

ASTRONOMICAL OBJECTS FOR A PUBLIC VIEWING SESSION

by Steve Coe

The members of the Saguaro Astronomy Club of Phoenix, Az. have been very active in trying to educate the public concerning astronomy. To this end we have held many public viewing sessions over the years.

What follows is a list of deep sky objects to show in your telescope and some info on those objects. The list is arranged by season, **starting with Autumn.**

AQUARIUS--The Water Carrier. This place in the sky has often been associated with watery things. Ancient Babylonian art depicted a boy pouring water from an urn, while Arabians saw a two-handled water amphora.

M2/NGC 7089

Mag 7 Atlas Chart 13

RA 21hr 33.5min Dec $-00^{\circ} 49'$ Mag 6.5 Size 16'

A globular cluster with about 150,000 stars and about 37,500 light years distant. The cluster is 175 light years across. At the tremendous distance of this cluster, our Sun would be very dim at magnitude 20.7, only visible in large professional telescopes.

NGC 7009 (Saturn Nebula)

Mag 7 Atlas Chart 13

RA 21hr 04.2min Dec $-11^{\circ} 22'$ Mag 7.8 Size 30"x25"

An end of star life planetary nebula. Called the "Saturn Nebula" by Lord Rosse because of extending arms or ansae which protrude from the nebula when seen under a good, dark sky. About 3200 light years distant, which means it's about 0.3 light years across.

PEGASUS--The Flying Horse. The winged steed, tamed by Bellerophon, and later ridden by the hero Perseus to save the maiden Andromeda.

M15/NGC 7078

Mag 7 Atlas Chart 13

RA 21hr 30min Dec $+12^{\circ} 10'$ Mag 6.2 Size 18'

A globular cluster that contains more than 100,000 stars, and one of the oldest at about 13.2 billion years old. It is 36,400 light years distant and about 175 light years across. In high power there are many beautiful star chains/arms.

NGC 7331 (mini-Andromeda Galaxy)

Mag 7 Atlas Chart 7

RA 22hr 37.1min Dec $+34^{\circ} 25'$ Mag 10.4 Size 9'x4'

One of the brightest non-Messier galaxies. A large scope can show dust lanes. It can be seen in the finder or binocs. About 50 million light years distant. Several faint companion galaxies are nearby to the East.

Enif / Epsilon (ϵ) PEG (the nose)

Mag 7 Atlas Chart 13

RA 21hr 44.2min Dec $+9^{\circ} 53'$ Mags 3/9

A lovely colored optical double star. A wide pair at 145", they are easily split in any telescope. The variable orange supergiant star, about 690 light years distant, is dying (a few million years left), and now fuses helium into carbon and oxygen.

ANDROMEDA--The Chained Lady. She is a princess, daughter of Cepheus and Cassiopeia. Andromeda is rescued by Perseus before she can be eaten by Cetus, the sea monster. All these people and animals are in the sky.

M31/NGC 224 (Andromeda Galaxy)

Mag 7 Atlas Chart 2

RA 00hr 42.7min Dec +41° 16' Mag 3.4 Size 178'x70'

The largest, brightest SPIRAL galaxy near the Milky Way. It is easily naked eye from a dark site and was plotted on the star charts of a Persian astronomer Al Sufi in 964 B.C. 2.5 million light years distant, but on a collision course with us (in about 2.5 billion years). 140,000 light years across, about the size of the Milky Way and approximately what the Milky Way would look like from outside. Two companion galaxies are nearby, and one of them, M32, passed through M31 about 200 million years ago.

NGC 7662 (Blue Snowball)

Mag 7 Atlas Chart 2

RA 23hr 25.9min Dec +42° 33' Mag 8.3 Size 17"x14"

A very nice planetary nebula. I have always seen the color as blue or aqua. It is about 5600 light years distant, which means it is 0.8 light years across.

Almach / Gamma (γ) AND

Mag 7 Atlas Chart 2

RA 02hr 03.9min Dec +42° 19' Mags 2/5

Means "The Foot" in Arabic, because it is the foot of Andromeda. A colorful orange and blue double star, about 370 light years away, separated by 10" (about 1200 AU, or 1 light week), taking thousands of years to complete an orbit. The companion is a triple star, with BC orbiting every 64 years (0.5" separation), and Ba/Bb orbiting in 2.7 days.

CASSIOPEIA--The Queen. The mother of Andromeda and mother in law of Perseus. She was described as very vain and was made to hang upside down over the North Pole because of it.

M52/NGC 7654

Mag 7 Atlas Charts 1 & 2

RA 23hr 24.2min Dec +61° 35' Mag 6.9 Size 15'

An excellent open star cluster. It is 4000 light years distant and 10 to 15 light years across. A nice orange star is involved and there are several dark lanes among the stars.

