



**It's hard to tell where the Sagittarius Star Cloud (M24) ends and the rich Milky Way begins in this awesome star-packed region of the sky. Sagittarius is well-placed for exploring during the summer months.**

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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Ed Cunniss · Gary Kronk · Kurt Sleeter · Eric Young

Contacts

MAIL River Bend Astronomy Club
Bill Breeden
5340 Chippewa Street
St. Louis, MO 63109
WEB www.riverbendastro.org
EMAIL wmrbreeden@yahoo.com



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, July 30, 2011 • 7:00 PM

Saturday, August 27, 2011 • 7:00 PM

Saturday, September 24, 2011 • 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
(18 yrs. and up) (17 yrs. and under)
I enclose a check for \$\_\_\_\_\_ made out to:
Mike Veith, Treasurer, RBAC
Signature \_\_\_\_\_
Date \_\_\_\_\_

Mail to: River Bend Astronomy Club
c/o Mike Veith, 1121 St. Louis St., Edwardsville, IL 62025.

## The Cosmos Unveiled

### River Bend “East” Celebrates National Astronomy Day

By Mark Brown

After four military moves in five years and a long absence from outreach and Astronomy Day events, I was finally able to do something I’ve truly missed. And that is to develop and coordinate another National Astronomy Day event. Because of my travels and moving, I’ve not been able to settle into another astronomy club. But then again, it’s hard to move into a club knowing the folks you meet will not be the same as the club members (family) I had to leave in 2006.

Over the past 6 years, my military affiliation brought me to within an hour of another River Bend club member, Ed Cunnius. I believe he was the first to be given the official River Bend “East” Astronomy Club member title. I guess I somewhat inherited that title too as I still continue to migrate eastward and pay my club dues to RBAC rather than to another astronomy club. I now reside in Carlisle, PA and initially lived here only for a year from 2007 to 2008. After a two year stint in Washington DC, the Air Force decided to bring the family back to Carlisle. It was here that while working in the local school district I met up with a truly enthusiastic 8th grade science teacher, Ms. Jean Fendrich.

I first met Jean in January while participating as a science fair judge and then again in February while substitute teaching at Lambert Middle School in the Carlisle School District. We recognized each other and struck up a conversation. Come to find out that although we are from totally different parts of the country we both have ties to my home town in Kansas. (That’s another story)

Jean mentioned that she wanted to host a science night for her school and students. Intrigued by her enthusiasm, I asked when she wanted to do it. She said, “In early May.” Right then and there my eyebrows perked up and I suggested that she host an astronomy day event. Not knowing the gist of Astronomy Day, Jean and I sat down for over an hour as I gave her all the details on the history of National Astronomy Day and the events I had helped organize through River Bend. From that moment on, she was hooked. Yes, she was enthusiastic, but little did I know just how tenacious Jean was. Little did I know the journey I was about to take and that I had finally met my match.

### A Pipe Dream

Many of you River Bend folks can recall the Astronomy Day events held at the Children’s Museum in Edwardsville. Those were a big deal for me and for others in that little museum. The ideas I brought to the table with Jean seemed like small potatoes. She countered my ideas with even more elaborate suggestions. Knowing my background, Jean even toyed with the idea of buying or renting a portable planetarium to present sky shows. But that meant we needed to find someone who was willing to donate their time and dome or that we had to have lots of money to purchase our own dome and projector. Well in harsh financial times, it just wasn’t feasible and finding a donor was not happening.

A few nights later, I received an email from Jean saying that we were going ahead with the planetarium idea and it was going to be spectacular. Jean had been researching the web and found a site that touted how to construct a planetarium dome from cardboard. I was a bit skeptical. Well, no...quite honestly I was not on board with this idea at all. I tried to play down the idea as a pipe dream, but the next day, she informed me that she

had found a supplier of used cardboard and they were going to donate what we needed.

Within a day, the plans were drawn up from the website and Jean had the cardboard delivered. For the next 6 weeks, we spent our mornings, afternoons, planning time, evenings and weekends measuring, painting, cutting and scoring huge sheets of cardboard into triangular shapes. The plans called for the cardboard to be assembled into large pentagons and supported with A-frame triangles. The geodesic dome would then rest on a 1-meter high wall supported by—yup, you guessed it; cardboard.



Mark Brown attaches binder clips to secure the structure of the Fendrich Planetarium. Photo by Jean Fendrich.



