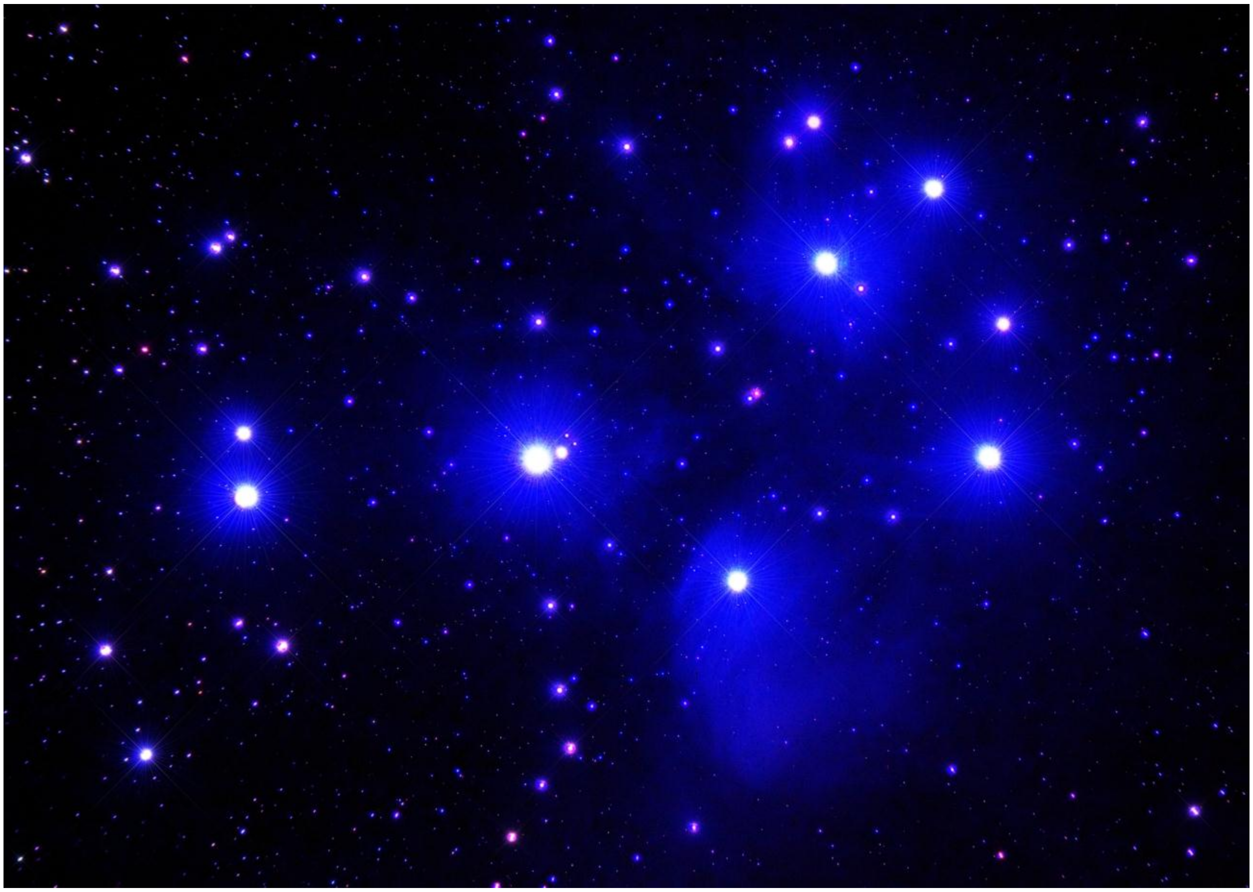
Current Astronomy

RIVER BEND ASTRONOMY CLUB NEWSLETTER

JANUARY/FEBRUARY 2012



The Pleiades (M45) is easily the most famous open cluster in the entire night sky. This issue features the first part of a **new series** on the Pleiades by Gary Kronk.

Photo by Gary Kronk.

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River Bend Astronomy club serves astronomy enthusiasts of the American Bottom region, the Mississippi River bluffs and beyond, fostering observation, education, and a spirit of camaraderie.

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Affiliated with the Astronomical League, dedicated to fostering astronomical education, providing incentives for astronomical observation and research, and assisting communication among amateur astronomical societies. www.astroleague.org

Check out our **online calendar** on the NASA Night Sky Network, a nationwide coalition of amateur astronomy clubs bringing the science, technology and inspiration of NASA's missions to the general public.

Monthly Meetings

Saturday, January 21, 2012 • 7:00 PM
Saturday, February 18, 2012 • 7:00 PM
Saturday, March 24, 2012 • 7:00 PM
For meeting locations, please see our calendar at
www.riverbendastro.org.

