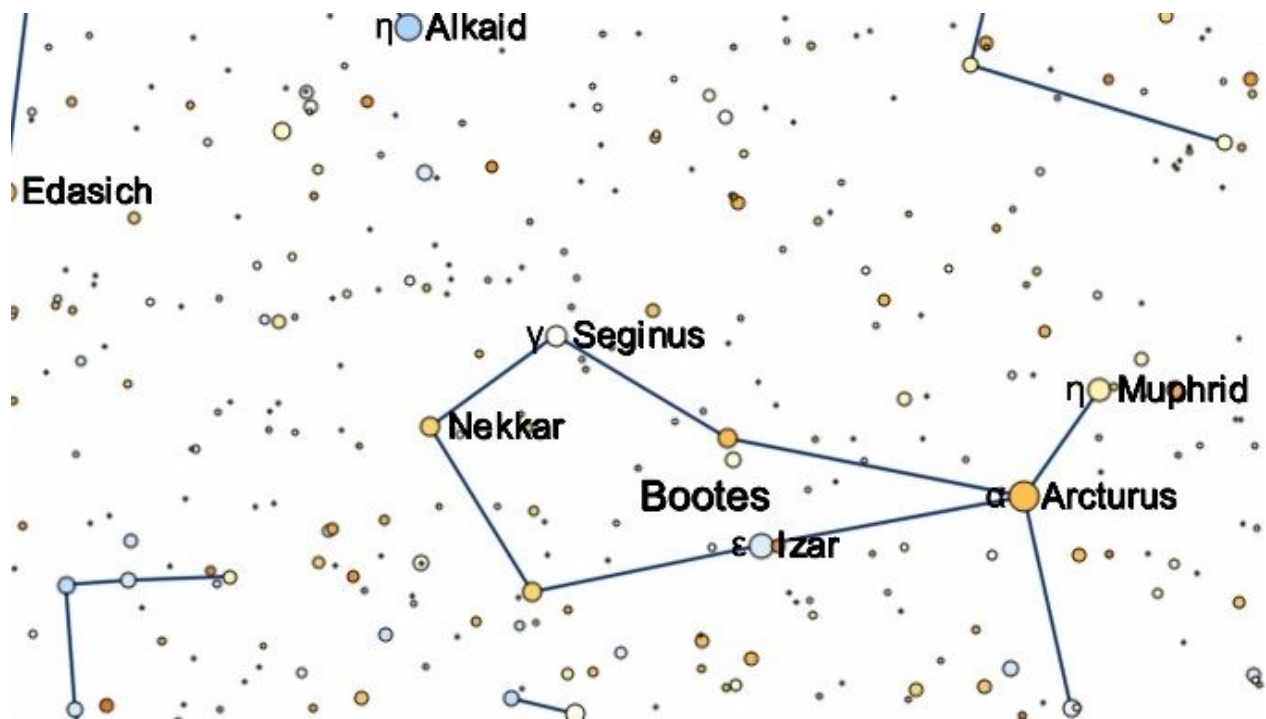
the war with the Titans, Pan escaped by turning his lower body into a fish.

- **\*Alpha Capricorni "Al Giedi" (multiple star) SAO 163422**



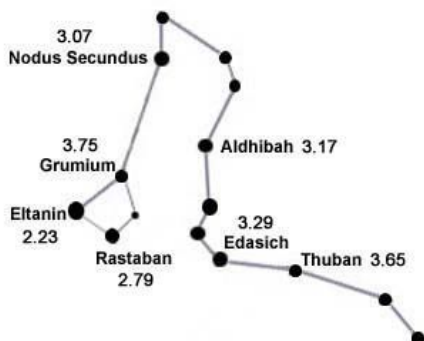
**Scutum (the Shield)**--Latin for shield. Introduced in the 17th. Century.

