

A CELESTIAL SAFARI

The Elephant's Trunk nebula is a concentration of gas and dust in the star cluster IC 1396—located in the constellation Cepheus at a distance of 2,400 light-years. The bright rim of the trunk is the surface of a dense gas cloud that is being irradiated and ionized by a nearby star. The dark, sinuous elephant trunk is comprised of globules that are dense enough to protect themselves from the star's ultraviolet rays. Details: At the EGK dark site at Deer Trail, Darrell used a Honis-modified Canon 450 D camera with a Baader UV/IR Cut Filter on a C-11 telescope working at f/6.3. The data totaled 67 minutes.

Image © Darrell Dodge

Calendar

| | |
|---------|--------------------|
| 1..... | New moon |
| 8..... | First quarter moon |
| 15..... | Full moon |
| 22..... | Last quarter moon |
| 30..... | New moon |

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JULY SKIES

by Dennis Cochran

VESTA VEERS! Looking like a large baked potato in a computer model, this main-belt asteroid is cruising through our skies, specifically the summer zodiac constellation Capricorn (Cap) the Goat. Cap, you'll remember, is a v-shaped Cheshire-cat grin east of the Teapot in Sagittarius. Vesta will do its veering inside the left half of the "grin" and by August will be near its bottom. In July Vesta will be sliding down inside the left-bottom line parallel to Cap's Epsilon and Zeta stars. By August 30 it will be next to the Psi star. If you have a detailed star map of Capricorn, search that part of the sky with your scope for a new star that doesn't seem to belong: that will be Vesta. In August, NASA's Dawn spacecraft will visit the asteroid at the time of its opposition, when it will be magnitude 5.6 and possibly visible to the naked eye. Then that hunk of manmade

hardware will go on to visit Ceres in Cetus in September, 2015. The DAS will participate in the Dawn Mission's "Vesta Fiesta" in August. Updates will follow in full in the August *Observer* and more information can be found at http://dawn.jpl.nasa.gov/news/vesta_fiesta.asp.

Vesta was discovered by Heinrich Olbers in 1807; he had found Pallas five years earlier. He is also famous for Olber's Paradox: *If the universe is infinite, why isn't the sky completely bright with light from the surfaces of an infinite number of stars?* I don't remember the answer; look it up in a book about cosmology, or go to the Questions in Cosmology discussion group at Boulder Library, third Thursdays of the month at 7 P.M. And if you like problems arising from the notion of an infinite universe, these appear conspicuously in Brian Greene's latest book, the *Hidden Uni-*

Continued on Page 3

PRESIDENT'S CORNER

by Ron Pearson

Over the past few weeks, we've had a flurry of activity on two of our major projects in the DAS: the Brooks Observatory at our Edmund G. Kline Dark Site, and refurbishment of the Saegmuller mount of the 20-inch Clark in Chamberlin.

Quite a few of our DAS builders have been working hard since May and the long-anticipated Brooks Observatory building is now complete. We will install the telescope sometime in July and then have a celebration and dedication ceremony for this accomplishment. A lot of hard work also went into the disassembly and refurbishment of the mechanics of the 117-year old mount and its right ascension drive system, parts of which were patented by George Saegmuller. While most of the work was done by DU resources, DAS is paying a 50% cost share of this work which we hope will carry the historic telescope and its great views of the sky well into our 21st century. You might note that there are a lot

of names associated with these "things." They are the names of dedicated individuals that, although they are gone, their legacy lives on through us and the work of many in DAS and DU. You can take a bit of pride in association with the legacies of their work.

As I think I've written about before, I hope you see your membership in DAS as more than just a couple old guys playing with telescopes on the south lawn in Observatory Park or at some dark site. We are a society dedicated to sharing our love of Astronomy just as Alvan Clark, George Saegmuller, Humphrey Chamberlin and Herbert Howe did with the pioneers of Denver 117 years ago this month. For some of us, the sharing of amateur and professional astronomy allows growth which enhances our lives and careers.