NGC 457

Mag 7 Atlas Charts 1 & 2

RA 01hr 19.1min Dec +58° 20' Mag 6.4 Size 20'

A young (21 million years old) star cluster with over 100 stars located about 7900 light-years from us. It includes Phi¹ (ϕ^1) and Phi² (ϕ^2) CAS, 5th and 7th magnitude stars.

Often called the Owl Cluster because these bright stars are like the eyes of an owl with outstretched wings. Orange variable star V466 is under one wing.

Achird / Eta (η) CAS

Mag 7 Atlas Charts 1 & 2

RA 00hr 49.1min Dec +57° 49' Mags 4/7

A double star with color contrast (light yellow and orange), separated by 10". The two suns are 10 light years distant and about 70 Astronomical Units (9.7 light hours) apart (an AU is the distance from the Sun to the Earth, about 93 million miles). They take about 500 years to complete one revolution about their center of gravity.

End of Autumn



Start of Winter

PERSEUS--The Hero. The rescuer of Andromeda and eventually her husband. He is pictured in the sky as holding the head of the Gorgon, the snake-haired woman, in his hand. This place is the location of **Algol**, the famous Demon Star 93 light years distant, which is an eclipsing star pair changing magnitude from 2.1 to 3.4 for 10 hours every 2 days, 20 hours, 42 minutes.

NGC 869 and NGC 884 (Double Cluster)

Mag 7 Atlas Chart 2

RA 02hr 19min Dec +57° 09' Mag 5.3 Size 18' / RA 02hr 22.4min Dec +57° 07' Mag 6 Size 18'

A pair of excellent star clusters that are optically so close together that they will fit in one wide field of view. The ancient Greek observer Hipparchus included it in a scroll he wrote in 130 B.C. The clusters are about 6900 and 9600 light years distant. That means that the ten brightest stars are about 60,000 times more luminous than our Sun. The Sun would be a magnitude 18 star and only visible in the largest amateur telescopes.

M34/NGC 1039

Mag 7 Atlas Chart 2

RA 02hr 42min Dec +42° 47' Mag 5.2 Size 35'

A nice open star cluster of with 3 curved arms. It is 1400 light years distant, about 15 light years across, and has about 400 stars. Easy to see in binoculars.

Miram / Eta (η) PER

Mag 7 Atlas Chart 2

RA 02hr 50.7min Dec +55° 54' Mags 4/8

A color contrast double star (gold and blue), separated by 31", and easily split at 100X. They are 1300 light years distant, with an orbital period of at least 350,000 years

TAURUS--The Bull. Jupiter transformed into a snow-white bull in order to carry off Europa, daughter of the King of Crete. The constellation consists of two of the best open clusters in the sky, the Hyades and the Pleiades.

M45/Melotte 22 (Pleiades)

Mag 7 Atlas Chart 3

RA 03hr 47min Dec +24° 07' Mag 1.5 Size 120' (3 full moons fit across)

One of the best star clusters in the sky, M45 is named for the half sisters of the Hyades. All had Atlas for a father. 440 light years distant. 8 light years across. 1000 member stars (~100 in binoculars). 100 million years old. Many lovely chains of stars. Our Sun would be an insignificant star of 10th magnitude at the distance of this group, so the brightest stars all giant stars. The Japanese name of this star cluster is Subaru and there is a representation of the cluster on every Subaru automobile.

Melotte 25 (Hyades)

(not labeled) **Mag 7 Atlas Chart 3**

RA 04hr 27min Dec +16° 00' Mag 0.5 Size 330'

The closest star cluster to Earth is about 152 light years distant, 625 million years old. Aldebaran is NOT a member (only 65 light years); it is just in the same line of sight.

M1/NGC 1952 (Crab Nebula)

Mag 7 Atlas Chart 3

RA 05hr 34.5min Dec +22° 01' Mag 8.4 Size 6'x4' (13X11 light years, expanding)

One of the few supernova remnants that can be viewed in a small telescope, the Crab Nebula is one of the most studied objects in the sky. Lord Rosse gave this object its name when he saw filaments within the nebula that reminded him of the claws of a crab. Chinese astronomers saw a bright star (4x brighter than Venus) flare up in this location in 1054 A.D. for 23 days in daylight (653 days at night). That was the light from a supernova explosion, a large star ripping itself to pieces in an extremely violent explosion. The Crab is 6200 light years distant. There is a spinning neutron star (pulsar) in the center that excites the gas to glow, just like in a neon bulb.

AURIGA--The Charioteer. Honors Erichthonius, King of Athens, the 4-horse chariot inventor.