Assembling the pentagons for the Fendrich Planetarium. Photo by Mark Brown.

As we began assembling the pieces, we quickly realized that we had outgrown the room we were authorized to use. Come to find out, the plans we thought we were using for a 2.5 meter dome turned out to be for a 5-meter dome. We were at a work stoppage as we had to ask the school principal for permission to build our dome in the cafeteria where the assembled product would stand until astronomy day. The principal was thrilled and gave us full reign to do whatever we needed.

With permission granted, we scheduled a weekend to assemble our montage of triangles and pentagons in the school cafeteria. After about 4 hours, Jean's pipe dream was fast becoming a reality. With a little creativeness and building support, the dome had to be assembled from the top down in order to properly fit the pieces together. The dome fit together quite well with each triangle segment joined and secured not with glue, not with tape, but with 2-inch binder clips. This dome was nearly a "green" and environmental creation. It did have some problems, but nothing a little bit of duct tape couldn't fix. After assembling the 5-meter geodesic dome, the weight proved too much to be supported by a cardboard wall. With astronomy day drawing near, we decided to leave the dome resting on the floor rather than constructing a suitable support. We assembled an entry door and with that the structure was complete and usable. The dome was appropriately named, the Fendrich Planetarium.



Assembled Fendrich Planetarium constructed from recycled cardboard and binder clips. Photo by Mark Brown.



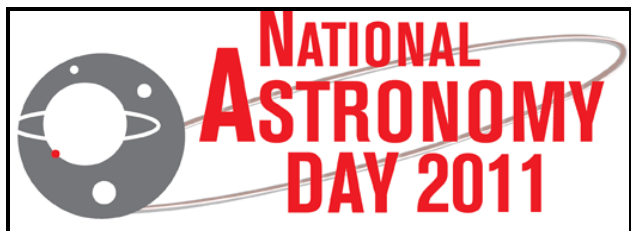
Jean Fendrich, 8th Grade Science Teacher opens the door to the stars for the public during National Astronomy Day. Photo by Mark Brown.

## No Planetarium Projector - No Problem

As many of you know, finding a projector to project a well simulated night sky is difficult to come by and expensive. After exhausting all possibilities, we decided it was best to present a night sky show with a static sky representative of the spring sky seen on May 7th from Carlisle. Using a cheap five-dollar projector, we projected the spring sky for 9:00pm onto the dome. The stars from the projector were huge and out of proportion. Yet the pattern shown on the ceiling was accurate enough to replicate and allowed for us to make some revisions with our own planisphere. With the stars projected, I painted the domed ceiling with dots of glow in the dark paint. The finished product was then illuminated with a long-wave UV light fixture at the inside base of the dome. Although we could not rotate the sky as in a real planetarium, the static sky worked well and was impressive.



Students wait for the stars to come out in the Fendrich Planetarium. Photo by Mark Brown.



## Astronomy Day 2011 arrives

Despite some early clouds and a passing shower, over 300 bustling visitors were not deterred and came with an appetite to learn a bit more about astronomy and to see the treasures of the day and night sky. Computerized quizzes, 3D images of the solar system, and a display of telescopes were offered at Lambertson during the afternoon event from 2:00pm to 5:30pm. District teachers, student volunteers and parents presented indoor demonstrations and crafty ideas related to the phases of the moon, ultraviolet radiation, galaxies and the constellations. Visitors also witnessed the creation of a comet's nucleus from a bubbling brew of household materials.

One of the items our event was in short supply of was telescopes and knowledgeable people to staff and operate the scopes. I contacted the Astronomical Society of Harrisburg, PA, to assist in our event, but received no reply. I then contacted Tri-State Astronomers (TSA) near Hagerstown, MD to ask for help. The response was immediate and they provided 4 volunteers with telescopes to make the trek up to Carlisle to help out. Two dedicated physics students from nearby Dickinson College also brought out the college's 10-inch Dobsonian to share with the public.

Outside under blue sky, Lambertson's 7th grade science teacher Mark Smeltz treated visitors to safe, telescope views of our nearest star, the Sun. Smeltz's filtered telescope revealed an orange globe

peppered with dark sunspots, while another telescope from TSA thrilled spectators with its dramatic views of solar flares extending up from the solar surface. Visitors also learned how to tell time by using the flagpole as a sundial. Those with a sweet tooth enjoyed S'mores, where the marshmallow, chocolate and graham cracker treat was "cooked" using a solar oven.

