The Denver
OBSERVER
NOVEMBER 2012

A STELLAR DUET

THE DOUBLE CLUSTER IN PERSEUS (NGC 869 AND NGC 884)

A favorite object for many star-gazers, the Double Cluster is easy to observe. Binoculars and small telescopes reveal their many stars. Due to the nature of the layout of the newsletter, much of Joe's image is lost after cropping. This spectacular result is a close-up mosaic of four images taken on October 31, 2008 at the EGK site. He used an SBIG ST-2000XM CCD camera on his 18-inch f/4.5 telescope. There are four separate frames of six minutes each of LRGB exposures with one-minute sub exposures binned 1x1.

Image © Joe Gafford

Calendar

6..... Last quarter moon
13.....New moon
20 .....First quarter moon
28.....Full moon,
.....Penumbral lunar eclipse (At moonset)

Inside the *Observer*

NOVEMBER SKIES

by Dennis Cochran

At three in the morning I awoke. The large window in my room at Moorlands House looked directly south across an immaculate lawn that featured the sculptured altarpiece of an old church, set up like a lawn ornament. Rumor has it that it was used in bizarre rites by the previous owner. From my window the sky was uncharacteristically clear and very dark. No towns or cities were in this wild part of southwestern England, on the edge of Dartmoor National Park. Orion floated over the trees, Sirius peeked above the horizon and a little higher, the "vee" of Taurus the Bull. It was a still, picture-perfect observing moment and I had no telescope. Jupiter approached the bull from the east, then later came Venus. The Herschels must have treasured nights like this. In fact I've often wondered how they could have accomplished all of the observing they did, in England, of all places. They must have rushed out to the telescope every time a sucker hole came by!

That same Jupiter will be rising earlier this month, about two hours after sunset, making it a late evening phenomenon. On Monday the 26th, Venus visits Saturn in the pre-dawn sky. Mars is a sunset dropper. Then . . .

Aieeah! Meteors will rain down like, well, rain. Get out the helmets and body armor! First come the Northern Taurids on Monday the 12th, with a possible rich event during the dark of the moon. This group is spread out and may start as early as October 20th and last into early December. Hardly have we put away our armor before the Leonid Meteors arrive on Saturday the 17th—they may mingle with laggard Taurids. Leonids are also spread out across almost the entire month. They are the spawn of comet Temple-Tuttle, and this year they are not expected to be a huge deal, but may show a double

Continued on Page 3

PRESIDENT'S CORNER

by Ron Pearson

Thanks to the many DAS members who volunteered and participated in our Colorado Astronomy Day activities at the Denver Museum of Nature & Science (DMNS) and Chamberlin Observatory. Despite some clouds that hid the sun for many hours, we had a great time at the DMNS. From our telescopes we were even able to watch the activity on top of Mt. Evans to replace the destroyed dome on Meyer Womble Observatory with a new one. This was the first time I remember in many years of DMNS solar observing events that we did not have a sun to view for most of the day!

We continue to struggle with some outreach activities such as filling requests for elementary school programs, and our showing of the film *The City Dark* for members and the public. We spent extra money for advertising and had hoped for much better attendance. But we welcomed the very interested and engaged audience who did see this film about what we have lost due to light pollution. Denver area schools have returned astronomy and the solar system to their elementary grade curriculums and we have had several requests to help them, but we have been able to fill only one at this time.

Our Annual DAS Scholarship auction was a success as we raised nearly $1,700 for the Van Nattan Hansen Scholarship Fund in one afternoon last week. This was possible primarily by auctioning several telescopes and items that have been donated to the DAS over the past few years. We hope to sell a few more items in the coming weeks on the astro-classified websites and we'll likely raise $2,000 for the scholarship fund this year. Thanks to all who participated, donated and helped out with the auction! We also auctioned some astro-items from the estate of Fran Ohmer who was one of the founders of the DAS more than 60 years ago. We will soon be accepting his 16-inch f/7 Newtonian telescope into our stable of DAS telescopes. Fran and you are "paying it forward" to future students of astronomy and the physical sciences.