The latest news from Carla Swartz-Johns in L.A., 20-inch Clark telescope operator, past VP and President of DAS, brings this home. After moving to L.A. and continuing her volunteer work at unpaid positions with Griffith Observatory and Mt. Wilson Observatory for several years, her experience and enthusiasm have landed her a "day job" at the Jet Propulsion Laboratory (JPL) in Pasadena! She thanks the DAS for the large part the club played in helping this dream come alive for her. She started out not knowing a lot of astronomy, but was an enthusiastic telescope operator on a PN Team and always wanted to learn and do more within the DAS. She is not the first, and I hope not the last to succeed due in part to our Society and associated good work of many members. We've had a number of fine student Van Nattan-Hansen Scholarship winners go on to professional roles in astronomy.

All this is to say, don't get stuck in one rut or one aspect of our society. We have many aspects and opportunities to network and learn with so many different people that contribute to the DAS. If you limit yourself to just coming to an occasional meeting, Open House or just hunting faint fuzzies at the dark sky site you are missing out on so much. You pay \$36 per year for your membership but many of you only participate in a fraction of what is available. I liken it to buying an expensive \$36 bottle of fine wine and then only drinking 1/3 or 1/4 of it and throwing the rest away. But that is your choice. All it takes is a bit of will to participate, to have another glass and savor all that vintage has to offer—an entire universe! Come to our Annual Picnic and Open House on the 9th and celebrate the 117-year fine vintage of Chamberlin Observatory. Then watch for the announcement in your email of the Brooks Observatory dedication ceremony. I hope you'll come celebrate the legacy of my friend Larry Brooks and raise a glass to all in the DAS who worked hard to make it live! *Clear Skies and "Keep Looking Up!"*

DAS SCHEDULE

JULY

- 1-3 EGK Dark Sky weekend
- 9 DAS Picnic (Begins at 4:00 P.M.) and Open House at Chamberlin (Begins at 8:30 P.M.) Saturn viewing!
- 15 DAS General Membership meeting (Begins at 7:30 P.M.). Speaker: Jamie Riggs: *Radioastronomy*
- 22 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 27-31 Weekend Under the Stars, Fox Park WY.
- 29-31 EGK Dark Sky weekend

AUGUST

- 6 Open House at Chamberlin Observatory (Begins at 8:30 P.M.) *Vesta Fiesta!*
- 12 DAS General Membership meeting (Begins at 7:30 P.M.). Speaker: Ben Wentworth: *Tactile Astronomy*
- 19 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 26-28 EGK Dark Sky weekend

Public nights are held at Chamberlin Observatory every Tuesday and Thursday evenings beginning at the following times:

March 9 - April 14 at 8:00 p.m.
 April 15 - September 1 at 8:30 p.m.
 September 2 - March 8 at 7:00 p.m.

Costs to non-members are: \$3.00 adults, \$2.00 children.

Please make reservations via our website (www.denverastro.org) or call (303) 871-5172.

Society Directory

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| Joe Gafford | Tim Pimentel |
| Chuck Habenicht | David Shouldice |
| Ron Hranac | Dan Wray |
| Ron Mickle, Past President | |
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The Executive Board conducts the business of the DAS at 7:30 p.m. at Chamberlin Observatory. Please see the Schedule of Events for meeting dates. All members are welcome.

www.denverastro.org

JULY SKIES (CONTINUED FROM PAGE 1)

verse which discusses the various multi-verse hypotheses pulled from the new bottomless grab-bag of the theoretical physics community.

The NASA spacecraft Messenger arrived at Mercury and has started sending us images. In fact this was already happening two months ago when we heard about it from Clark Chapman at our General Meeting (this month's GM is Friday the 15th). Big surprise: there are no canals on Mercury. Darn! See below for observing Mercury.