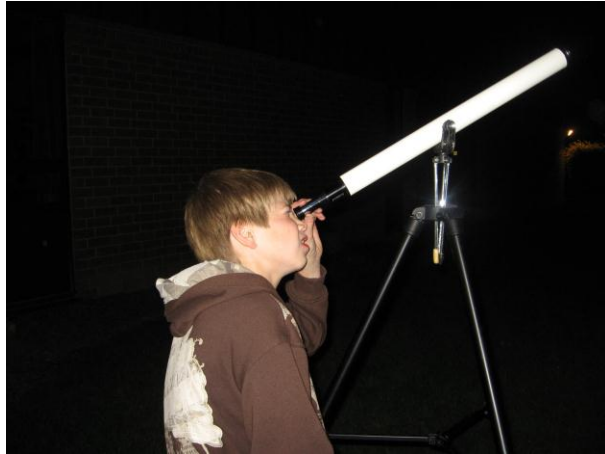
Lamberton Middle School also sported its own 7-foot reflecting telescope which was donated to the school in 2008. The 60-year old scope has a unique history and was constructed from Wisconsin lumber. The equatorial mount was made from the base of a windmill. Inside the Fendrich Planetarium, the public learned how to navigate the spring sky with some backyard astronomy tips narrated by librarian Stephanie Weimer and me during the afternoon and evening sessions.



Lamberton's Celestial Showpiece is a 60 year old 7-foot Reflecting Telescope that was donated to the school in 2008. Photo by Mark Brown.

Attendees also gazed over the free giveaways and abundance of door prizes donated by generous sponsors. Prizes included seven telescopes, a pair of binoculars, gift certificates and books. Brian Jarnagin, 7th grade student from Wilson Middle School, was the proud winner of the grand prize 4.5-inch reflecting telescope. The funny thing is Brian is my next door neighbor. I had nothing to do with drawing names out of

the box and calling out the winner. On every clear night so far, he has set the scope up in his driveway to look at Saturn and the Moon.



8th grade student Caleb Smith enjoys a view of the crescent moon through his modest refractor.  
Photo by Mark Brown.

For the evening portion of our Astronomy Day event, Mother Nature's evening clouds and rain shower retreated so telescopes could be set up in front of the school. As darkness fell and the clouds parted, visitors once again returned to the school from 8 to 10:30pm and were "wowed" by views of the crescent Moon, Saturn, double stars and a few bright deep-sky star clusters. Visitors anxiously awaited their place in line as no less than seven telescopes took center-stage capturing distant photons from the cosmos.

Mr. Todd Shirley, Wilson Middle School Counselor commented, "Each student that participated had a curious look on his or her face....I even sat on my back porch Saturday night with a new appreciation for the night sky. Until Saturday, I had never seen an event hosted by a school that brought in preschoolers and grandparents."

National Astronomy Day was born in 1973 with the sole purpose of "Bringing Astronomy to the People". Lambertson's celebration not only reinforced that idea, but brought awareness, inspiration and education related to astronomy in hopes of

stretching one's mind toward science. Without the help of our parents, students, teachers and members of the TriState Astronomers who volunteered their time on Saturday, Astronomy Day 2011 would not have been a success.

Before fully disassembling and recycling the Fendrich Planetarium, it was used the following week to show Lambertson's 6th, 7th and 8th grade students the evening sky. The students were encouraged to go home and put away their texting devices and other electronic gadgets during the evening. Rather than looking down, they should take a few minutes to look up and see what our night sky has to offer.

Although Ed Cunniss was not able to attend this year's event, he has vowed to make every effort possible to participate in next year's River Bend "East" Astronomy Day event. We look forward to making River Bend Astronomy Club truly a national club that extends across borders! [RBAC](#)

## Member Volunteer Needed to Host RBAC Christmas Star Party on December 3

By Bill Breeden

It's hard to think about Christmas in the summertime, but we need to plan our annual Christmas Star Party ahead of time to get information out to all River Bend Astronomy Club members. If you would like to host the Christmas Star Party, please post a message to the RBAC Yahoo! Group , or give me a call at 314-752-2020. Dark skies are optional but certainly welcome!