Looked Up Lately?

Join River Bend Astronomy Club

Want to learn more about astronomy? The members of River Bend Astronomy Club invite you to join. You won't need expensive tools or special skills - just a passion for observing the natural world.

- Meetings offer learning, peeks through great telescopes, and fun under the stars.
- You will receive the club newsletter, *Current Astronomy*, packed with news and photos.
- Get connected with our member-only online discussion group.
- Borrow from the club's multimedia library.
- Borrow from the club's selection of solar telescopes.
- And that's not all! Through club membership you also join the Astronomical League, with its special programs and colorful quarterly newsletter *The Reflector* to enrich your hobby.
- We meet monthly, observe regularly, email news and quips constantly, and generally have a good time. Won't you join us?

Name____
Address_____________________________________
City_________________State_______Zip__________
Phone_______________________________________
Email address_________________________________
Where did you hear of our club?___________________
____
How long have you been interested in astronomy?_____
Do you have optical equipment?___________________
Are you afraid of the dark? ___Yes ___No (just kidding)
I am submitted my application for:
______Adult Membership(s) ___Youth Membership(s)
$20/year each $15/year each
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I enclose a check for $_______________ made out to:
Mike Veith, Treasurer, RBAC
Signature___________________________________
Date_______________________________________

Mail to: River Bend Astronomy Club
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Questions? Contact us by email at rbac@riverbendastro.org.

The Pleiades
(First of a Series)

By Gary Kronk

Mythology of the Pleiades

[For almost 30 years I have been fascinated by the mythology of the stars, but no star, constellation, or asterism has a mythology as rich as the Pleiades.]

"Though small their size and pale their light, wide is their fame." Thus, wrote the Greek poet Aratus about the Pleiades in his Phaenomena during the 3rd century BC. Little did he know that, as men explored the rest of the world, his statement would still hold true more than 2300 years later. Indeed, few astronomical subjects can claim a mythology as rich as the Pleiades, as virtually every culture has a story about how this star cluster came to be.

The most well-known myths surrounding the Pleiades come from ancient Greece. From these myths came the name of the star cluster itself, as well as the names of nine of its stars.

The Pleiades were the seven daughters of Atlas and Pleione. The oldest known text bearing the names of the daughters is The Astronomy, which was written by the Greek poet Hesiod around the 8th century BC. Although The Astronomy itself no longer exists, fragments appear in other texts. An early comment in the 5th century BC text Nemean Odes, written by Pindar, quotes Hesiod as "Lovely Teygeta, and dark-faced Electra, and Alcyone, and bright Asterope, and Celaeno, and Maia, and Merope, whom glorious Atlas begot …." These names were also provided by the 3rd century BC Greek poet Aratus in his Phaenomena, the 2nd century BC Greek scholar Apollodorus in Chronicle, and the 1st century BC Latin author Gaius Julius Hyginus in Poetica Astronomica and Fabulae, although different translations have led to slightly different spellings.

Interestingly, even the Pleiades have an alternate spelling, as the Greek rhetorician Athenaeus wrote in the 2nd Century AD, that Hesiod always called them the "Peleiades".

There are basically two Greek tales that relate how the Pleiades came to be in the sky and each was offered in a different book by Hyginus. In Poetica Astronomica, he relates how Pleione was traveling through Boeotia with her seven daughters and Orion. Suddenly, Orion tried to attack her. She and the girls escaped, but Orion continued to look for them. After seven years, Zeus felt sorry for the girls and placed them in the sky. A very different story is given in Fabulae. Hyginus relates how Atlas and Pleione had twelve daughters and one son. The son, Hyas, was killed by a boar or lion. The sisters were all stuck with such grief that they began dying. The first five that died became the Hyades star cluster, while the remainder became the Pleiades.

Some ancient writers typically end their discussion of the Pleiades with the story of the "Lost Pleiad." Hyginus provides the two most popular stories in both Poetica Astronomica and in Fabulae. He says that each of the Pleiades had at least one child by a god, except for Merope. Alcyone and Calaeno had children by Poseidon, Asterope had one child by Aries, and Electra, Maia, and Taygeta had children by Zeus. Merope married a mortal. Poetica Astronomica says this is the reason why

Merope's star is dimmer than the rest, while Fabulae indicates Merope was banished from her band of sisters and that she wears her hair unbound, like a comet. Hyginus relates the idea in Poetica Astronomica that Electra is the missing Pleiad. He said she was so distraught over the death of her son Dardanus and the loss of the city of Troy, that she left the Pleiades and moved into the northern sky where she wore her hair unbound like a comet.