Terra, meanwhile, has survived the latest End O' the World Event. I would add a sarcastic remark but that is unnecessary: the whole business is its own joke. To celebrate our narrow escape, the DAS will hold Open House at Chamberlin Observatory on Saturday the 9th after the picnic.

Across the July zenith we find quite a parade. M13, the big globular cluster in Hercules that we spoke of last month, is closely followed by the small constellation Lyra that contains the bright star Vega at one end, and at the other, the Ring Nebula, (M57), the remnants of a star that looks as if it blew a smoke ring. Following Lyra is Cygnus, home of the North America and Pelican nebulae near the tail star, Deneb; the head star, called Albireo, is a colorful double. The Cygnus Loop, aka the Veil Nebula, which is a supernova remnant big enough to comprise four NGC numbers, is halfway out and bit in front of the southeastern wing of the bird, while the same distance out the other wing and a bit behind is NGC 6826, (the Blinking Nebula), a planetary nebula like the Ring. 52 Cygni in the western part of the Veil is an orange and blue double. The middle, or crossing star, Gamma, has the Butterfly and Crescent nebulae nearby, plus a faint cluster, M29. Finally the open star cluster M39 trails the swan east-northeast of Deneb.

We'll get to the rich southern sky next month. Locally, Saturn is already in the southwest by the time the sky is dark. On the sixth of this month, way in the dusky west, Mercury joins the swarm in the Beehive Cluster, M44 in Cancer. Jupiter rises at earlier times as the month progresses, but still too late for evening viewing, starting the month by rising at 2 A.M. and ending by rising at midnight. Another solar system event is the Delta Aquarid meteor shower that peaks on



IN THE WORDS OF SOL

Our parent sun has been behaving more like a normal star of late, releasing frequent CMEs and churning up spots from deep in its magnetic fields. David Wolf's superb solar image features prominences at the edge and plages on the surface. For size, picture 110 Earths lined up across the middle; now THAT'S a huge ball of plasma! David made this image on June 6, 2011 at his Chainlube Observatory in Englewood, CO. Equipment: He used a Canon 400D camera on a Coronado SolarMax II.

Image © David Wolf

the 30th. Its peak is spread out over a few days on either side of the 30th, but the hourly rate is slow, 15-20. Meanwhile, Mongo crashes into Neptune, wiping out Ming the Merciless and his murderous minions! Flash Gordon and Dr. Zarkov fly away in a shower of sparks despite having trouble getting

their spaceship started. Bad Things: Torrents of snowmelt may affect the observer this year, in addition to mosquitos from all of the water. So keep looking up—and occasionally down, bug spray in hand. Oh—Happy 100th Birthday to the AAVSO!

ABOUT THE DAS

Membership in the Denver Astronomical Society is open to anyone wishing to join. The DAS provides trained volunteers who host educational and public outreach events at the



University of Denver's Historic Chamberlin Observatory, which the DAS helped place on the National Register of Historic Places. First light at Chamberlin in 1894 was a public

night of viewing, a tradition the DAS has helped maintain since its founding in 1952.

The DAS is a long-time member in good standing of the **Astronomical League** and the **International Dark Sky Association**. The DAS' mission is to provide its members a forum for increasing and sharing their knowledge of astronomy, to promote astronomical education to the public, and to preserve Historic Chamberlin Observatory and its telescope in cooperation with the University of Denver.

The DAS is 501 (c)(3) tax-exempt corporation and has established three tax-deductible funds: the Van Nattan-Hansen Scholarship Fund, the DAS-General Fund and the Edmund G. Kline Dark Site Fund. To contribute, please see the bottom of the membership form for details (found on the DAS website: thedas.org).

More information about the DAS, its activities and the special tax-deductible funds is available on the DAS website at www.denverastro.org.

MARK YOUR CALENDARS FOR THE DAS PICNIC AND OPEN HOUSE!