M37/NGC 2099

Mag 7 Atlas Chart 3

RA 05hr 52.4min Dec +32° 33' Mag 5.6 Size 24'

One of the best winter open clusters. Any telescope will show hundreds of members with several bright stars and beautiful dark lanes winding among the stars. About 4600 light years distant and 300 million years old. There is a lovely orange (or yellow) star near center that is NOT a cluster member; it has a different motion than the cluster.

M38/NGC 1912

Mag 7 Atlas Chart 3

RA 05hr 28.7min Dec +35° 50' Mag 6.4 Size 20'

A nice open cluster 4200 light years distant and 220 million years old. Has an overall starfish or π shape at 100X. Look for NGC 1907, an open cluster nearby to the south.

ORION--The Hunter. He was fatally stung by Scorpius and put in the sky in a location opposite Scorpius, so that they are never above the horizon at the same time.

M42/NGC 1976 (Great Orion Nebula)

Mag 7 Atlas Chart 9

RA 05hr 35.4min Dec -05° 27' Mag 5 Size 66'x60'

Although earlier telescopic discoveries (~1611) were lost, "The Great Orion Nebula" was rediscovered by Christian Huygens in 1658. About 1350 light years distant and 24 light years across. Density of the gas in this glowing nebula is a vacuum by laboratory standards, but with enough material to make 10,000 Suns. Stars being born within the nebulosity of this stellar nursery radiate large amounts of ultraviolet light, causing fluorescence of nearby material. A Trapezium of four bright stars (less than 100,000 years old) is in the center, near a dark nebula nicknamed the "Fish's Mouth".

Rho (ρ) ORI

Mag 7 Atlas Chart 9

RA 05hr 13.3min Dec +02° 52' Mags 5/9

Nice double star (yellow and pale orange) separated by 7" and 350 light years distant.

Nair al Saif / Iota (ι) ORI (the bright one of the sword) **Mag 7 Atlas Chart 9**

RA 05hr 35.4min Dec -05° 55' Mags 3/7/11 *(not labeled w/NGC 1980)*

One of the best triple stars in the sky. It is about 1300 light years away, all three stars are giants in size and luminosity. One companion is at 11" (4400 AU, or 3.6 light weeks), the other is 50" from the primary star (20,000 AU, or 16.5 light weeks), with orbital periods of at least 75,000 and 700,000 years. I have seen this triple as white, light green and purple. Honest. Nair al Saif /Iota appears to be a "runaway star", kicked out of the Trapezium Cluster by a very close encounter about 2.5 million years ago.

Betelgeuse / Alpha (α) ORI

Mag 7 Atlas Chart 9

RA 05hr 55.2min Dec +07° 24' Mag 0.4-1.3 variable

This orange star often has its name translated "Arm of the Giant" and is about 520 light years distant. Over about 5.7 years it varies in size from 550 times the size of the Sun to 920 times. It is the 9th brightest and one of the largest stars visible to the naked eye. The luminosity (mostly in the infrared) varies from 40,000 times our Sun to 100,000 times our Sun. This pulsating red supergiant may be near its end of life as a supernova, or it may have already exploded, and when the light reaches us it will be visible in daylight. Because of its rotational axis, harmful gamma ray bursts will not reach Earth.

LEPUS--The Hare. Bird changed to a hare by Ostara yet allowed to lay eggs (Easter tradition).

R Leporis (Hind's Crimson Star)

(not plotted) **Mag 7 Atlas Chart 9**

RA 04hr 59.6min Dec -14° 48' Mag 5.5-11.7 over 432 days (300x brightness difference)
A long period "Mira-type" variable star 1200 light years distant that is most red when dim (copper when bright). John Hind described it as "like a drop of blood on a black field." Periodically, the vast amounts of carbon making it to the star's surface and dimming the star (and also absorbing blue light), are blown away.

GEMINI--The Twins are Castor (to the west) and Pollux, represented by the two brightest stars at the "head of the twins".

M35/NGC 2168

Mag 7 Atlas Chart 3

RA 06hr 08.9min Dec +24° 20' Mag 5.1 Size 40'

A very nice open cluster of intermediate age: 100 million years. It is 2800 light years distant and 24 light years across with over 300 stars. Nice orange star near the cluster center. NGC 2158 is a compact cluster 26' SW, further away at 16,500 light years.

NGC 2392 (Clown Face or Eskimo Nebula)

Mag 7 Atlas Chart 3

RA 07hr 29.2min Dec +20° 55' Mag 9.1 Size 47"x43"

One of the best planetary nebulae in the sky. It is large and bright for this type of object. About 3000 light years distant and 0.6 light years across. Search for it at about 100X or so, you are looking for a grey-green dot. Then switch to high power (about 200X) to look for detail. Called the Clown Face or Eskimo Nebula because it resembles a person's head surrounded by darkness then a furry hood. There is a conspicuous central star (HD 59088, magnitude 10.5) easily seen on a night with fair seeing.