We usually get together for observing and just enjoying good conversation. Feeding everyone is not expected - we usually have a pot-lock, and everyone brings food and soft drinks to share! [RBAC](#)

## Space Shuttle *Endeavor* and ISS Fly-Over

By Mark Brown

Here are a few images of *Endeavour* and ISS taken the morning of May 30, 2011. This as you know was the last time to see the two flying so close together.

These images were taken at 4:49am EDT from my home here in Carlisle, PA. Endeavour had undocked from ISS about four hours prior and had initiated one final separation burn. At the time these images were taken, the two craft were just over 3-miles apart. As they trekked across the sky, their separation was comparable to that of Mizar and Alcor in Ursa Major.

Image Details: Canon EOS 550D, lens 28-55mm at 35mm, ISO 400 @ f/4.5, 15 second exposure.

Quite a fitting sight and Memorial Day tribute. [RBAC](#)



Space Shuttle Endeavor and ISS Fly-Over.  
Photo by Mark Brown.



Space Shuttle Endeavor and ISS Fly-Over.  
Photo by Mark Brown.



Space Shuttle Endeavor and ISS Fly-Over.  
Photo by Mark Brown.



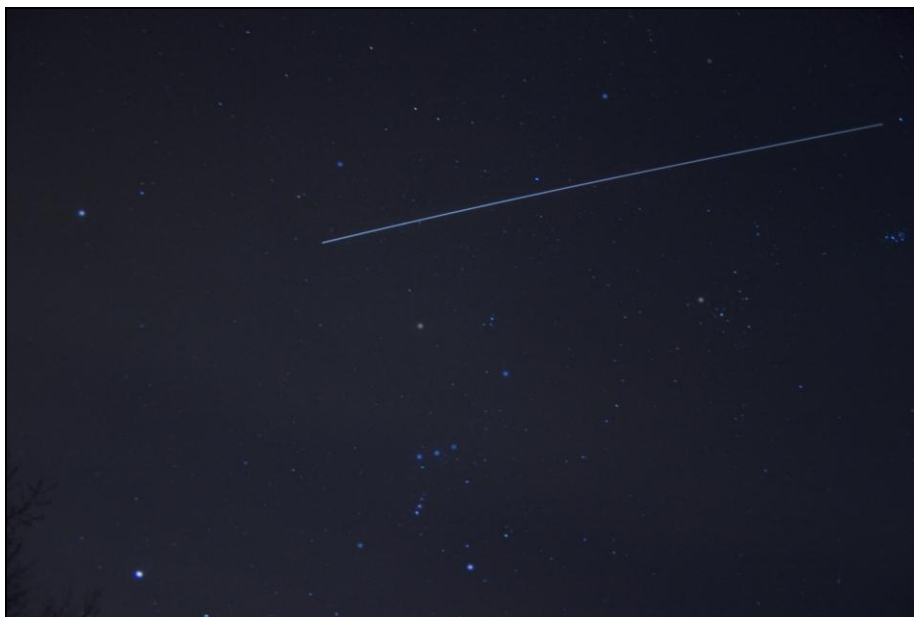
## Space Shuttle *Discovery* Fly-Over

By Mark Brown

This was *Discovery's* final pass that I captured during the evening hours of March 8, 2011. *Discovery* had significantly

separated from ISS and I was not able to image them together.

The first image shows the shuttle rising over a church, and then moments later passing the stars of Orion (second image). The moon was a waxing crescent in the first image. RBAC



Photos by Mark Brown.



## Finding Planets among the Stars

by Dr. Tony Phillips

Strange but true: When it comes to finding new extra-solar planets, or exoplanets, stars can be an incredible nuisance.

It's a matter of luminosity. Stars are bright, but their planets are not. Indeed, when an astronomer peers across light years to find a distant Earth-like world, what he often finds instead is an annoying glare. The light of the star itself makes the star's dim planetary system nearly impossible to see.

Talk about frustration! How would you like to be an astronomer who's constantly vexed by stars? Fortunately, there may be a solution. It comes from NASA's Galaxy Evolution Explorer, an ultraviolet space telescope orbiting Earth since 2003. In a new study, researchers say the Galaxy Evolution Explorer is able to pinpoint dim stars that might not badly outshine their own planets.

"We've discovered a new technique of using ultraviolet light to search for young, low-mass stars near the Earth," said David Rodriguez, a graduate student of astronomy at UCLA, and the study's lead author. "These M-class stars, also known as red dwarfs, make excellent targets for future direct imaging of exoplanets."