Photo courtesy of Joe Gafford

We hope to see you at Chamberlin for the Annual DAS Members Potluck Picnic before the July 9th Chamberlin Open House. Bring your favorite picnic dish to share and a comfortable lawn chair. DAS

will provide catered Bar-B-Q meats and ice-cold drinks. The picnic begins at 4:00 P.M. and the Open House begins at 8:30 P.M.



FUN IN THE SUN AT THE DAS PICNIC!

Joe Gafford shot this great panorama photo of last year's DAS Potluck Picnic.

JULY SPEAKER: JAMIE RIGGS OF THE DEEP SPACE EXPLORATION SOCIETY

by Lisa Judd

Jamie Riggs has been with DSES since 2005 and has served as President since 2010. She began her professional career in

radiation physics relating to oncology, but moved into statistics as a mathematical science at Boeing. She holds three U.S. Patents for statistical methodologies and electronic devices. She has worked with NOAA's Forecast Systems Laboratory and is now with the University of Northern Colorado, Applied Statistics and Research Methods.

Jamie's astronomical research interests are concerned with real-time analysis of massive data sets for radio astronomy, primarily for transient detection but also to characterize periodic flux sources such as pulsars. Jamie collaborates on radio interferometer adaptive optics, intermediate mass star forming regions for Adler Planetarium, observer correction factors for relative sunspot numbers for AAVSO, and radioactive galactic nucleus evolution for NRAO. She also coordinates with the University of Colorado on satellite transmission signature characterization, and organizes the joint DSES/Front Range Community College Astronomy Night for public participation in optical and radio astronomy.



BROOKS OBSERVATORY UPDATE

by Darrell Dodge

On Saturday, May 28th, Craig Betzina delivered the 8-foot ExploraDome observatory kit to the E.G. Kline Dark Site. By the end of that day, a small team of DAS members had assembled the main structural members. The partly-finished building rode out the high winds that were raging all week, with a little assurance provided by some wire bracing. The next weekend, the building construction was completed and the polyethylene ExploraDome was lifted into place, adjusted, and locked in with a retaining ring. On June 11th, the 10-inch diameter steel pier was hauled to the site and the pier bolts were set in the concrete pier-base. The steel pier was set in place the next week.

As announced by Ron Pearson at the June 17th general meeting, installation of the Losmandy G11 equatorial mount and the 14-inch Celestron SCT will be done in July, after members return from the Rocky Mountain Star Stare and the Astronomical League Convention. A dedication ceremony for the completed Lawrence Brooks Observatory will be scheduled later in the summer.

DEDICATED WORKERS

The observatory construction crew on June 4th: (left to right): Darrell Dodge, Stuart Hutchins, Glenn Frank, Dan Wray, Ted Cox, and Joe Gafford.



WHAT AM I GOING TO OBSERVE TONIGHT?

by Mike Hotka

Photo courtesy of Mike Hotka

Have you ever asked yourself the question, “What am I going to observe tonight?” Even worse, did you ask yourself this question after your scope is set up and evening twilight is ending?

If you are working towards an Astronomical League observing club certificate, you will have the answer to this question. There are currently 111 Astronomical League members, active and past, who have completed 10 or more Observing Clubs to receive the Master Observer Observing Club certificate. Ten current Astronomical League members have received 20 or more Observing Club certificates, three of those with 30 or more certificates. The top Observing Club certificate holder has 36 Observing Club certificates to his name.

Why should you complete more Observing Club programs? I surveyed the top 10 certificate holders with a questionnaire sent to each, and the following relates how they answered.