CANCER--The Crab. Juno sent the crab to help Hydra while in battle with Hercules. The muscular figure stepped on the sea-crab, which was placed in the heavens for trying its best.

M44/NGC 2632 (Praesepe or the Beehive)

Mag 7 Atlas Charts 4 & 10

RA 08hr 40min Dec +19° 59' Mag 3.7 Size 95'

A large, scattered star cluster, named "Little Mist" by the Greek Aratos in 260 B.C., then Ptolemy described it as "Phartne", which translates in Latin to Praesepe (Manger), where two donkeys (γ/γ and δ/δ Cnc) are eating. The cluster is about 575 light years distant and about 25 light years across. So, the Black Death was getting a good grip on Europe about the time the light began its journey to your eyes. Several hundred stars make up the cluster, with nice pairs and triples within at 100X or so. Similar in age and motion to the Hyades Cluster, they probably share a common origin.

Iota¹ (ι^1) CNC

Mag 7 Atlas Chart 4

RA 08hr 46.7min Dec +28° 46' Mags 4/6

A nicely colored gold and light blue double star, about 300 light years distant. Separated by 31" (2800 AU, or 2.3 light weeks) and moving through space together, they take at least 65,000 years to orbit. About 1 million years ago, the giant primary was a hot blue-white star, and in a billion years the companion will cool to pale yellow.

End of Winter



Start of Spring

LEO--The Lion. This constellation represents the Nemaen Lion, who was strangled by Hercules as the first of 12 labors. He then wore its skin as armor in combat. Babylonians and Egyptians also identified these stars as a lion. In ancient China, this represented the Yellow Dragon.

Algieba / Gamma (γ) LEO

Mag 7 Atlas Charts 4 & 10

RA 10hr 20min Dec +19° 51' Mags 2/4

This is one of the most beautiful and best observed double stars within reach of a telescope, separated by 4", and colored orange and yellow (or yellow and greenish). They are about 170 AU from each other (4x the distance from the Sun to Pluto, or about 1 light day), thus taking over 500 years to complete an orbit. The Arabic name of this star is Al Geiba (the Forehead), which may be a mistranslation of Juba (the Mane), for its position in the body of the Lion. These giant stars are about 125 light years distant, which means the stars are 180 and 50 times the brightness of our Sun, and are now fusing helium instead of hydrogen.

M66/NGC 3627 (brightest of Leo Triplet)

Mag 7 Atlas Chart 10

RA 11hr 20.2min Dec +12° 59' Mag 8.9 Size 8'x2.5'

The largest and brightest of this Leo galaxy subgroup. M66 and M65 are both face-on spiral galaxies. Another galaxy, the faint edge-on NGC 3628, is also in a wide field of view. All are about 35 million light years distant.

HYDRA--The Monster. The largest constellation in the sky has represented a variety of monsters. The most popular association is with the hundred-headed snake that lived in the Lernaen Swamp until it was killed by Hercules (second of 12 labors).

M48/NGC 2548

Mag 7 Atlas Chart 10

RA 08hr 13.8min Dec -05° 48' Mag 5.8 Size 30'

A large and bright open cluster, possibly a naked-eye object. This Messier cluster was "lost" until it was realized (in 1934 & 1954) that Charles Messier made a recording mistake (5° south) in the declination of its position when he discovered it in 1771. As a result, it was "re-discovered" by Caroline Herschel in 1783. The cluster is about 1500 light years distant, 24 light years across, and about 300 million years old.

V Hydrae

Mag 7 Atlas Charts 10 & 16

RA 10hr 51.6min Dec -21° 15' Mag 8 to 12 in a 530 day period

This variable star is amazing in a telescope because it among is the reddest stars known. It is a carbon star, one of the rare yet colorful star classes that shows strong absorption bands in its spectrum of blue by carbon molecules in its atmosphere. An estimate of the distance to this star is about 2300 light years.

URSA MAJOR--The Great Bear. The most famous of northern constellations, this group represents Callisto, who was transformed into a bear by the jealous Juno, wife of Jupiter. The Greeks knew these stars as a Wagon, from the 4-wheeled Chariot of the Babylonian weather-god. Babylonians also saw the Big Dipper as a plow; the Chinese saw the Dipper Stars as a chariot of the Emperor or a plow. Native Americans tell the story of 3 hunters (as the arcing Dipper handle) hunting the star bear (four Dipper Stars) each year. Arabs saw the Dipper Stars as a coffin, trailed by 3 mourners. In Britain, it outlines Charles' Wain, the wagon used to transport King Charles I (and King Arthur's spirit) to heaven. The Big Dipper, 80 light years distant, is the outline most easily recognized here and many of the stars in the Big Dipper have the same path through the Milky Way (not Alkaid--end of handle, nor Dubhe--Dipper lip).