As people ventured out to other parts of the world, it was discovered that the Pleiades were also present in the mythology and lore of other cultures.

Natives of North America

The Arikara, Cheyenne, Crow, Kiowa, and Sioux tribes have an interesting story that centers around Devil's Tower in Wyoming. The premise involves a group of children that are playing. In some of the stories, one of the children turns into a bear, while in others a bear suddenly comes out of the trees. In each case, the children begin to run to get away from the bear. They tried everything, but could not escape the bear. Soon the children saw a flat rock and they jumped on top of it. As the bear approached, the rock suddenly began growing upwards. The bear reached the growing stone and began trying to climb the rock, but the sides were too steep. Nevertheless, the bear continued to try, leaving deep claw marks on every side of the rock. The rock rose so high, that the children became stars. The myth explains the creation of Devils Tower and the Pleiades. Although some Indian narrators say the children appear as the "Big Dipper," most refer to the Pleiades and described the stars as "bunched together" and "clustered." Some stories indicate that five stars are visible, while others indicate seven. The ones with seven sometimes note that one star is fainter…usually it was the youngest child.

The Jicarilla Apache have a very similar story, but without Devils Tower. Several children were out playing, when one little girl began digging a hole in the side of a hill. She eventually came out and told the other children that she wanted to play bear. So, she went back into the hole and came out pretending to be a bear. Then she ran back in. The other children gathered around the entrance to the hole and called to her. This time she ran out but was changing into a real bear. Some children ran for their lives, while the others who stayed were killed. The younger sister of the girl who turned into a bear ran to find her father and five other men who were out hunting. They all returned and found the bear sleeping in the hole. They piled wood up around the opening and set it afire. Not knowing if the bear was dead or not, the six men and the little girl ran toward the east to the top of a big mountain. They began praying as cloud drifted over. They got on top of the cloud and the wind blew them up to the sky. They became the seven stars that rise in the east and are overhead when it gets dark in the winter.

The Arapaho myth also involves a bear. They say that seven men went on the war path, when a bear began chasing them. Not knowing how to escape, one man took a ball and kicked it upwards and rose toward the sky. Each man then did the same thing, with the last just making it before the bear got him. They are now seven stars in the sky.

Several tribes have stories that indicate the Pleiades were created in a completely different manner…by dancing. In most cases, the dancing is a reaction by children who are unhappy with decisions their parents are making. These stories come from the Caddo, Cherokee, Comanche, Iroquois, Koasati, Onondaga, and Wyandot. In general, the parent gets angry at their children, usually because the children are not patient or are too busy playing. Occasionally, the children are just described as lazy. The children begin dancing around in a circle and singing/chanting. As the children danced, their feet were no longer touching the ground as they were rising into the sky. Some of the parents saw them rise and tried to bring them back, but were too late. The children continue to rise and became the Pleiades. The Cherokee call the cluster Ani'tsutsii ("The Boys"), while the Wyandot call it Huti-watseejah ("the Cluster"). The Iroquois say that one of the Pleiades is dimmer than the rest and it is because one of the children is pale because he wants to go home but cannot. The Onondagas said one child looked down as they rose and became a shooting star.

Look for the next article in this continuing series in future issues of this newsletter! RBAC

Read *Current Astronomy* on your iPad, Kindle Fire, or other tablet computer!

Simply browse to
www.riverbendastro.org/news.html
and choose the issue you wish to read.

Turn your tablet sideways (landscape orientation) for best results. Remember to cover it with red cellophane or rubylith if you use it while at a star party! Enjoy! RBAC

Observe the Auriga Clusters (M36, M37, and M38)

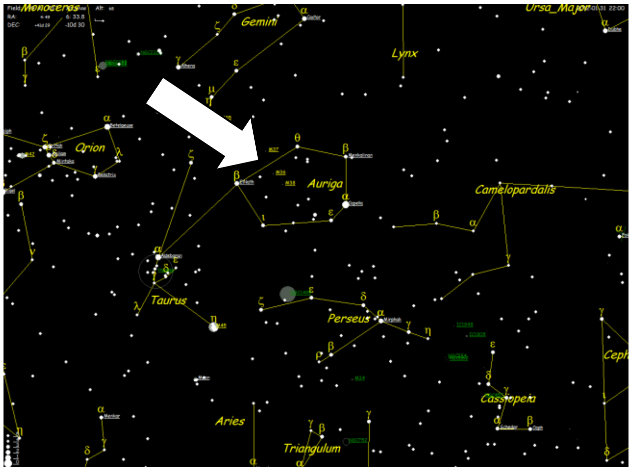
By Bill Breeden

If you love open clusters as much as I do, you are in for a treat when you point your telescope toward Auriga, especially this time of year when it rides high above you in the winter sky.