Young red dwarfs produce a telltale glow in the ultraviolet part of the electromagnetic spectrum that Galaxy Evolution Explorer can sense. Because dwarf stars are so numerous—as a class, they account for more than two-thirds of the stars in the galaxy—astronomers could reap a rich bounty of targets.

In many ways, these stars represent a best-case scenario for planet hunting. They are close and in clear lines-of-sight, which generally makes viewing easier. Their low mass means they are dimmer than

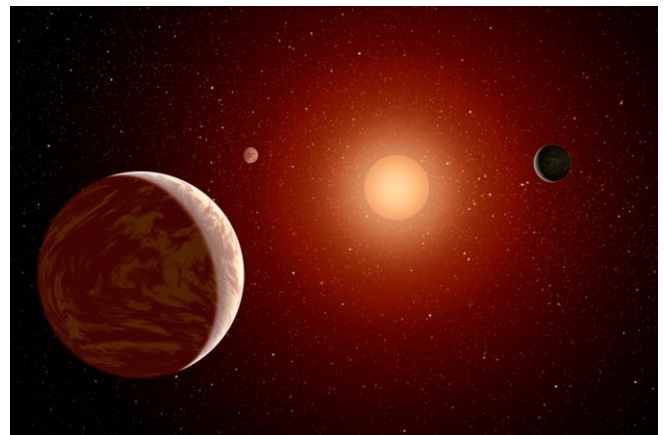
heavier stars, so their light is less likely to mask the feeble light of a planet. And because they are young, their planets are freshly formed, and thus warmer and brighter than older planetary bodies.

Astronomers know of more than five hundred distant planets, but very few have actually been seen. Many exoplanets are detected indirectly by means of their "wobbles"—the gravitational tugs they exert on their central stars. Some are found when they transit the parent star, momentarily dimming the glare, but not dimming it enough to reveal the planet itself.

The new Galaxy Evolution Explorer technique might eventually lead to planets that can be seen directly. That would be good because, as Rodriguez points out, "seeing is believing."

And it just might make astronomers feel a little better about the stars.

The Galaxy Evolution Explorer Web site at <http://www.galex.caltech.edu> describes many of the other discoveries and accomplishments of this mission. And for kids, how do astronomers know how far away a star or galaxy is? Play "How Old do I Look" on The Space Place at <http://spaceplace.nasa.gov/whats-older> and find out!



Exoplanets are easier to see directly when their star is a dim, red dwarf.

*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.



### July Observing List

Prepared by Bill Breeden

#### Double Stars

- \_\_\_\_\_ 16 / 17 Draconis SAO 30012 Const. DRA Type DS RA  
16 36.2 Decl. +52° 55' Mag. 5.4 6.4 5.5  
\_\_\_\_\_ 36 Ophiuchi SAO 185199 - Const. OPH Type DS RA 17  
15.3 Decl. -26° 36' Mag. 5.1 5.1  
\_\_\_\_\_ Alpha Herculis SAO 102680 Rasalgethi Const. HER

Type DS RA 17 14.6 Decl. +14° 23' Mag. 3.5 5.4

- \_\_\_\_\_ Beta Scorpii SAO 159682 Graffias Const. SCO Type DS RA 16 05.4 Decl. -19° 48' Mag. 2.6 4.9  
\_\_\_\_\_ Delta Herculis SAO 84951 Sarin Const. HER Type DS RA 17 15.0 Decl. +24° 50' Mag. 3.1 8.2  
\_\_\_\_\_ Kappa Herculis SAO 101951 Const. HER Type DS RA 16 08.1 Decl. +17° 03' Mag. 5.3 6.5  
\_\_\_\_\_ Mu Draconis SAO 30239 - Const. DRA Type DS RA 17 05.3 Decl. +54° 28' Mag. 5.7 5.7  
\_\_\_\_\_ Nu Draconis SAO 30447 Kuma Const. DRA Type DS RA 17 32.2 Decl. +55° 11' Mag. 4.9 4.9  
\_\_\_\_\_ Nu Scorpii SAO 159763 Const. SCO Type DS RA 16 12.0 Decl. -19° 28' Mag. 4.3 6.4  
\_\_\_\_\_ Omicron Ophiuchi SAO 122387 - Const. OPH Type DS RA 17 18.0 Decl. -24° 17' Mag. 5.4 6.9  
\_\_\_\_\_ Psi Draconis SAO 8890 - Const. DRA Type DS RA 17 41.9 Decl. +72° 09' Mag. 4.9 6.1  
\_\_\_\_\_ Rho Herculis SAO 66000 Const. HER Type DS RA 17 23.7 Decl. +37° 09' Mag. 4.6 5.6  
\_\_\_\_\_ Sigma Coronae Borealis SAO 65165 Const. COB Type DS RA 16 14.7 Decl. +33° 52' Mag. 5.6 6.6  
\_\_\_\_\_ Struve 1999 SAO 159670 - Const. Type DS RA 16 04.4 Decl. -11° 27' Mag. 7.4 8.1  
\_\_\_\_\_ Xi Scorpii SAO 159665 - Const. SCO Type DS RA 16 04.4 Decl. -11° 22' Mag. 4.8 7.3