Other on-going activities and improvements are being carried out behind the scenes by several DAS volunteers. These include a new laptop and pc upgrades for Public Night presentations, networking and image displays in Chamberlin Observatory. There is new flooring in the Brooks Observatory and repairs to the warming hut siding. There will soon be a new display of clocks and astronomy time on the 20-inch Clark-Saegmueller telescope. Our thanks go to Scott, Dan and Tim for all their work on these improvements! DAS is run by and grows by its many volunteers. What gets done or improved happens because you or someone next to you takes an interest and steps up to do what you or they think is most important. You are the ones providing opportunities for others to share your love of astronomy, or to enjoy a telescope or just look up at the sky—this is the credo of the DAS. *Keep looking up!*

DAS members gather on the lawn outside of DU's Historic Chamberlin Observatory for Colorado Astronomy Day, 2012. ***Photo by Ron Pearson***

DAS SCHEDULE

NOVEMBER

2 General Membership Meeting at D.U.'s Olin Hall: Members Show 'n Tell (Begins at 7:30 P.M.)
4 Daylight Saving Time Ends
9 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
9-11 EGK Dark Sky weekend
11 Veterans Day
17 Open House at Chamberlin Observatory (Begins at 6:00 P.M.)
22 Thanksgiving (No Public Night)
28 Penumbral lunar eclipse (At moonset)

DECEMBER

1 DAS Holiday Potluck (See page 5).
7 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
8 Chanukah begins at sunset
14-16 EGK Dark Sky weekend
22 Open House at Chamberlin Observatory (Begins at 6:00 P.M.)
25 Christmas Day (No Public Night)

Public nights are held at Chamberlin Observatory every Tuesday and Thursday evenings beginning at the following times:
March 13 - April 14 at 8:00 P.M.
April 15 - August 31 at 8:30 P.M.
September 1 - September 30 at 8:00 P.M.
October 1 - March 10 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.

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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

NOVEMBER SKIES

(CONTINUED FROM PAGE 1)

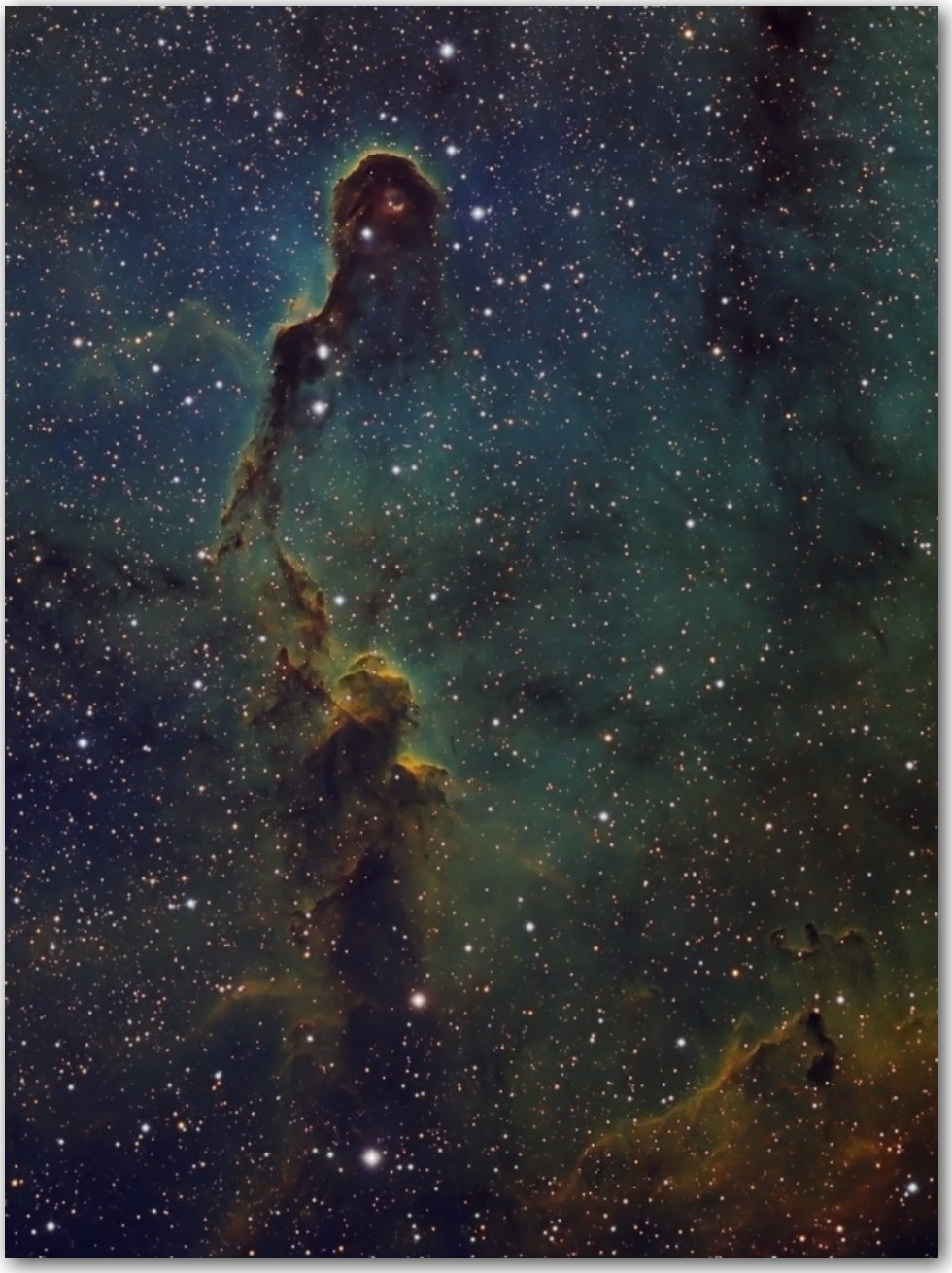
maximum. Guy Ottewell says, "Leonids approach the Earth nearly head-on, so are extremely swift, often bright and 50-70% of them leave persistent trains," (*Astronomical Calendar 2012*). Finally, on Wednesday the 21st we are visited by a minor meteor shower that produced a big, but short (30 minute) swarm in 1995 and will appear near midnight: the Alpha Monocerotids.