Eighteenth-century comet-hunter Charles Messier listed three awesome open clusters, conveniently grouped together near the center of the constellation. The easiest way to find them is to start with the bright star Capella (alpha Aurigae), and go about one quarter of the way toward Betelgeuese in Orion. The three clusters form a line running nearly perpendicular to the line formed by Capella and Betelguese.

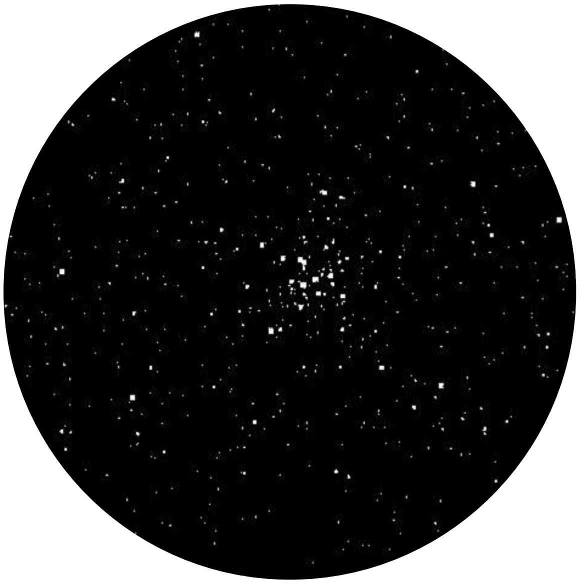
Start at the innermost cluster M38, nearest to Capella. M38 glows at magnitude 7.4 and is 21 arcminutes in size. A medium-power eyepiece (13-18mm) shows M38 very well. To me, this appears to be the most spread-out of the three clusters.

Simulated eyepiece view of M38 using a 13mm eyepiece from a reasonably dark location. The actual field of view is just over 30'.
Photo by Gary Kronk.



M36, M37, and M38 are located at the center of this star chart in the constellation Auriga.
Image from *Hallo Northern Sky*, © Han Kleijn.

Now, move up to M36, the middle cluster of the three. M36 is the smallest of the clusters, with an apparent size of 12 arcminutes. It shines at magnitude 6.3, more than twice as bright as M38. It is a smaller and denser cluster, making it the easiest to see and find of the three Auriga open clusters. This was the first of the three clusters included in Messier's catalog in 1764. M36 is about 4,100 light-years from earth.



Simulated eyepiece view of M36 using a 13mm eyepiece from a reasonably dark location. The actual field of view is just over 30'. Note the brightness difference between the two clusters.
Photo by Gary Kronk.

Now, move out to M37, the “outlier” cluster of the three. M37 is the largest of the three clusters, with an apparent size of 24 arcminutes. It is also technically the brightest cluster of the three, at magnitude 6.2. Because of its large size, its brightness is spread out, so it doesn’t appear quite as bright at M36.

M37 is the richest of the three clusters, making it a spectacular sight in a backyard telescope. M37 is my favorite of the three because of its density and its even distribution of stars. The cover of this issue of Current Astronomy shows an image of M37 taken by Gary Kronk. This is a wide-field image of this open star cluster obtained on January 30, 2011. He used a modified Canon T2i camera attached to an 8-cm refractor. This is a single 2 minute exposure. M37 makes a great target for imaging, showing at star parties, or just enjoying for yourself for a while.

Due to the size of this cluster, it is best enjoyed through low-power eyepieces, with a focal lengths of 19mm and longer.

This simulated eyepiece view of M37 demonstrates the view through a low-power 24mm eyepiece from a reasonably dark location. The actual field of view is just under 1 degree.
Photo by Gary Kronk.

The simulated eyepiece views in this article all originated with images taken by Gary Kronk from Kronk Observatory in St. Jacob, Illinois. The original images show color and much richer detail than you will see through the eyepiece of a small to medium sized backyard telescope.

Compare the image of M37 on the cover of this newsletter to the simulated eyepiece view on this page. To present a view similar to what you will see through the eyepiece, the original image was cropped to represent the correct field of view. Then it was cropped again using a circular template. Finally, I adjusted color, brightness, and contrast to create the final simulated view through the eyepiece.

When you are out observing this winter, be sure to point your telescope at M36, M37, and M38. You can enjoy them yourself, or you can use them to demonstrate to star-party-goers the differences in magnitude, apparent size, and how the views change using different eyepieces. RBAC

Carbon Stars!

Don’t forget, we have added the Astronomical League’s Carbon Star List to our Monthly Observing Lists! See the final pages of the newsletter, and add those beautiful carbon stars to your observing plans!