Mizar & Alcor / Zeta (ζ) UMA

Mag 7 Atlas Charts 1 & 4 & 5

RA 13hr 23.9min Dec +54° 56' Mags 2/4

This famous double star is named Mizar, which means Girdle or Loins, its position in the Big Bear. The first double star to be discovered, the pair is separated by 12' (1/5th of a degree) and is about 80 light years distant. The naked eye companion, called Alcor and related to Alioth, is Arabic for "black horse". Mizar and Alcor form the "Horse and Rider" they were used as a test of vision in ancient times.

A 4th magnitude companion of Mizar is readily seen in a telescope with a 14" separation (about 500 AU, taking over 5000 years to orbit). Each of these stars is a spectroscopic binary, making Mizar a quadruple system. Alcor also has a very close companion at 1" separation. There seems to be enough mass among Mizar and Alcor to keep them gravitationally bound at their vast separation of 0.3 light years, taking over 750,000 years to complete an orbit. Thus, Mizar and Alcor seem to be a sextuple star system.

Between Mizar and Alcor is an 8th magnitude field star known as Sidus Ludovicianum (Ludwig's Star), an unusual name for a star. "Discovered" by German professor Johann Liebknecht in 1722, he erroneously believed it to be a "new" planet and named it after his King, Ludwig of Hessen-Darmstadt. Unfortunately for poor Johann it turned out not to be anything more than a previously observed "star" causing the King considerable embarrassment. It is a line-of-sight companion of Mizar and Alcor (with a spectral type similar to Alcor), and is roughly 5 times more distant.

M81/NGC 3031 (Bode's Nebulae)

Mag 7 Atlas Chart 1

RA 9hr 55.6min Dec +69° 04' Mag 6.8 Size 20'x10'

M82/NGC 3034 (Bode's Nebulae or Cigar Galaxy)

RA 9hr 55.8min Dec +69° 41' Mag 8.4 Size 11'x5'

M81 is a beautiful spiral galaxy 38 arc minutes north of M82, a bizarre edge-on galaxy. They are about 12 million light years distant. A couple hundred million years ago, M81 had a close encounter with the smaller M82, dramatically deforming M82 and increasing its star formation rate ten-fold. They are still close at about 140,000 light years apart.

End of Spring



Start of Summer

CANES VENATICI--The Hunting Dogs. The names of Bootes' two hunting dogs are Asterion (Little Star) and Chara (Joy), in pursuit of the celestial bears Ursa Major and Minor.

Cor Caroli / Alpha (α) CVN

Mag 7 Atlas Chart 5

RA 12hr 56min Dec +38° 19' Mags 3/6

Cor Caroli meaning "Heart of Charles" was named either for King Charles I of England by Francis Lamb or for Charles II by Edmund Halley. The components of this yellowy double system have bluish and greenish tinting and are separated by 19". At their distance of 110 light years, the separation equals 650 Astronomical Units (AU), where an AU is the distance between Earth and Sun, about 93 million miles or 150 million kilometers, giving an orbital period of at least 7900 years.

M51/NGC 5194 (Whirlpool Galaxy)

Mag 7 Atlas Chart 5

RA 13hr 29.9min Dec +47° 12' Mag 8.4 Size 11'x7'

The Whirlpool Galaxy is the standard example of a face-on spiral galaxy. Its picture has graced the cover of many astronomical books over the years. Spiral structure was first thought to be examples of other planetary systems in formation. However, in the 1920's they were recognized as huge systems of stars. At 23 million light years distant, it is comparable to our Milky Way and the Andromeda Galaxy in size, mass and luminosity. M51 can be seen interacting with the smaller, nearby galaxy NGC 5195.

M3/NGC 5272

Mag 7 Atlas Chart 5

RA 13hr 42.2min Dec +28° 23' Mag 6.2 Size 18'

One of the very best and most studied globular clusters in the sky. About 34,000 light years distant and 180 light years across. In 1954 Alan Sandage COUNTED 44,500 stars on a Mt. Palomar photographic plate. The actual total number of stars is about 500,000.

COMA BERNICES--Bernices' Hair in honor of Bernice II of Egypt. She cut her "golden tresses" and placed them in a shrine when her king, Ptolemy III (from 246 to 222 B.C.), returned safely from battle. The golden locks disappeared, but the court astrologer Conon told the royal couple that the god Aphrodite was very pleased and had placed the locks into the sky for all to see (Conon thereby saved the shrine priests from execution).