- **\*\*M11 (Wild Duck Cluster)**--Open cluster resembling the "V" flight of ducks. 6200 ly



**Boötes** the Herdsman (Bear Driver)--Star **Arcturus** (Guardian of the Bear) **Myth:** The Greek name for Boötes, *Arctophylax*, which means "Bear Watcher". Arcus, the great hunter, was the son of Callisto and Zeus. When Hera discovered the relationship, she was changed into a bear, Ursa Major. Her son was great hunter, and as he drew close to shooting her, Zeus placed her and her son into the heavens.

- **\*\*Epsilon Boötis** aka **"Izar"** Triple-star system famous for its contrasting colours. 203 ly. Lovely. **SAO 83500**
- **\*Arcturus** (Orange giant; 4th-brightest star in sky. 37 ly) Sparkles when near horizon. 7 billion y.o.
- **\*Delta Boötis (double star)** yellow-blue **SAO 64589**
- **\*Mu Boötis** aka **"Alkalurops"** (triple star) yellow-blue, relatively bright, **SAO 64686**
- **Xi Boötis (quadruple star system)** **SAO 101250**
- **Nu Bootis (orange-white double star)** **SAO 45580**



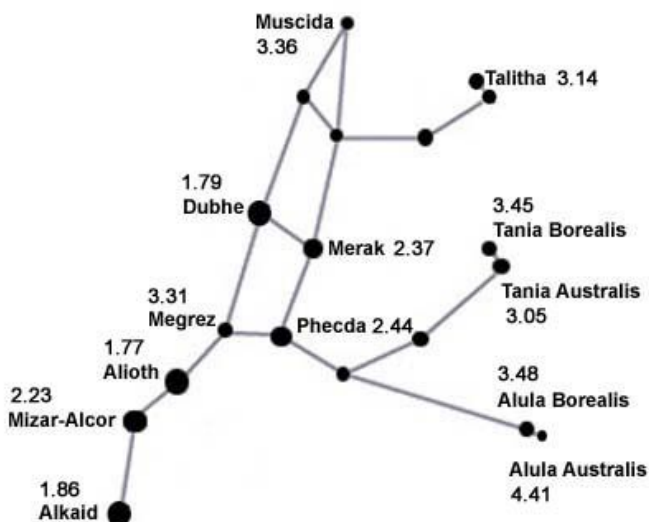
**Draco Myth:** The most famous story involving **Draco** tells that he was the dragon that Hercules had to defeat in order to possess the Golden Apples of Hesperides. **Draco** is also regarded as the dragon who guarded the Golden Fleece, and the dragon that the goddess Athena defeated when the Olympian gods fought the Titans.

- **\*\*Nu Draconis** aka "Kuma"

(double star) One of 4 stars, head of

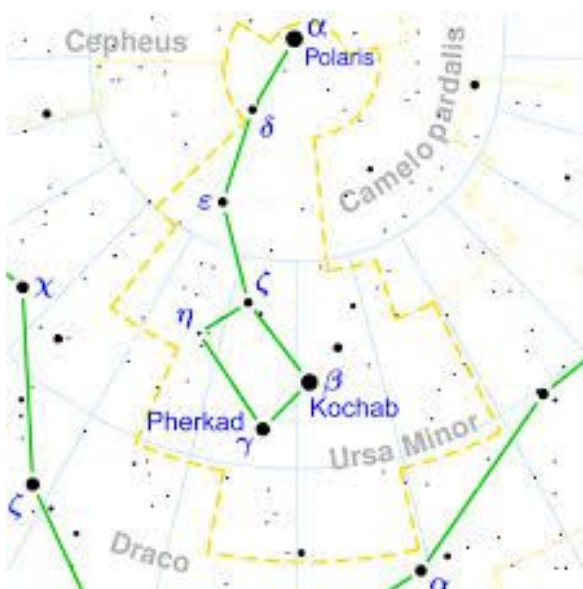
Draco. The white eyes of the dragon. *SAO 30447*