When asked: What motivates you to start and complete so many Observing Club programs? For me, the motivation is that I like the hunt. Finding objects and actually seeing them. Brad Young (Astronomy Club of Tulsa) said, “The structure of the clubs allows me to plan, set goals, and feel accomplishment when I am finished.” Robert Pitt (Birmingham Astronomical Society) likes “. . . the challenge of the club requirements, which gives direction to my limited viewing opportunities.” Mike Ramirez (Northeast Florida Astronomical Society) said, “By starting with an Observing Club plan and setting goals to achieve that plan, I was able to keep going and complete the Observing Club.” Doug Brown (Minnesota Astronomical Society) indicates that “It’s a good structured way to observe. For me, if I don’t have a plan for observing, I tend to gab too much instead of observing.” Scott Krantz (Astronomical Society of Kansas City) said, “There’s never an evening sunset when I don’t know what I’ll be hunting down that coming night.” For Aaron Clevenson (North Houston Astronomy Club), “I want to see it all! The problem is there are thousands and thousands of things to see. Where do I begin? The Observing Club lists, obviously.” John Goar (Olympic Astronomical Society) said, “There is something exciting about hunting down a list of related objects.” Young replied, “Without the Observing Clubs I would be stuck in the mode of observing the same things over and over again.” For Krantz, “The Observing Clubs keeps me looking at new and off-the-beaten-track objects.”

When the top 10 certificate holders were asked: What Observing Club did you like the best? I liked the Lunar II Club. I had no idea you could see all kinds of subtle features on the lunar surface if the Sun angle was low enough. Shadows reveal a ton of lunar detail. Brown liked the Messier Observing Club, while Young preferred the Asteroid Club. Clevenson’s favorite Observing Club was the Planetary Observer’s. Ted Forte (Back Bay Amateur Astronomers) liked “. . . the Herschel 400 the best. The main reason is this club was best suited to my usual observing style. I liked the varied types of objects represented and the broad range of difficulty embodied in the objects.” Pitt likes all the Observing Clubs he has completed, while Ramirez liked “. . . two, one personal and one for the teacher in me. First, the personal club was Lunar I Club because I love to gaze back into time as to how Earth and other planets were formed. The second, which encompasses the first, is the Outreach Club, for I love sharing the lunar features with people and to see in their faces the awe that I see every time I look into the eyepiece.” Krantz liked the Globular Cluster club the best. For Goar, “The Comet Observers Club was my favorite.” Jim Ketchum’s (Astronomical Society of Kansas City) “. . . favorite was the Globular Cluster Club. It was relaxing, enjoyable and I’m partial to globular clusters.”

Most of these ten observers all started out by receiving their Messier Certificate first. Since then, they have kept on going, and by completing more and more Observing Clubs, these people have become seasoned ob-



KEEP LOOKING UP!

Great observing opportunities await those who love to hunt and find celestial treasure. Awards can be had to boot!

servers. Each Observing Club has something to teach you, whether you are more enlightened about the subject/objects or you learn new observing techniques to aid in your observing efforts.

When asked: What Club taught you the most? I replied, “The Open Cluster Observing Club. It taught me to make sure I have what I need in the field to find and observe faint objects. If I know I will be looking for faint objects, I will make sure I have a picture of the star field or other references to help me find the faint fuzzy I am looking for.” The Sunspotter Program taught Krantz “. . . the most about the observing subject. I learned to categorize sunspots and sunspot groups. I learned that there was a lot more to see on the Sun than just random dark spots.” This was also the case for Clevenson. He indicated “Although I know many things about many objects, I really found that I knew rather little about the Sun and its surface.” Forte, too, liked “The Sunspotter Club, without a doubt. I found myself rather well-versed in the particulars of the other clubs that I have done. Still, I was no stranger to the Sun, either, for I had been casually observing [it] for years. Doing the Sunspotter Club, however, opened up new questions for me and I became more interested in the mechanics of sunspots and the solar cycle. It made me a much bigger fan of our star.” Young replied, “The Earth-Orbiting Satellite Observing Club, although the Dark Nebula Club was a very close second, as [I] had ignored both before the clubs were announced.” Ketchum liked “. . . both the Lunar and the Lunar II, for they taught me so much about our closest neighbor. There is such a rich array of craters, mountains and plains that you can readily see and appreciate.” Goar was able to “. . . hone my star-hopping skills the most by completing the Herschel 400 Club. But just about every club taught me a unique skill, which I think is the most valuable thing about completing these programs.” Ramirez’s choice was the Messier Club, “. . . primarily because it was my first attempt to learn how to use charts and star-hopping techniques. It taught [me] to become proficient in navigating the night sky.” According to Pitt, “Both the Planetary Observer’s and Open Cluster Observing Clubs taught me the most about those objects. I liked the observing guides for these clubs and the descriptions of the characteristics to be documented. I appreciated the variety of these objects much more after

NASA'S SPACE PLACE

FINDING PLANETS AMONG THE STARS

A Space Place Partner Article
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.