Perseus and Cassiopeia are just north of the zenith—we can look for the Double Cluster between these two (see front page photo), a bit closer to Perseus's pointy head. West of Cassiopeia is Cepheus. It harbors the deep-red star μ (mu) Cep, the Garnet Star, floating above the nebulosity of IC 1396 (photo at right), which is perhaps too faint to see but bright enough to image. Cepheus is a house-shaped constellation with its steeply-peaked roof pointing east of Polaris, and μ (mu) Cep is below the center of the bottom of the house. A line of two stars trickles out westward from the house's lower-right corner, and below these lie the galaxy NGC 6946 and the open cluster NGC 6939. Almost in the middle of the imperfectly-square box of the house is ξ (xi) Cep, the brightest star in that region, a see-able double. Lastly, if you were to ooze northwards from the peak of the roof towards Polaris, at 2/3 of the way you'd run into NGC 188, a star cluster thought to be one of the oldest of these stellar assemblies.

Trickling southward from the bottom-left corner of Cepheus's house is the head of Lacerta the Lizard. Just left of the topmost star, β (beta) Lac, of the little lozenge-shaped head is cluster NGC 7296. To the right of the lozenge's middle is cluster NGC 7243, and straight south of that a ways, paralleling the lizard's dangling body, is the smaller cluster NGC 7209. Then, if you can find the bottom star of this constellation at +39.5° declination, below-left of it about 1/3 of a lizard, in a lonely spot at +35°, 22^h 40^m right ascension (R.A.), is spiral galaxy NGC 7331.

A Bad Things note: it is said that if you go out onto the moor at midnight, you will be pursued by the Hound of the Baskervilles. This is especially a bummer if you are dragging a telescope around. Outside of the moor, however, the hideous hound is inoperable.

Good Things: as you observe, keep an eye out for Santa Claus and his flying entourage. They are said to be making practice runs this month!



FALL (HUBBLE PALETTE) COLORS—IC1396, THE ELEPHANT TRUNK NEBULA
Taken in September, 2012, Alan used his QSI 540wsg CCD Camera on a 7-inch Maksutov-Newtonian with an AP Mach1 mount, He imaged for 8 hrs OIII, 8 hrs SII and 4 hrs H-alpha. Wow! 20 hours! BRAVO, Alan! *Image © Alan Erickson*

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-exampt 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.