- **\*\*NGC 6543 (Pl. Neb) Cat's Eye Nebula** Bluish-green egg. 3600 ly
- **\*16 Draconis (double star)** white-white optical double. *HD 148329*
- **\*M102** aka "Spindle Galaxy" 50 million ly
- **39 Draconis (triple star)** *SAO 30949*
- **Omicron Draconis (double star)** orange-orange *HD 175306*
- **Ux Draconis** red carbon star *HD 183556*
- **Kemble 2** aka "mini-Cassiopeia" near Chi Draconis *SAO 9087*
- **Psi Draconis (double star)** *SAO 8890*
- **NGC 6505 (Gal)**
- **NGC 5866n (Gal) faint**



**Ursa Major Myth:** The nymph Callisto, who was changed into a bear by Zeus after giving birth to Arcas, to disguise her from the jealous wrath of Hera. Arcas became a great hunter and nearly killed his mother, but Zeus intervened and placed them both in the sky. Arcas is represented by the star Arcturus, which follows Ursa Major throughout the sky. Slaves in the American South used the "Drinking Gourd" as the path to follow to the north)

- **"Big Dipper" (asterism)** the plow in Great Britain; also wagon and even a hippo to the Egyptians.
- **\*\*Mizar and Alcor (double star)** Mizar also has its own double
- **\*\*M81 (Bode's Galaxy)** oval-shaped and **M82 (Cigar Galaxy)** spindle-shaped. Lovely. Ursa Major. **11.8 million ly** (\*To find, use diagonal ladle stars of Dipper (BL to UR go 1x distance), they point to these galaxies.)
- **\*\*M101 (Gal)** aka **Pinwheel Galaxy** Faint halo. Use low power eyepiece. (Above handle. Follow 2nd and 3rd stars (Alioth to Mizar) of Dipper handle out same distance and curve a little.)
- **\*\*M51 aka "Whirlpool Galaxy"** near Big Dipper (\*To find, go one-quarter way from Alkaid, last star of Dipper handle, to the middle of the 2 stars of Canes Venatici.
- **\*M108 (Gal)** aka **"Surfboard Galaxy"** (\*To find, start Merak, BR bowl star and go just  $\frac{1}{6}$  way toward Phecda, BL bowl star. It's a little under that line and very close to Merak)
- **\*M97 (Pl. Neb)** aka **"Owl Nebula"** Filters help. Faint (\*To find, go to M108 from Merak and keep going a little further. Or consider it's under the bowl, about  $\frac{1}{4}$  of the way from Merak to Phecda.)
- **\*M109 (Gal)** faint. Try 100x and put Phecda just out of field of view. Tapping telescope helps too. (\*To find, look very close to Phecda, just beyond left side of bowl.)
- **\*M40 (double star)** orange-white **SAO 28353**
- **\*Dubhe (double star)** (\*To find, look at the TR star of the Dipper bowl.)

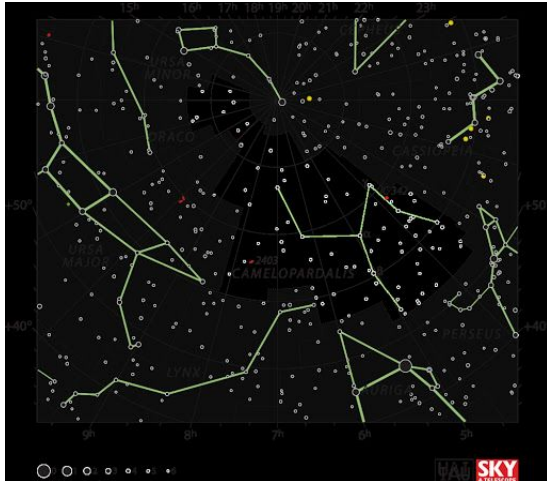


**Ursa Minor Myth:** Ursa Minor is Arcas, the son of Zeus and the maiden Callisto (Ursa Major). Arcas and Callisto were changed into bears and placed in the sky by Zeus in order to be protected from his jealous wife Hera.