Look for the arrows!

Dawn Takes a Closer Look

By Dr. Marc Rayman

Dawn is the first space mission with an itinerary that includes orbiting two separate solar system destinations. It is also the only spacecraft ever to orbit an object in the main asteroid belt between Mars and Jupiter. The spacecraft accomplishes this feat using ion propulsion, a technology first proven in space on the highly successful Deep Space 1 mission, part of NASA's New Millennium program.

Launched in September 2007, Dawn arrived at protoplanet Vesta in July 2011. It will orbit and study Vesta until July 2012, when it will leave orbit for dwarf planet Ceres, also in the asteroid belt.

Dawn can maneuver to the orbit best suited for conducting each of its scientific observations. After months mapping this alien world from higher altitudes, Dawn spiraled closer to Vesta to attain a low altitude orbit, the better to study Vesta's composition and map its complicated gravity field.

Changing and refining Dawn's orbit of this massive, irregular, heterogeneous body is one of the most complicated parts of the mission. In addition, to meet all the scientific objectives, the orientation of this orbit needs to change.

These differing orientations are a crucial element of the strategy for gathering the most scientifically valuable data on Vesta. It generally requires a great deal of maneuvering to change the plane of a spacecraft's orbit. The ion propulsion system allows the probe to fly from one orbit to another without the penalty of carrying a massive supply of propellant.

Indeed, one of the reasons that traveling from Earth to Vesta (and later Ceres) requires ion propulsion is the challenge of tilting the orbit around the sun.

Although the ion propulsion system accomplishes the majority of the orbit change, Dawn's navigators are enlisting Vesta itself. Some of the ion thrusting was designed in part to put the spacecraft in certain locations from which Vesta would twist its orbit toward the target angle for the low-altitude orbit. As Dawn rotates and the world underneath it revolves, the spacecraft feels a changing pull. There is always a tug downward, but because of Vesta's heterogeneous interior structure, sometimes there is also a slight force to one side or another. With their knowledge of the gravity field, the mission team plotted a course that took advantage of these variations to get a free ride.

The flight plan is a complex affair of carefully timed thrusting and coasting. Very far from home, the spacecraft is making excellent progress in its expedition at a fascinating world that, until a few months ago, had never seen a probe from Earth.

Keep up with Dawn's progress by following the Chief Engineer's (yours truly's) journal at http://dawn.jpl.nasa.gov/mission/journal.asp. And check out the illustrated story in verse of "Professor Starr's Dream Trip: Or, how a little technology goes a long way," at http://spaceplace.nasa.gov/story-prof-starr.

This full view of the giant asteroid Vesta was taken by NASA's Dawn spacecraft, as part of a rotation characterization sequence on July 24, 2011, at a distance of 5,200 kilometers (3,200 miles). Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

RBAC's Monthly Observing Lists

These lists include brighter deep-sky objects that transit near 10:00 PM each month.

January Observing List

Prepared by Bill Breeden

Double Stars

_________ 1 Camelopardalis SAO 24672 Const. CAM Type DS RA 04 32.0 Decl. +53° 55' Mag. 5.7 6.8
_________ 118 Tauri SAO 77201 Const. TAU Type DS RA 05 29.3 Decl. +25° 09' Mag. 5.8 6.6
_________ 55 Eridani SAO 131442 Const. ERI Type DS RA 04 43.6 Decl. -08° 48' Mag. 6.7 6.8
_________ Beta Orionis SAO 131907 Rigel Const. ORI Type DS RA 05 14.5 Decl. -08° 12' Mag. 0.1 6.8
_________ Chi Tauri SAO 76573 Const. TAU Type DS RA 04 22.6 Decl. +25° 38' Mag. 5.5 7.6
_________ Delta Orionis SAO 132220 Mintaka Const. ORI Type DS RA 05 32.0 Decl. -00° 18' Mag. 2.2 6.3
_________ Gamma Leporis SAO 170759 - Const. LEO Type DS RA 05 44.5 Decl. -22° 27' Mag. 3.7 6.3
_________ Iota Orionis SAO 132323 Nair al Saif Const. ORI Type DS RA 05 35.4 Decl. -05° 55' Mag. 2.8 6.9
_________ Lambda Orionis SAO 112921 Meissa Const. ORI Type DS RA 05 35.1 Decl. +09° 56' Mag. 3.6 5.5
_________ Sigma Orionis SAO 132406 Const. ORI Type DS RA 05 38.7 Decl. -02° 36' Mag. 4.0 7.5 6.5
_________ Struve 747 SAO 132298 - Const. Type DS RA 05 35.0 Decl. -06° 00' Mag. 4.8 5.7
_________ Theta 1 Orionis Trapezium Const. ORI Type DS RA 05 35.3 Decl. -05° 23' Mag. 6.7 7.9 5.1 6.7
_________ Theta 2 Orionis SAO 132322 Const. ORI Type DS RA 05 35.4 Decl. -05° 25' Mag. 5.2 6.5
_________ Theta Aurigae SAO 58636 - Const. AUR Type DS RA 05 59.7 Decl. +37° 13' Mag. 2.6 7.1
_________ Zeta Orionis SAO 132444 Alnitak Const. ORI Type DS RA 05 40.8 Decl. -01° 57' Mag. 1.9 4.0 9.9