More information about DAS activities and membership benefits is available on the DAS website at *www.denverastro.org.*

OKIE-TEX WRAP-UP

by F. Jack Eastman
Photos by Joe Gafford

Once again the panhandle of Oklahoma beckoned me to the Okie-Tex star party (it was my fourth). I travelled the same path as last year. It was a pleasant trip, about six hours and just short of 350 miles. As last year, I arrived just in time for dinner, and after a great meal (Chicken and Beef Mexican Casseroles plus trimmings) I went off to set up my camp and telescopes. I set up the tripod for the 6-inch refractor and carefully aligned the polar axis, which paid off with more accurate tracking, particularly when observing double stars at high magnification. Other telescopes I took with me were the 6-inch f/4.8 Maksutov-Newtonian comet hunter, my very small 40mm Newtonian and an even smaller 23.5mm Newtonian, made many years ago by a good friend, Joe Meyers.

Telescopes at the event ranged from my tiny 23.5mm Newtonian to numerous large Dobsonian-mounted Newtonian reflectors in the 20- to 28-inch range, and at least one 30-inch! Globular clusters, in particular, are spectacular in these large instruments. Also represented were a few Apo refractors up to 175mm in aperture and, of course, Tim Havens' twin Takahashi 152 ED refractors. There was definitely an impressive array of telescopes.

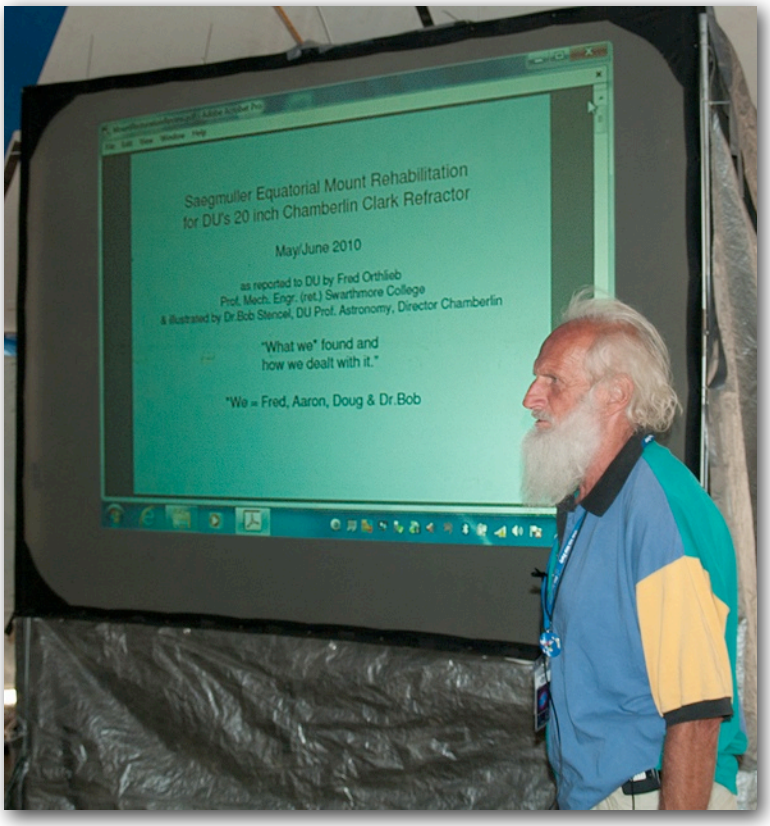
Attendance was estimated at around 343 people in total, including students from Norman North and Norman high schools, and Tulsa Community College.

The weather was hot and dry—near 100° during the day down to the high 40s and 50s for the first few nights. We had a rainy Wednesday night, then pleasant temperatures for the rest of the party. There was considerable smoke and haze on the way down and noticeable haze at the camp, but the skies were good. They weren't great, but good enough for very enjoyable exploration of the Milky Way, especially in Scorpius and Sagittarius. I'd give the sky a 3.5 on the Bortle dark sky scale, a subjective measure of sky darkness, (see *Sky & Telescope,* February, 2009).* Sky Quality Meter readings were on the average in the order of 21.2 to 21.35.

The party was the second week of September, about three weeks earlier than previous Okie-Tex star parties. This allowed early evening exploration of the Scorpius region, including NGC 6144 (See the Denver *Observer* May 2010, page 6). On Sunday I set up the rest of the 6-inch refractor and, with its 75mm "comet" eyepiece (31X, 1.2 degrees on the sky) the Scorpius/Sagittarius Milky Way, Andromeda Galaxy and friends (I was also able to see M31, M32, M33 and M110 in the 40mm Newtonian!) were spectacular. There had been no chance to see them at home in Colorado with all the smoke from the wildfires in the northwest.

DAS vice president Lisa Judd shows off her 6-inch telescope.