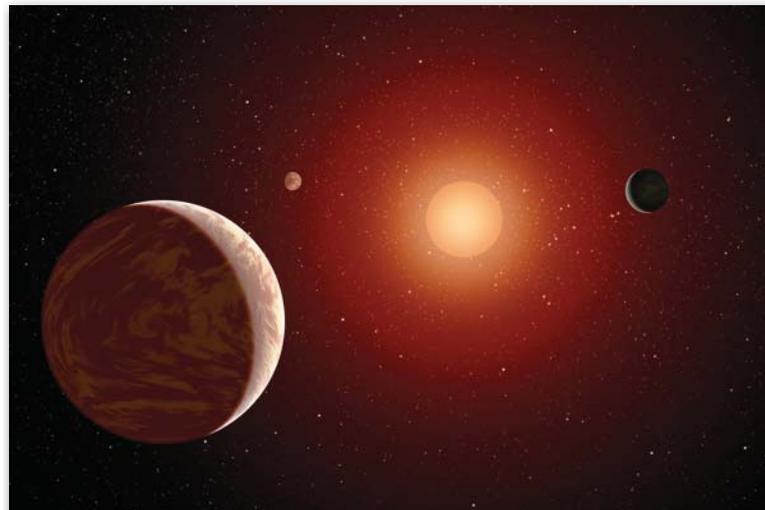
In many ways, these stars represent a best-case scenario for planet hunting. They are close and in

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.



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

Illustration courtesy of NASA/JPL.

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!

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

WHAT TO OBSERVE TONIGHT (CONTINUED FROM PAGE 5)

gaining a better understanding of the classical descriptors applied to these objects and learning what features to look for when comparing different examples."

Next, the top 10 were asked: What new techniques were learned while completing so many Club [programs]? For me, it was just being prepared for my observing session and making sure I have all the tools and references I need in the field to help me find faint objects. Forte's reply was, "Doing these clubs has made me a much more disciplined note taker and has encouraged me to sketch objects much more than I ever had before." Goar has "learned the sky well. I am able to star-hop with ease wherever I want to go." Ramirez, also, "learned how to use charts and star hopping techniques. I have become proficient in navigating the night sky." Ketchum "... learned how to read star maps, whether hard copies or on a computer screen, to be able to pinpoint the exact location of some of the really hard objects to see. I learned how to coax an object out of the dark sky by using averted-vision techniques. Both take lots of practice, but pay huge dividends." Clevenson has "perfected the techniques of finding faint fuzzies, and although I am no artist, I sketch everything. If you are not sketching, then you are missing much detail." Young said, "I have become more proficient at star-hopping, averted vision, sketching, eyepiece/filter selection, planning, and the tracking and predictions required for satel-

lites", but "most of all, I just have more confidence that I can see things that I might otherwise think too difficult." For Brown, it was "learning how to use equipment to its best advantage." Pitt learned that "Patience and planning are the most important techniques that I have learned, along with dealing with frustrations. Most objects will come around again next year if you miss them this year. Many of my observing skills, including patience, were dramatically improved with the experience gained from the different clubs." Krantz learned some valuable techniques he summarized as follows: "While hunting down faint and elusive objects, I learned scope-tapping to get some movement in the field of view. Move your eye around the desired object to find your averted-vision sweet spot. Use an eye patch on your non-observing eye and keep that eye open. Keep breathing! Without thinking about it, many times you'll hold your breath trying to find something. Use a detailed image or digitized sky survey image in conjunction with a chart. Never give up! If you can't see it tonight, try again tomorrow night."