Messier Objects

_________ M1 NGC1952 Crab Nebula Const. TAU Type EN RA 05 34.5 Decl. +22 01 Mag. 8.2
_________ M36 NGC1960 Const. AUR Type OC RA 05 36.1 Decl. +34 08 Mag. 6.3
_________ M37 NGC2099 Const. AUR Type OC RA 05 52.4 Decl. +32 33 Mag. 6.2
_________ M38 NGC1922 Const. AUR Type OC RA 05 28.4 Decl. +35 50 Mag. 7.4
_________ M42 NGC1976 Orion Nebula Const. ORI Type EN RA 05 35.4 Decl. -05 27 Mag. 4
_________ M43 NGC1982 Orion Nebula Const. ORI Type EN RA 05 35.6 Decl. -05 16 Mag. 9.1
_________ M78 NGC2068 Const. ORI Type EN RA 05 46.7 Decl. +00 03 Mag. 10.3
_________ M79 NGC1904 Const. LEP Type GC RA 05 24.5 Decl. -24 33 Mag. 8.4

Caldwell Objects

_________ C031 IC405 Flaming Star Nebula Const. AUR Type BN RA 05 16 12.00 Decl. +34 16 00.0 Mag. 6
_________ C041 Mel 25 Hyades Const. TAU Type OC RA 04 27 00.00 Decl. +16 00 00.0 Mag. 1
_________ C073 NGC1851 Const. COL Type GC RA 05 14 06.00 Decl. -40 03 00.0 Mag. 7.3
_________ C103 NGC2070 Tarantula Nebula Const. DOR Type BN RA 05 38 42.00 Decl. -69 06 00.0 Mag. 1

Royal Astronomical Society of Canada Objects

_________ RASC19 NGC1491 Const. PER Type EN RA 04 03.4 Decl. +51 19 Mag. -
_________ RASC20 NGC1501 Const. CAM Type PN RA 04 07.0 Decl. +60 55 Mag. 12
_________ RASC22 NGC1535 Const. ERI Type PN RA 04 14.2 Decl. -12 44 Mag. 10.4
_________ RASC23 NGC1514 Const. TAU Type PN RA 04 09.2 Decl. +30 47 Mag. 10.8