The seeing was rather good, allowing the splitting of a few close double stars. One of our (DAS) members mentioned that ξ (xi) Sco and Struve 1999 was a nice "double-double," so I set out to find it. After several false starts (wrong Greek letter, wrong constellation) I did find this intriguing object: a pair of rather easy doubles, separated by 4.7 arc minutes. Struve's separation is about 11 arc seconds and that of ξ (xi) AC is 7.9 arc seconds. The brightest component of ξ (xi) (A) is itself a close double at a current AB separation of just 0.99 arc second. It was easily split in the 6-inch Clark refractor at 189X, as was ζ (zeta) Aqr at a separation of 2.2 arc seconds. The Milky Way was fun to explore, using the Comet Hunter with its 20mm 100-degree eyepiece (2.8 degree real field) as was looking at M31 and friends, M33 and the Helix Nebula in Aquarius. Both M33 and the Helix are large and faint, low surface brightness therefore requiring low magnifications. Even so, the Helix showed some structure in Cody Lawson's (from Tulsa) 12.5-inch Newtonian. As the night drew to a close, the Zodiacal Light became very prominent in the pre-dawn sky.



Jack Eastman gave a talk about the mount restoration of Chamberlin Observatory's 20-inch Saegmuller.

I brought the bicycle. My intention was to make a ride north to the Colorado state line, and another west to the New Mexico line, but it was too hot for comfortable rides. I only got a quarter of a mile, and that was to the main hall to get it out of Wednesday's rain. Rain? Yes, after four hot days and uninterrupted observing, Wednesday's weather cooled off with a strong wind blowing hard enough to send one of the pink flamingo mascots of the Okie-Tex event away (the next day a wind from the opposite direction blew it back). A rescue was made and all was well once again!

Wednesday afternoon, as in parties past, the talks began. Mike Lockwood was to speak on Large Telescope Projects and have an optical Q and A session but he was unable to attend. Instead, Jim Edlin spoke of an extended star party/working session on spectroscopy held at the Haute Province Observatory in France. I was amazed at the quality of the work in this area done by amateurs with relatively modest equipment. Jim was followed by John Davis discussing the DSLR camera, its care and feeding for astrophotography with numerous fine examples of his work. That evening there was a great retrospective of the Apollo Moon program by Dan Schneider, who was deeply involved in many aspects of Apollo—a very, very interesting discussion, indeed. Then it was off for some well needed sleep as this was the wet and soggy night.

Thursday's talks began with Becky Ramotowski-Tijeras presenting a unique method for tracking the sun's path in the sky using tiny pinhole cameras, made from 35mm film cans and similar small containers, with photographic print paper as the detector. No film development is needed as the path is "burned in" on the raw paper. The image is then preserved by scanning it into a computer before it fades due to ambient light. Tom Hoffelder then spoke of his experiences doing "Messier Marathons." He was followed by Neta Apple with an update on some of the results from the Fermi Project, a sensitive Gamma Ray telescope already making astonishing discoveries in the area of high energy astrophysics. The second part of her presentation involved the search for other Earth-like planets. Then we went back out to the telescopes for more observing.

Friday, Jim Edlin was back, this time with a discussion of Amateur Supernovae Spectroscopy. Again, I am truly amazed by the quality of this work, something the professionals could only dream about in the not-so-distant past! Then, John Davis was back with a discussion of the making of mosaics—stitching together astrophotos for very wide views. Our own Joe Gafford had done this many years ago with film photos. Joe's Milky Way, from film photos, is truly spectacular. After John, it was my turn with a discussion of the overhaul of Chamberlin's Saegmuller mount of the 20-inch refractor.

The folks from the Cimarron Heritage Museum prepared the meals.

Tim Havens shows his binocular telescope to Bill Christian of Lumberton, TX.

The evening talk was our own Naomi Pequette's discussion of the results of Dr. Bob's research on the current eclipse of ϵ (epsilon) Aurigae, essentially the talk Dr. Bob presented at a DAS meeting several months ago.