Melotte 111 (Coma Star Cluster)

(not labeled) **Mag 7 Atlas Chart 5**

RA 12hr 25min Dec +26° 00' Mag 1.8 Size 4.5°

This large scattered star grouping of Bernice's Hair is best studied in a pair of binoculars or a finderscope. The Coma star cluster is about 400 million years old and 290 light years distant. So the British were just starting to overtax the settlers in the colonies when the light started from this cluster to your eye. There are about 40 members, and it was only identified as an open cluster in 1938 by R.J. Trumpler.

NGC 4565 (Needle Galaxy)

Mag 7 Atlas Chart 5

RA 12hr 36.3min Dec +25° 59' Mag 9.6 Size 16'x3'

This is the classic edge-on spiral galaxy. Its "flying saucer" shape and dark lane make it a lovely sight, it has also yielded many beautiful photographs. It is about 40 million light years distant and over 100,000 light years in length.

24 Comae

Mag 7 Atlas Charts 5 & 11

RA 12hr 35.1min Dec +18° 23' Mags 5/7

Often seen as blue and gold, this pair is about 300 light years distant and is separated by 20" (estimated at 3700 AU). The companion is also a spectroscopic binary pair.

HERCULES--The Hero. This boisterous adventurer is the subject of many Greek and Roman legends, including the voyage of the Argonauts and his Twelve Labors. He was placed in the heavens at his death by Jupiter.

M13/NGC 6205 (Great Hercules Cluster)

Mag 7 Atlas Chart 6

RA 16hr 41.7min Dec +36° 28' Mag 6 Size 23'

One of the finest objects in the heavens, M13 is a large and bright globular cluster. This globular was discovered by Edmond Halley in 1714, and 50 years later Messier added it to his catalog with the note "round nebula, contains no star" (Charles Messier could have used a better telescope). Some estimate the number of cluster members to be over one million. Theoretical inhabitants of the center of the cluster would see 1000 stars with a brightness between Venus and the Full Moon!! M13 is about 25,000 light years away and 145 light years across, with an age of about 12 billion years.

SCORPIUS--The Scorpion. Orion was stung and killed, and Jupiter/Jupiter put both into the sky, but 180 degrees apart, so Orion does not see the creature that slew him. Hawaiians see the Fish Hook of the god Maui here in the sky, placed there after he used it to fish the Hawaiian Islands up from the sea. The Chinese mark this celestial location as the Azure/Blue Dragon.

Antares / Alpha (α) SCO (heart of the scorpion)

Mag 7 Atlas Chart 18

RA 16hr 29.4min Dec -26° 26' Mags 1/6

Antares means "Rival of Mars" because this reddish star is near the average brightness of Mars and because it is the same ruddy color to the naked eye. Antares is about 15 times the mass of the Sun and at least 400 times the size of the Sun. About 550 light years distant, it is 9900 times the brightness of Old Sol, radiating considerable energy in the infrared. A true supergiant star. The outer layers of the star are very tenuous and would qualify as a laboratory vacuum. There is a greenish (because of contrast) 6th magnitude companion only 3" from Antares, making it a difficult split on many nights.

M4/NGC 6121

Mag 7 Atlas Chart 18

RA 16hr 23.6min Dec -26° 32' Mag 6 Size 25'

A very loose globular cluster that is resolved in most any telescope, and the only one Charles Messier was able to resolve. Look for the curious "bar" feature of stars across the center of the cluster. It is about 7200 light years distant and 140 light years across. Early Egyptian dynasties were starting along the Nile when the light started its journey.

M6/NGC 6405 (The Butterfly Cluster)

Mag 7 Atlas Chart 18

RA 17hr 40.1min Dec -32° 13' Mag 4.2 Size 30'x15'

An open cluster that is bright enough to be naked eye under fairly dark skies. It is about 1600 light years distant and 12 light years across. There are about 80 cluster members. Look for the delicate chains of stars that form the "Butterfly" figure.

SAGITTARIUS--The Archer. Chiron (Centaurus) placed the archer/satyr Crotus (who dispatched the scorpion that killed Orion) at this location in the sky to guide the Argonauts home after they had found the Golden Fleece. Crotus was a muse who also invented archery.

M8/NGC 6523 (Lagoon Nebula)

Mag 7 Atlas Charts 12 & 18

RA 18hr 03.8min Dec $-24^{\circ} 23'$ Mag 6 Size 90'x40'

The Lagoon Nebula is a famous example of a diffuse nebula and stellar nursery (similar to the Great Orion Nebula). Stars being born within radiate large amounts of ultraviolet light, causing fluorescence of nearby material. The name Lagoon comes from the irregular dark dust lane that protrudes into the nebula. This object is about 4100 light years distant, 110x50 light years across, and may be faintly visible to the naked eye.