#### Messier Objects

- \_\_\_\_\_ M4 NGC6121 Const. SCO Type GC RA 16 23.6 Decl. -26 32 Mag. 6.4  
\_\_\_\_\_ M6 NGC6405 Const. SCO Type OC RA 17 40.1 Decl. -32 13 Mag. 5.3  
\_\_\_\_\_ M7 NGC6475 Const. SCO Type OC RA 17 53.9 Decl. -34 49 Mag. 4.1  
\_\_\_\_\_ M9 NGC6333 Const. OPH Type GC RA 17 19.2 Decl. -18 31 Mag. 7.3  
\_\_\_\_\_ M10 NGC6254 Const. OPH Type GC RA 16 57.1 Decl. -04 06 Mag. 6.7  
\_\_\_\_\_ M12 NGC6218 Const. OPH Type GC RA 16 47.2 Decl. -01 57 Mag. 6.6  
\_\_\_\_\_ M13 NGC6205 Great Hercules Cluster Const. HER Type GC RA 16 41.7 Decl. +36 28 Mag. 5.7  
\_\_\_\_\_ M14 NGC6402 Const. OPH Type GC RA 17 37.6 Decl. -03 15 Mag. 7.7  
\_\_\_\_\_ M19 NGC6273 Const. OPH Type GC RA 17 02.6 Decl. -26 16 Mag. 6.6  
\_\_\_\_\_ M23 NGC6494 Const. SGR Type OC RA 17 56.8 Decl. -19 01 Mag. 6.9  
\_\_\_\_\_ M62 NGC6266 Const. OPH Type GC RA 17 01.2 Decl. -30 07 Mag. 6.6  
\_\_\_\_\_ M80 NGC6093 Const. SCO Type GC RA 16 17.0 Decl. -22 59 Mag. 7.7  
\_\_\_\_\_ M92 NGC6341 Const. HER Type GC RA 17 17.1 Decl. +43 08 Mag. 6.5  
\_\_\_\_\_ M107 NGC6171 Const. OPH Type GC RA 16 32.5 Decl. -13 03 Mag. 9.2

#### Caldwell Objects

- \_\_\_\_\_ C006 NGC6543 Cat's Eye Nebula Const. DRA Type PN RA 17 58 36.00 Decl. +66 38 00.0 Mag. 8.8  
\_\_\_\_\_ C069 NGC6302 Bug Nebula Const. SCO Type PN RA 17 13 42.00 Decl. -37 06 00.0 Mag. 12.8  
\_\_\_\_\_ C075 NGC6124 Const. SCO Type OC RA 16 25 36.00 Decl. -40 40 00.0 Mag. 5.8  
\_\_\_\_\_ C076 NGC6231 Const. SCO Type OC RA 16 54 00.00 Decl. -41 48 00.0 Mag. 2.6  
\_\_\_\_\_ C081 NGC6352 Const. ARA Type GC RA 17 25 30.00 Decl. -48 25 00.0 Mag. 8.1  
\_\_\_\_\_ C082 NGC6193 Const. ARA Type OC RA 16 41 18.00 Decl. -48 46 00.0 Mag. 5.2  
\_\_\_\_\_ C086 NGC6397 Const. ARA Type GC RA 17 40 42.00 Decl. -53 40 00.0 Mag. 5.6  
\_\_\_\_\_ C089 NGC6067 S Norma Cluster Const. NOR Type OC RA 16 18 54.00 Decl. -57 54 00.0 Mag. 5.4  
\_\_\_\_\_ C095 NGC6025 Const. TRA Type OC RA 16 03 42.00 Decl. -60 30 00.0 Mag. 5.1  
\_\_\_\_\_ C107 NGC6101 Const. APS Type GC RA 16 25 48.00 Decl. -72 12 00.0 Mag. 9.3