________ RASC24 NGC1931 Const. AUR Type E/RN RA 05 31.4 Decl. +34 15 Mag.
________ RASC25 NGC1788 Const. ORI Type RN RA 05 06.9 Decl. -03 21 Mag.
________ RASC26 NGC1973+ Const. ORI Type E/RN RA 05 35.1 Decl. -04 44 Mag.
________ RASC27 NGC2022 Const. ORI Type PN RA 05 42.1 Decl. +09 05 Mag. 12.4
________ RASC28 NGC2024 Const. ORI Type EN RA 05 40.7 Decl. -02 27 Mag.
Carbon Stars (Astronomical League)
________ ALCS21 EL Aurigae SAO 24981 RA 05 03 23 Decl. +50 37 58 Mag. 8.5 – 8.7 Per. Irr. Class C5 (N3)
________ ALCS22 W Orionis SAO 112406 RA 05 05 23 Decl. +01 10 39 Mag. 5.8 – 10.0 Per. 212 Class C5 (N5)
________ ALCS23 TX Aurigae GSC 2895:203 RA 05 09 05 Decl. +39 00 08 Mag. 8.5 – 9.2 Per. Irr. Class C5 (N3)
________ ALCS24 SY Eridani SAO 131832 RA 05 09 48 Decl. -05 30 55 Mag. 8.3 – 10.0 Per. 96 Class C6 (N0)
________ ALCS25 UV Aurigae SAO 57941 RA 05 21 48 Decl. +32 30 43 Mag. 7.4 – 10.6 Per. 394 Class C6 – C8 (Ne)
________ ALCS26 S Aurigae GSC 2411:222 RA 05 27 07 Decl. +34 08 59 Mag. 8.2 – 13.3 Per. 590 Class C4/5 (N3)
________ ALCS27 RT Orionis GSC 126:161 RA 05 33 13 Decl. +07 09 12 Mag. 8.0 – 8.9 Per. 321 Class C6 (Nb)
________ ALCS28 S Camelopardalis SAO 13563 RA 05 41 02 Decl. +68 47 55 Mag. 7.7 – 11.6 Per. 327 Class C7 (R8)
________ ALCS29 TU Tauri SAO 77502 RA 05 45 13 Decl. +24 25 12 Mag. 5.9 – 9.2 Per. 190 Class C5 (N3)
________ ALCS30 Y Tauri SAO 77516 RA 05 45 39 Decl. +20 41 42 Mag. 6.5 – 9.2 Per. 242 Class C6.5 (N3)
________ ALCS31 FU Aurigae SAO 58449 RA 05 48 08 Decl. +30 37 51 Mag. 8.3 – 8.5 Per. ? Class C7 (N0)
________ ALCS32 TU Geminorum SAO 78066 RA 06 10 53 Decl. +26 00 53 Mag. 7.4 – 8.4 Per. 230 Class C6 (N3)
________ ALCS33 FU Monocerotis GSC 136:183 RA 06 22 23 Decl. +03 25 27 Mag. 8.5 – 9.8 Per. 310 Class C8 (CSe)
________ ALCS34 V Aurigae GSC 3380:1119 RA 06 24 02 Decl. +47 42 23 Mag. 8.5 – 13.0 Per. 353 Class C6 (N3)
________ ALCS35 BL Orionis SAO 95659 RA 06 25 28 Decl. +14 43 19 Mag. 6.0 – 7.0 Per. 154 Class "C6 (Nb Tc)"
________ ALCS36 UU Aurigae SAO 59280 RA 06 36 32 Decl. +38 26 43 Mag. 5.1 – 7.0 Per. 234 Class C5 – C7 (N3)
________ ALCS37 VW Geminorum SAO 59383 RA 06 42 08 Decl. +31 27 17 Mag. 8.1 – 8.5 Per. Irr. Class C5 (Na)
________ ALCS38 GY Monocerotis SAO 133825 RA 06 53 11 Decl. -04 34 34 Mag. 8.1 – 9.0 Per. Irr. Class C6 (N3/R8)
________ ALCS39 RV Monocerotis SAO 114704 RA 06 58 21 Decl. +06 10 01 Mag. 7.0 – 8.9 Per. 132 Class C4 – C6 (Nb/R9)

Simulated eyepiece view of the Orion Nebula (M42) (left), as seen through a low-power eyepiece, using a large-aperture (greater than 12 inches) Dobsonian reflector.
Photo by Gary Kronk.