M20/NGC 6514 (Trifid Nebula)

Mag 7 Atlas Charts 12 & 18

RA 18hr 02.3min Dec $-23^{\circ} 02'$ Mag 6.3 Size 30'

The Trifid Nebula is also named for the shape of the dark dust lanes that cut in front of the nebulosity. The Lagoon and Trifid may be sections of a vast nebulous cloud in that portion of Our Galaxy. It is about 5200 light years distant, about 10 light years across, and relatively young at 300,000 years. No longer a stellar nursery because intense radiation has blown clouds of dust and gas away from the central region.

M17/NGC 6681 (Swan Nebula)

Mag 7 Atlas Chart 12

RA 18hr 20.8min Dec $-16^{\circ} 11'$ Mag 6 Size 46'x37'

The Swan Nebula, or Omega Nebula, or Checkmark, this object has been given several names because of a prominent dark dust lane. It is about 5500 light years distant and 40 light years across. Star formation is nearing its end in this nebula. The "Checkmark" feature can be seen in any telescope, but use a UHC filter for the faint outer sections.

M22/NGC 6656

Mag 7 Atlas Charts 12 & 18

RA 18hr 36.4min Dec $-29^{\circ} 54'$ Mag 5.1 Size 32'

This is an excellent globular cluster which is about 10,400 light years distant and about 97 light years across. It is distinctly elliptical in shape with about 500,000 stars.

M24 (Small Sagittarius Star Cloud)

Mag 7 Atlas Charts 12 & 18

RA 18hr 18.4min Dec $-18^{\circ} 35'$ Mag 4.6 Size 120'x90'

(not labeled)

The Small Sagittarius Star Cloud is an easily naked eye bright portion of the Milky Way. It is excellent in binoculars, showing about 1000 stars. There are two dark nebulae of dust (Barnard 92 and 93) that stand out to the North-West, about 5000 light years distant, which are similar to those of the Lagoon, Trifid, and Swan Nebulae. The star cloud is itself is about 12,000 to 16,000 light years distant, and 600 light years across.

SCUTUM--The Shield. Introduced by Johannes Hevelius as Sobieski's Shield in 1684 for the famous King of Poland who led a successful rebellion against the Ottoman Empire.

M11/NGC 6507 (Wild Duck Cluster)

Mag 7 Atlas Chart 12

RA 18hr 51.1min Dec $-6^{\circ} 16'$ Mag 6.3 Size 14'

One of the richest open clusters in the Milky Way, M11 with about 500 stars down to 14th magnitude with many knots or clumps. English observer Admiral Smyth noted its fan-shaped appearance resembled a "flight of wild ducks" (especially at low power). It is about 6000 light years distant and about 250 million years old. R.J. Trumpler calculated that an observer at the center would see several hundred first magnitude stars, and the brightest 40 or so would equal or exceed Venus!

LYRA--The Lyre. This stringed musical instrument was made from a turtle shell. When played by Orpheus it would cast a spell that charmed all the creatures of the earth.

Epsilon^{1 & 2} ($\epsilon^{1 \& 2}$) LYR (Double-Double)

Mag 7 Atlas Chart 6

RA 18hr 44.3min Dec +39° 40' Mags 5/6

Binoculars or a finderscope will split the wide pair of this well-known star system. Then each of those pairs will split in a telescope at about 150X. The wide separation is 208", then each tight pair is between 2" and 3" and oriented perpendicular to each other. The distance between the narrow pairs is about 140 to 160 AU, or about 4 times the distance from Pluto to the Sun, and requires 400 to 600 years to complete an orbit. The wide pairs are about 0.2 light years from each other and take thousands of years to orbit. The stars are about 180 light years from us. This quadruple star system is about 800 million years old, and will probably be disrupted by another star passing nearby.

M57/NGC 6720 (Ring Nebula)

Mag 7 Atlas Chart 6

RA 18hr 53.6min Dec +33° 02' Mag 9 Size 80"x60"

As one of the best examples of a planetary nebula, the Ring Nebula is one of the most studied objects in the sky. It is about 2300 light years away and 0.9 x 0.7 light years across. The 15th magnitude central star (now a planet-sized white dwarf) ejected material forming the barrel-shaped Ring about 7000 years ago. This dwarf star now has a surface temperature of about 100,000 degrees Kelvin, much hotter than any normal star, which ionizes the ejected material to glow brightly. The star will cool over several billion years, ending as a cold, dead, black dwarf star.