#### Royal Astronomical Society of Canada Objects

- \_\_\_\_\_ RASC88 NGC6503 Const. DRA Type G-Sb RA 17 49.4 Decl. +70 09 Mag. 10.2  
 \_\_\_\_\_ RASC89 NGC6543 Cat's Eye Nebula Const. DRA Type PN RA 17 58.6 Decl. +66 38 Mag. 8.8  
 \_\_\_\_\_ RASC90 NGC6210 Const. HER Type PN RA 16 44.5 Decl. +23 49 Mag. 9.3  
 \_\_\_\_\_ RASC91 NGC6369 Const. OPH Type PN RA 17 29.3 Decl. -23 46 Mag. 10.4  
 \_\_\_\_\_ RASC102 NGC6445 Const. SGR Type PN RA 17 49.2 Decl. -20 01 Mag. 11.8



## August Observing List

Prepared by Bill Breeden

### Double Stars

- \_\_\_\_\_ 40 / 41 Draconis SAO 8994 Const. DRA Type DS RA 18  
 00.2 Decl. +80° 00' Mag. 5.7 6.1  
 \_\_\_\_\_ 57 Aquilae SAO 143898 - Const. AQL Type DS RA 19  
 54.6 Decl. -08° 14' Mag. 5.8 6.5  
 \_\_\_\_\_ 70 Ophiuchi SAO 123107 Const. OPH Type DS RA 18 05.5 Decl. +02° 30' Mag. 4.2 6.0  
 \_\_\_\_\_ 95 Herculis SAO 85647 Const. HER Type DS RA 18 01.5 Decl. +21° 36' Mag. 5.0 5.1  
 \_\_\_\_\_ Beta Cygni SAO 87301 Albireo Const. CYG Type DS RA 19 30.7 Decl. +27° 58' Mag. 3.1 5.1  
 \_\_\_\_\_ Beta Lyrae SAO 67451 Sheliak Const. LYR Type DS RA 18 50.1 Decl. +33° 22' Mag. 3.4 8.6  
 \_\_\_\_\_ Epsilon Lyrae SAO 67310 Double Double Const. LYR Type DS RA 18 44.3 Decl. +39° 40' Mag. 5.0 6.1  
 5.2 5.5  
 \_\_\_\_\_ Otto Struve 525 SAO 67566 Const. Type DS RA 18 54.9 Decl. +33° 58' Mag. 6.0 7.7  
 \_\_\_\_\_ Struve 2404 SAO 104170 - Const. Type DS RA 18 50.8 Decl. +10° 59' Mag. 6.9 8.1  
 \_\_\_\_\_ Theta Serpentis SAO 124068 Alya Const. SER Type DS RA 18 56.2 Decl. +04° 12' Mag. 4.5 5.4  
 \_\_\_\_\_ Zeta Lyrae SAO 67321 Const. LYR Type DS RA 18 44.8 Decl. +37° 36' Mag. 4.3 5.9