- **\*Polaris (double star)** white-blue at 40x, it's in a circlet of stars called "engagement ring with Polaris the diamond. **2400 ly**



- **\*Pherkad (double star)** white-orange double. (*\*To find, look at the front of Little Dipper, next to brighter Kolchab*)
- **Zeta Ursae Minoris (double star)** white-orange double. *SAO 8328*
- **Eta Ursae Minoris (double star)** white-white *SAO 8470*
- **Delta Ursae Minoris (double star)** white-white *SAO 2937*
- **Mini-Coathanger** near **Epsilon Ursae Minoris** *SAO 28553*

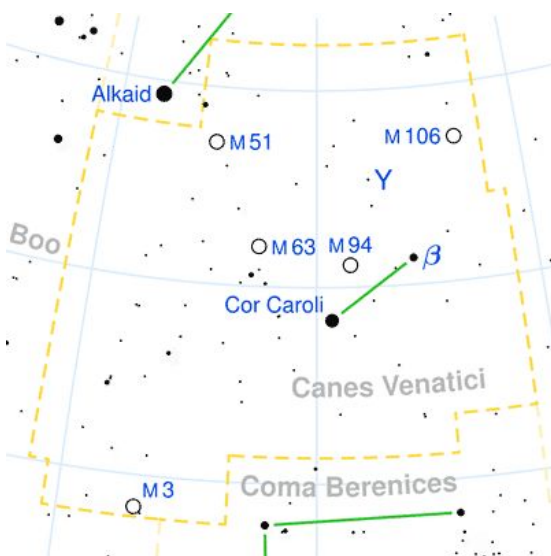


**Camelopardalis Facts:** Camelopardalis is one of 12 constellations named by the 17th. C. Dutch astronomer Petrus Plancius based on observations by Dutch navigators. This constellation was first observed to look like a camel.

- **\*\*Kemble's Cascade (OC)** find with **NGC 1502 (OC)** use low power.
- Fact:** Named in honour of Fr. Lucien Kemble, a Franciscan friar and amateur astronomer who in 1980 described it as "a beautiful

cascade of faint stars tumbling from the northwest down to the open cluster NGC 1502."

- **\*NGC 2403** aka **Caldwell 7 (Gal)**
- **\*Alpha Camelopardalis** Blue supergiant. *SAO 13298*
- **Stock 23 (OC)** *HD 237104*
- **NGC 1501 (Pl. Neb)**
- **IC 342** aka **Caldwell 5 (Gal)**



**Canes Venatici-star Cor Caroli (Hunting dogs of Bootes)**

**Myth:** Dogs "Asterion" and "Chara," hounds of Bootes, hunting the Bear.

- **\*\*M3 (Glob Cluster)** beautiful. (*\*To find, go halfway between Cor Caroli and Arcturus.*) 34,000 ly. 500,000 stars. 12 billion y.o.

- **\*\*Cor Caroli (double star)** blue white-cream double star **110 ly**  
**Facts:** Named for martyred King Charles I. When Charles II returned to England in 1660, the court physician said the star swelled to unusual brilliance, as if the heart of his father was swelling with pride.
- **\*\*Y Canum Venaticorum aka La Superba** Beautiful red giant, one of the reddest stars known. **710 ly**  
**Facts:** The 19th century astronomer Angelo Secchi, impressed with its beauty, gave the star its common name. (*\*To find, go about 1/2 distance from Cor Caroli and Megraz (TL bowl of Big Dipper)*) **SAO 44317**
- **\*\*M51 aka "Whirlpool Galaxy"** near Big Dipper (*\*To find, go one-quarter way from Alkaid, last star of Dipper handle, to the middle of the 2 stars of Canes Venatici.*
- **\*NGC 5195 (Gal)**, close to M51. showing a round glow outside the halo of M51.
- **\*M63 aka "Sunflower Galaxy"** (*\*To find, go 1/3 way from Cor Caroli to Alkaid, last star of Dipper handle)*
- **M94 (Gal)** (*\*To find, in the middle and just above the 2 stars of Canes Venatici)*
- **M106 (Gal)** (*\*To find, go halfway between Cor Caroli and Phecda, BL star of Dipper bowl.*