February Observing List

Prepared by Bill Breeden

Double Stars
_________ 12 Lyncis SAO 25939 - Const. LYN Type DS RA 06 46.2 Decl. +59° 27' Mag. 5.4 7.3
_________ 19 Lyncis SAO 26311 Const. LYN Type DS RA 07 22.9 Decl. +55° 17' Mag. 5.6 6.5
_________ Alpha Geminorum SAO 60198 Castor Const. GEM Type DS RA 07 34.6 Decl. +31° 53' Mag. 1.9 2.9
_________ Beta Monocerotis SAO 133316 Const. MON Type DS RA 06 28.8 Decl. -07° 02' Mag. 4.7 5.2
_________ Delta Geminorum SAO 79294 Wasat Const. GEM Type DS RA 07 20.1 Decl. +21° 59' Mag. 3.5 8.2
_________ Epsilon Canis Majoris SAO 172676 Adhara Const. CMA Type DS RA 06 58.6 Decl. -28° 58' Mag. 1.5 7.4
_________ Epsilon Monocerotis SAO 113810 Const. MON Type DS RA 06 23.8 Decl. +04° 36' Mag. 4.5 6.5
_________ Kappa Puppis SAO 174198 Const. PUP Type DS RA 07 38.8 Decl. -26° 48' Mag. 4.5 4.7
Messier Objects
_________ M35 NGC2168 Const. GEM Type OC RA 06 08.9 Decl. +24 20 Mag. 5.3
_________ M41 NGC2287 Const. CMA Type OC RA 06 46.0 Decl. -20 44 Mag. 4.6
_________ M46 NGC2437 Const. PUP Type OC RA 07 41.8 Decl. -14 49 Mag. 6
_________ M47 NGC2422 Const. PUP Type OC RA 07 36.6 Decl. -14 30 Mag. 4.5
_________ M50 NGC2323 Const. MON Type OC RA 07 03.2 Decl. -08 20 Mag. 6.3
_________ M93 NGC2447 Const. PUP Type OC RA 07 44.6 Decl. -23 52 Mag. 6
Caldwell Objects
_________ C007 NGC2403 Const. CAM Type SG RA 07 36 54.00 Decl. +65 36 00.0 Mag. 8.9
_________ C025 NGC2419 Intergalactic Tramp Const. LYN Type GC RA 07 38 06.00 Decl. +38 53 00.0 Mag. 10.4
_________ C039 NGC2392 Eskimo Nebula Const. GEM Type PN RA 07 29 12.00 Decl. +20 55 00.0 Mag. 9.9
_________ C046 NGC2261 Hubble's Variable Nebula Const. MON Type BN RA 06 39 12.00 Decl. +08 44 00.0 Mag. 10
_________ C049 NGC2237-9 Rosette Nebula Const. MON Type BN RA 06 32 18.00 Decl. +05 03 00.0 Mag.
_________ C050 NGC2244 Const. MON Type OC RA 06 32 24.00 Decl. +04 52 00.0 Mag. 4.8
_________ C058 NGC2360 Const. CMA Type OC RA 07 17 48.00 Decl. -15 37 00.0 Mag. 7.2
_________ C064 NGC2362 Tau Cma Cluster Const. CMA Type OC RA 07 18 48.00 Decl. -24 57 00.0 Mag. 4.1
_________ C071 NGC2477 Const. PUP Type OC RA 07 52 18.00 Decl. -38 33 00.0 Mag. 5.8
_________ C096 NGC2516 Const. CAR Type OC RA 07 58 18.00 Decl. -60 52 00.0 Mag. 3.8
Royal Astronomical Society of Canada Objects
_________ RASC29 NGC2194 Const. ORI Type OC RA 06 13.8 Decl. +12 48 Mag. 8.5
_________ RASC30 NGC2371/2 Const. GEM Type PN RA 07 25.6 Decl. +29 29 Mag. 13
_________ RASC31 NGC2392 Eskimo Nebula Const. GEM Type PN RA 07 29.2 Decl. +20 55 Mag. 8.3
_________ RASC32 NGC2237+ Const. MON Type EN RA 06 32.3 Decl. +05 03 Mag.
_________ RASC33 NGC2261 Hubble's Variable Nebula Const. MON Type E/RN RA 06 39.2 Decl. +08 44 Mag. var
_________ RASC34 NGC2359 Const. CMA Type EN RA 07 18.6 Decl. -13 12 Mag.
_________ RASC35 NGC2440 Const. PUP Type PN RA 07 41.9 Decl. -18 13 Mag. 10.3
_________ RASC37 NGC2403 Const. CAM Type G-Sc RA 07 36.9 Decl. +65 36 Mag. 8.4

Carbon Stars (Astronomical League)
_________ ALCS40 V614 Monocerotis SAO 134049 RA 07 01 01 Decl. -03 15 09 Mag. 7.0 – 7.4 Per. 60 Class C4 (R5)
_________ ALCS41 RY Monocerotis GSC 5381:403 RA 07 06 56 Decl. -07 33 26 Mag. 7.5 – 9.2 Per. 456 Class C5 – C7 (N5/R)
_________ ALCS42 W Canis Majoris SAO 152427 RA 07 08 03 Decl. -11 55 23 Mag. 6.4 – 7.9 Per. Irr. Class C6 (N)
_________ ALCS43 R Canis Minoris SAO 96548 RA 07 08 42 Decl. +10 01 26 Mag. 7.3 – 11.6 Per. 338 Class C7 (CSep)
_________ ALCS44 BM Geminorum GSC 1913:1170 RA 07 20 59 Decl. +24 59 58 Mag. 8.3 – 9.2 Per. 286 Class C5 (Nb)
_________ ALCS45 RU Camelopardalis SAO 14157 RA 07 21 44 Decl. +69 40 14 Mag. 8.1 – 9.8 Per. 22 Class C0 – C3 (K0 – R0)
_________ ALCS46 NQ Geminorum SAO 79474 RA 07 31 54 Decl. +24 30 12 Mag. 7.4 – 8.0 Per. 70 Class C6 (R9)
_________ ALCS47 RU Puppis SAO 175215 RA 08 07 29 Decl. -22 54 45 Mag. 8.1 – 11.1 Per. 425 Class C5 (N3)
_________ ALCS48 X Cancri SAO 98230 RA 08 55 22 Decl. +17 13 52 Mag. 5.6 – 7.5 Per. 195 Class C5 (N3)
_________ ALCS49 T Cancri SAO 80524 RA 08 56 40 Decl. +19 50 56 Mag. 7.6 – 10.5 Per. 482 Class C3 – C5 (R6 – N6)

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