Saturday's afternoon talk was a presentation by Don Wells of Boise City, OK., discussing the history of the dust bowl years in Oklahoma, the hardships suffered by the folks of the area during those trying times. It was a very interesting and informative history lesson from one who lived through it. That evening Gary Hug spoke about the role of the amateur in astrometry and photometry of small solar system objects, i.e., keeping track of asteroids, comets and the like. These are projects being done by, among others, our own Joe Gafford. The traditional swap meets were held Tuesday and Saturday with the usual array of equipment, books and such. This time I bought only a copy of Wil Tirion's *Sky Atlas 2000*. What!? No eyepieces? Not this time. The door prize drawings were held Thursday and Saturday evenings, and were over, unlike RTMC, before dark. Dano Black, the fellow who was doing the light pollution documentary last year won the Grand Prize—a 76mm ED refractor—but he wasn't there to collect it as he was off setting up his camp. Unfortunately for him, one must be present to win. All wasn't totally lost for his family, however—one of his kids won a Starblaster Dobsonian at Saturday's drawing.

All too soon, the star party was over and it was time to pack up and head northwest, back to Denver. All in all, the event was very pleasant and provided many of us a fun-filled week. I'm definitely hooked and will have at it again next year.

***Bortle scale:**

http://www.skyandtelescope.com/resources/darksky/3304011.html.

PARTY! PARTY! PARTY!

The Denver Astronomical Society would like to invite members to a **Holiday Potluck** at the **Columbine Universal Unitarian Church at 6724 South Webster Street** in Littleton on **Saturday, December 1st at 6:00 P.M.**

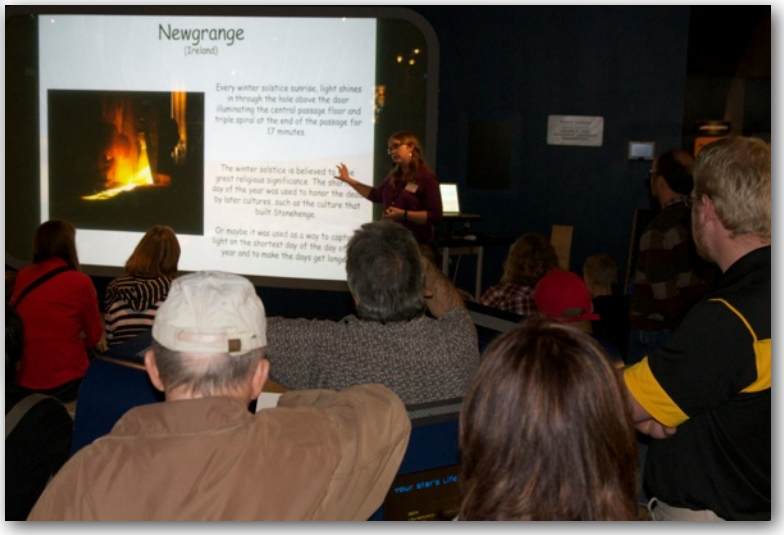
In the past we've gone out for a nice dinner, but to return to season's traditions, the event is free for the price of a dessert or side dish. Your humble club will provide the main feastables and drinks, beer and wine. Ho ho ho! Come and have some fun—your veep will be out of town until then, so any basic questions should be directed to David Shouldice at *holidaypotluck@denverastro.org*.

WELCOME DAS NEW MEMBERS!

Robert Acevedo	Edward Koh
Powell Brand	John Joseph Neimann
Wayne Brouillard	Edgar Reyes
David R. Catlin	Joseph Richardson
Bernd Christensen	James Ruf
Keith Dunaway	Timothy Sandsmark
Tim Flora	Gary Sutton
William Gillette	Halley Terry
Derek Keith	Bill Young

COLORADO ASTRONOMY DAY SUCCESS!

by Ron Pearson



IN PICTURES

Photos clockwise from the top: DAS members set up solar telescope viewing for museum goers at the DMNS on its west patio; DAS member Naomi Pequette gave a talk on Cultural Archaeoastronomy around the world in the Space Odyssey center at the DMNS; DAS member and U.S. Geological Survey physical scientist Neil Pearson gave a talk on Lunar Geology in the DMNS Space Odyssey theater and DAS member Norm Rosling demonstrates the principles of optics and telescopes to families at his table in the DMNS Space Odyssey. Bravo, members, bravo!!