The Astronomical League has many great Observing Club programs for you to complete. All the information about these Clubs is on the League's website. By looking at all the choices and picking those Clubs that you are interested in, you too will be on your way to becoming a Master Observer, and beyond.

NEW ASTRONOMER'S DEN

July, 2011

Familiar Shapes and Myriad Stars Inhabit "The Triangle"



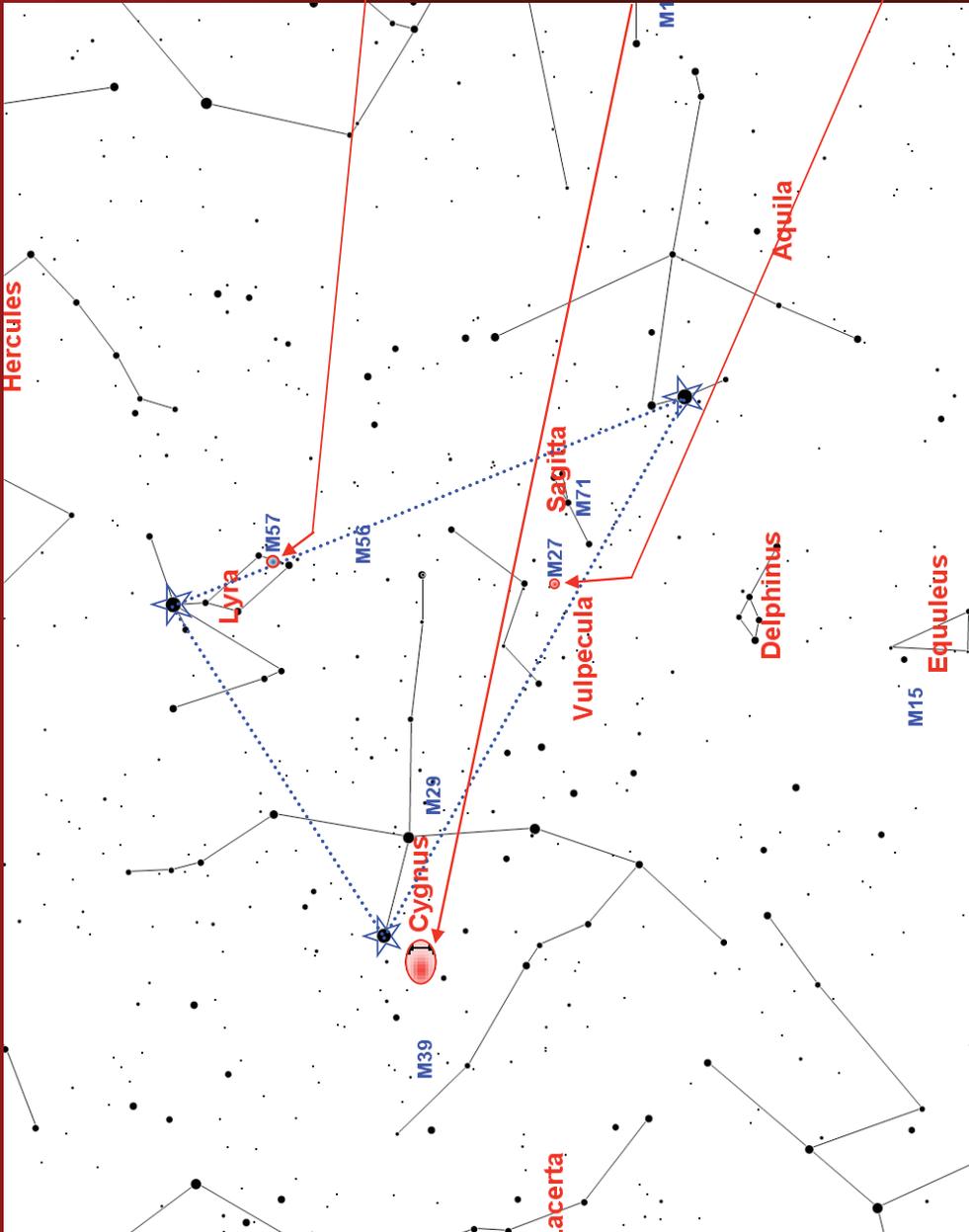
The smoky egg-shaped Ring Nebula (M-57) is actually our head-on view down a tube of stellar material blown off by the blue star at center as it collapses in death. Planetary nebula NGC 6720 lies 2,300 light years away.