VULPECULA--The Little Fox. Originally Vulpecula cum Anser, the Little Fox with Goose, maybe the Fox ate the Goose it was carrying. Yet the brightest star of this constellation is still named Anser, located at the shoulder of the Fox.

M27/NGC 6853 (Dumbbell Nebula)

Mag 7 Atlas Charts 6 & 7

RA 19hr 59.6min Dec +22° 43' Mag 7.4 Size 8'x6'

The Dumbbell Nebula get its name from the shape of this planetary nebula as described by John Herschel (William's son). It is estimated to be 1200 light years distant and about 1 light year across, although this is very uncertain. The magnitude 13.5 central star released the dust and gas that glows in the Dumbbell shape, probably starting about 9800 years ago. Lord Rosse used his 72" telescope to draw 18 stars involved within the knotted nebulosity.

Collinder 399 (Brocchi's Cluster, the Coathanger)

Mag 7 Atlas Chart 6

RA 19 hr 25.4min Dec +20° 11' Mag 4 Size 60'

(not labeled)

The 10-star Coathanger asterism (star pattern) was long thought to be part of a large and bright open cluster, with a curved line of stars that forms the hook of the Coathanger. First identified on star charts by Persian astronomer Al Sufi in 964 B.C., this star group was mapped in the 1920s by American astronomer Dalmiro Brocchi for calibrating photometers. This chance alignment of stars ranges from 200 to 1100 light years distant. It is easily seen in a pair of binoculars or a finderscope.

CYGNUS--The Swan. Jupiter/Zeus flew to visit the Queen of Sparta as a swan and then placed the swan in the heavens to commemorate the event. This is also the Northern Cross.

M39/NGC 7092

Mag 7 Atlas Chart 7

RA 21hr 32.2min Dec +48° 26' Mag 5 Size 32'

A bright, scattered open cluster that is best in binoculars or a finderscope. There are about 30 members in the cluster. It is 800 light years away and 7.5 light years across.

NGC 6826 (Blinking Planetary)

Mag 7 Atlas Charts 6 & 7

RA 19hr 44.8min Dec +50° 31' Mag 8.9 Size 27"x24"

This planetary nebula has a relatively bright magnitude 10.6 central star and that makes for a unique show. As you look at the nebula directly in a medium or high power eyepiece, the star overwhelms the nebulosity and it looks like a fairly bright star. Move your eye and look away from this planetary and the nebula seems brightest, so the object grows in size. Looking back and forth will produce a "blinking" effect. This object is about 3600 light years distant and about 1/2 light year across, still expanding rapidly.

NGC 6960 (Veil Nebula—Western segment)

Mag 7 Atlas Chart 7

RA 20hr 45.7min Dec +30° 43' Mag 5 Size 70'x6'

NGC 6974/79 (Veil Nebula—central segment)

RA 20hr 50.8min Dec +31° 52' / RA 20hr 51min Dec +32° 09' Mag 5 Size 45'x30'

NGC 6992/95 (Veil Nebula—Eastern segment)

RA 20hr 56.4min Dec +31° 43' / RA 20hr 57.1min Dec +31° 13' Mag 5 Size 60'x30'

The Veil Nebula, also called the Cirrus Nebula or Bridal Veil Nebula, is a supernova remnant from a stellar explosion 5000 to 8000 years ago. Because of its large size, about 6 times that of a full Moon, the separate brighter parts received different NGC identifiers. It is about 1900 light years away and 100 light years across. The Western part involves 52 Cygni, the Northern central segment is faintest, and the Eastern part is brightest. The UHC or especially an O-III filter works very well for viewing this object.

Albireo / Beta (β) CYG

Mag 7 Atlas Charts 6 & 7

RA 19hr 30.7min Dec +27° 58' Mags 3/5

Alberio is one of the most observed double stars in the sky. It is easily split in most any telescope and has a beautiful blue and gold color in most instruments. The stars are split by a wide 35" and, if they are gravitationally bound (some doubt remains), the 380 light years distant stars have an orbital period of more than 75,000 years. The primary star itself is actually a very close (0.4") binary orbiting every 100 or so years, making this overall system a triplet. After several mistranslations and misunderstandings, the name Albireo evolved from the Arabic name "Minqar al-Dajajah" for "the hen's beak" because it is pictured on the head of a South-flying Swan (Cygnus).

End of Summer



Start of Autumn

[repaginated (with some re-ordering), added seasonal dividers, and minor editing – Jim Kaminski, June 2012]

[added free star chart (Mag 7 Atlas) information – Jim Kaminski, January 2014]

[edited data per SkySafariPro v5.3.3.1, added LEP/Hind's Crimson Star, UMA/Ludwig's Star – Jim Kaminski, July 2017]