Photos by Ron Pearson

2012 AUCTION

The 2012 Annual DAS Scholarship Auction netted over $1,750 for the DAS Van Nattan-Hansen Scholarship Fund. At right, auctioneer Ivan Geisler takes bids for a C-8 Classic telescope at Historic Chamberlin Observatory. A number of items from the estate of DAS founder Fran Ohmer were sold during this auction.

iPhone photo by Ron Pearson

NASA'S *SPACE PLACE*

A COSMIC TEASE: TRIALS OF THE HERSCHEL SPACE TELESCOPE SCIENCE TEAMS

A Space Place Partner Article
by Dr. Marc J. Kuchner

Vast fields of marble-sized chunks of ice and rock spun slowly in the darkness this week, and I sat in the back of a grey conference room with white plastic tables spread with papers and laptops. I was sitting in on a meeting of an international team of astronomers gathered to analyze data from the Herschel Infrared Observatory. This telescope, sometimes just called Herschel, orbits the Sun about a million miles from the Earth.

The meeting began with dinner at Karl's house. Karl charred chorizo on the backyard grill while the airplanes dribbled into Dulles airport. Our colleagues arrived, jet-lagged and yawning, from Germany, Sweden, and Spain, and we sat on Karl's couches catching up on the latest gossip. The unemployment level in Spain is about twenty percent, so research funding there is hard to come by these days. That's not nice to hear. But it cheered us up to be with old friends.

The meeting commenced the next morning, as the vast fields of ice and rock continued to spin—shards glinting in the starlight. Or maybe they didn't. Maybe they didn't exist at all.

You see, this team is looking at a series of images of stars taken by a device called a bolometer that is blind to ordinary starlight. Instead, the bolometer inside Herschel senses infrared light, a kind of light that we would probably refer to as heat if we could feel it. But the idea of pointing the bolometer at the stars was not to collect ordinary starlight. It was to measure heat coming from the vicinity of these stars, like an infrared security camera, in case there was something else to be found lurking nearby.

And lo and behold, for a handful of stars, the bolometer measurements were off the charts! Maybe something was orbiting these stars. From the details of the bolometer readings—which channels lit up and so on—you would guess that this stuff took the form of majestic fields or rings of icy and rocky particles. It would be a new kind of disk, a discovery worth writing home to Madrid about.

There are several teams of astronomers analyzing data from the Herschel Space Telescope. They call themselves by oddly inappropriate sounding acronyms: GASPS, DUNES, DEBRIS. For the time being, the scientists on these teams are the only ones with access to the Herschel data. But in January, all the data these teams are working on will suddenly be released to the public. So they are all under pressure to finish their work by then. The team whose meeting I was sitting in on would like to publish a paper about the new disks by then.

But it's not so simple. The stars that this team had measured were relatively nearby as stars go, less than a few hundred light years. But the universe is big, and full of galaxies of all kinds—a sea of galaxies starting from maybe a hundred thousand light years away, and stretching on and on. Maybe one of those background galaxies was lined up with each of the stars that had lit up the bolometer—fooling us into thinking they were seeing disks around these stars.

Samuel Pierpoint Langley, who developed the bolometer in 1878. His instrument detects a broad range of infrared wavelengths, sensitive to differences in temperature of one hundred-thousandth of a degree Celsius (0.00001 C). In 1961, Frank Low developed the germanium bolometer, which is hundreds of times more sensitive than previous detectors and capable of detecting far-infrared radiation.

The team argued and paced, and then broke for lunch. We marched to the cafeteria through the rain. Meanwhile, vast fields of marble-sized chunks of ice and rock spun slowly in the darkness. Or maybe they didn't.

What else did Herschel recently uncover? Find out at *http://spaceplace.nasa.gov/comet-ocean.*

Dr. Marc J. Kuchner is an astrophysicist at the Exoplanets and Stellar Astrophysics Laboratory at NASA's Goddard Space Flight Center. NASA's Astrophysics Division works on big questions about the origin and evolution of the universe, galaxies, and planetary systems. Explore more at http://www.science.nasa.gov/astrophysics/.

THE IRIS NEBULA IN CEPHEUS

Also known as Caldwell 4, the Iris Nebula is created by the reflection of short-wavelength blue light generated by a 7th magnitude star off dust particles in a dense molecular cloud. The designation NGC 7023 refers to the star cluster within the nebula LBN 487. The nebula is about 1,300 light-years away, and is six light-years across. It was acquired September 15th, 2012 at the DAS EGK Dark Site using a Canon 450D DSLR through an AstroTech AT8IN 8-inch 4/f Newtonian. Twenty-six RGB sub-frames totaling 120 minutes were stacked and calibrated with Nebulosity 2.5 and processed with PhotoShop CS5.

Image © Darrell Dodge

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