In the tail of the Northern Cross, or Cygnus the Swan, lie two faint emission nebulae whose obvious shapes bestow their names: the North America Nebula and the Pelican Nebula (right). Together, the two cover an area of six times the size of the full Moon.



"Beauty in Death" best describes most planetary nebulae, and M-27, the Dumbbell, is certainly a testament to this. The largest-known white dwarf is the causal agent of this spectacle, glowing dimly from ~1350 lys.



East-northeast Sky — 9:00

Among the varied cultures of the world, there are 28 distinct interpretations of the patterns of stars in the heavens. Many of these shapes are obvious to western peoples, while others are mysteriously vague and unfamiliar. In modern times, the international star-gazing community recognizes a three-sided patch, appropriately called the 'Summer Triangle', anchored by the season's brightest globes: **Deneb**, in Cygnus the Swan, **Vega**, of Lyra the Harp, and **Altair**, in Aquila the Eagle. Ensnared within are entrancing clouds of radiating dust and remnants of stars in the throes of self-annihilation. Find your darkest skies and favorite nebula filter, and spend an hour exploring within the lines.



denverastro.org

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Star chart courtesy TheSky6 astronomy software suite. © 2011 Software Bisque

Answers To Last Month's Clusters Crossword Puzzle

Clusters crossword



In case you'd like to observe them.....

| | | |
|------------------------|-----------------|---------------------------------------|
| Jewel box | C94, NGC 4755 | RA, Dec: 12h 54m 2.3s, 60d 22m 29s S |
| Hercules cluster | M13, NGC 6205 | RA, Dec: 16h 41m 58.3s, 36d 27m 2s N |
| Coalsack cluster | C98, NGC 4609 | RA, Dec: 12h 42m 43.7s, 63d 0m 30s S |
| ET cluster /Owl | C13, NGC 457 | RA, Dec: 1h 19m 33.9s, 58d 22m 25s N |
| Beehive | M44, NGC 2632 | RA, Dec: 8h 40m 32.1s, 19d 57m 29s N |
| 37 cluster | NGC 2169 | RA, Dec: 6h 8m 49.7s, 13d 57m 3s N |
| Intergalactic Wanderer | C25, NGC 2419 | RA, Dec: 7h 38m 36.7s, 38d 52m 5s N |
| Omega Centauri | C80, NGC 5139 | RA, Dec: 13h 27m 14.7s, 47d 31m 23s S |
| Hyades | C41, Melotte 25 | RA, Dec: 4h 25m 54.0s, 17d 56m 45s N |
| Broccchi's Cluster | Coathanger | RA, Dec: 19h 25m 16.8s, 20d 9m 23s N |
| 47 Tucanae | C106, NGC 104 | RA, Dec: 0h 24m 27.6s, 72d 2m 28s S |
| Wild Duck Cluster | M11, NGC 6705 | RA, Dec: 18h 51m 30.2s, 6d 15m 35s S |
| Butterfly Cluster | M6, NGC 6405 | RA, Dec: 17h 40m 35.4s, 32d 13m 21s S |

CONGRATS!!

Congratulations to Bernie Poskus and Paul Scheele, who recently received their Messier Observing Club Certificates from the Astronomical League for viewing and documenting all 110 objects in the Messier Catalog using the star-hopping method.



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