### Messier Objects

- \_\_\_\_\_ M8 NGC6523 Lagoon Nebula Const. SGR Type EN RA 18 03.8 Decl. -24 23 Mag. 6  
 \_\_\_\_\_ M11 NGC6705 Wild Duck Cluster Const. SCT Type OC RA 18 51.1 Decl. -06 16 Mag. 6.3  
 \_\_\_\_\_ M16 NGC6611 Eagle Nebula Const. SER Type OC RA 18 18.8 Decl. -13 47 Mag. 6.4  
 \_\_\_\_\_ M17 NGC6618 Swan Nebula Const. SGR Type EN RA 18 20.8 Decl. -16 11 Mag. 7.5  
 \_\_\_\_\_ M18 NGC6613 Const. SGR Type OC RA 18 19.9 Decl. -17 08 Mag. 7.5  
 \_\_\_\_\_ M20 NGC6514 Trifid Nebula Const. SGR Type EN RA 18 02.6 Decl. -23 02 Mag. 9  
 \_\_\_\_\_ M21 NGC6531 Const. SGR Type OC RA 18 04.6 Decl. -22 30 Mag. 6.5  
 \_\_\_\_\_ M22 NGC6656 Const. SGR Type GC RA 18 36.4 Decl. -23 54 Mag. 5.9  
 \_\_\_\_\_ M24 NGC>6603 Sagittarius Star Cloud Const. SGR Type RA 18 16.9 Decl. -18 29 Mag. 4.6  
 \_\_\_\_\_ M25 IC4725 Const. SGR Type OC RA 18 31.6 Decl. -19 15 Mag. 6.5  
 \_\_\_\_\_ M26 NGC6694 Const. SCT Type OC RA 18 45.2 Decl. -09 24 Mag. 9.3  
 \_\_\_\_\_ M27 NGC6853 Dumbbell Nebula Const. VUL Type PN RA 19 59.6 Decl. +22 43 Mag. 7.4  
 \_\_\_\_\_ M28 NGC6626 Const. SGR Type GC RA 18 24.5 Decl. -24 52 Mag. 7.3  
 \_\_\_\_\_ M54 NGC6715 Const. SGR Type GC RA 18 55.1 Decl. -30 29 Mag. 8  
 \_\_\_\_\_ M55 NGC6809 Const. SGR Type GC RA 19 40.0 Decl. -30 58 Mag. 5  
 \_\_\_\_\_ M56 NGC6779 Const. LYR Type GC RA 19 16.6 Decl. +30 11 Mag. 8.2  
 \_\_\_\_\_ M57 NGC6720 Ring Nebula Const. LYR Type PN RA 18 53.6 Decl. +33 02 Mag. 8.8  
 \_\_\_\_\_ M69 NGC6637 Const. SGR Type GC RA 18 31.4 Decl. -32 21 Mag. 8.9  
 \_\_\_\_\_ M70 NGC6681 Const. SGR Type GC RA 18 43.2 Decl. -32 18 Mag. 9.6  
 \_\_\_\_\_ M71 NGC6838 Const. SGE Type GC RA 19 53.8 Decl. +18 47 Mag. 9

### Caldwell Objects

- \_\_\_\_\_ C015 NGC6826 Blinking Planetary Const. CYG Type PN RA 19 44 48.00 Decl. +50 31 00.0 Mag. 9.8  
 \_\_\_\_\_ C057 NGC6822 Barnard's Galaxy Const. SGR Type IG RA 19 44 54.00 Decl. -14 48 00.0 Mag. 9.3  
 \_\_\_\_\_ C068 NGC6729 R CrA Nebula Const. CRA Type BN RA 19 01 54.00 Decl. -36 57 00.0 Mag. 9.7  
 \_\_\_\_\_ C078 NGC6541 Const. CRA Type GC RA 18 08 00.00 Decl. -43 42 00.0 Mag. 6.6  
 \_\_\_\_\_ C093 NGC6752 Const. PAV Type GC RA 19 10 54.00 Decl. -59 59 00.0 Mag. 5.4  
 \_\_\_\_\_ C101 NGC6744 Const. PAV Type SG RA 19 09 48.00 Decl. -63 51 00.0 Mag. 9

Royal Astronomical Society of Canada Objects

_____	RASC92	NGC6572	Const. OPH	Type PN	RA 18 12.1	Decl. +06 51	Mag. 9
_____	RASC93	NGC6633	Const. OPH	Type OC	RA 18 27.7	Decl. +06 34	Mag. 4.6
_____	RASC94	NGC6712	Const. SCT	Type GC	RA 18 53.1	Decl. -08 42	Mag. 8.2
_____	RASC95	NGC6781	Const. AQL	Type PN	RA 19 18.4	Decl. +06 33	Mag. 11.8
_____	RASC96	NGC6819	Const. CYG	Type OC	RA 19 41.3	Decl. +40 11	Mag. 7.3
_____	RASC97	NGC6826	Const. CYG	Type PN	RA 19 44.8	Decl. +50 31	Mag. 9.8
_____	RASC103	NGC6520	Const. SGR	Type OC	RA 18 03.4	Decl. -27 54	Mag. 8.1
_____	RASC104	NGC6818	Const. SGR	Type PN	RA 19 44.0	Decl. -14 09	Mag. 9.9
_____	RASC105	NGC6802	Const. VUL	Type OC	RA 19 30.6	Decl. +20 16	Mag. 8.8



M17, the Swan Nebula in Sagittarius. It is 5,000 light-years away, and makes a great target for backyard telescopes. Photo taken April 10, 2011 using modified Canon T2i attached to an 8-cm refractor. Photo by Gary Kronk.