

OBSERVER

PHOTO OPPS GALORE—GEAR UP!!

SISTER GALAXY—THE ANDROMEDA GALAXY (M31 OR NGC 224)

The Andromeda galaxy is one of the closest galaxies to our own. At only 2.5 million light-years away, it spans about 170 arc-minutes of sky which is over three times the diameter of the moon! Although that distance in light years equates to 393,121,310,400,000,000 km, it is still close enough to see in incredible detail. Because of its close proximity, Andromeda is fairly easy to image because it is bright enough to capture in short exposures. The images that comprise this image were taken on November 1, 2008 at the CSAS site near Gardner, CO. with a Canon EOS Digital Rebel XTi using a Canon 200 mm f/4L lens riding atop a Meade 10-inch LX200GPS on an equatorial wedge. There are a total of 13 60-second images stacked together to render this image. Stacking and editing was accomplished using Images Plus.

Image © Scott Leach

Calendar

4.....	New moon
11.....	First quarter moon
18.....	Full moon
26.....	Last quarter moon

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OCTOBER SKIES

by Dennis Cochran

The Canadian astronomy magazine *Sky News* informs us that on October 11, there will be three—count 'em—three moon shadows on Jupiter. The last time this happened was in 2004. **Big photo op!** Clouds of flying saucers will swarm out of Ganymede and—uh, no. Not yet. But we'd better hurry up or there'll be nothing worth having on Earth for us to take. Species are dying off fast except for the prolific humanoids, who reproduce like insects but take up more room. Anyway, Callisto, Europa and Io will provide the shadows on the Big Guy. A repeat of the shadow show will occur Jan 23, 2015. Jupiter rises at about 10 P.M. at month's end, so you'll have to be up in the morning to see this shadow dance.

Did anybody get to see the Perseids in August besides Lisa? This month we get the Draconids

(from comet Giacobini-Zinner) on the 8th, then on the 10th we'll see the Southern Taurids (from comet Enke). On the 21st we'll be treated to the Orionids (from Halley). The latter swarm has a higher velocity than the other two. The moon is good for the first two but unfortunately, just past full for the Orionids.

Comet ISON may be a factor this early. It will be near Mars in the sky midmonth, both of them near Regulus in Leo.

Overhead, Cygnus flies through magnificent swaths of the Milky Way. Just north of overhead some players in the Andromeda story follow the swan: Cepheus the King and Cassiopeia the Queen. Just south of the zenith is the huge square of Pegasus, the Flying Horse, also an actor in some versions of the story, and springing from its upper left corner, the "spray," as I see it—two diverging lines of stars—

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PRESIDENT'S MESSAGE

by Ron Hranac

When I was a youngster in the late 1950s, my parents took me to our hometown's local airport where one of the community's amateur astronomers had set up a telescope for public viewing of a comet. What I remember the most is being amazed at how big the telescope seemed to be. The scope reminded me of a cannon, because it was nearly horizontal and probably aimed toward the west. Unfortunately, like many little kids trying to look through a telescope at a dim fuzzy object, I didn't see anything in the eyepiece.

I share this story because as amateur astronomers, we get a lot of "wow" factor from looking at dim fuzzies in our telescopes. But most dim fuzzies are generally not the best things to observe during public outreach events, especially since some members of the public expect Hubble-like views. You and I might see a distant galaxy or nebula, but most non-amateur astronomers see a grayish smudge: "Is that a fingerprint on the lens?"

Over the years I've compiled a list of objects that tend to get some "wow" factor from the general public. These objects are pretty ordinary to the seasoned observer, but they are altogether different to someone looking through a telescope for the first time. At the top of the list is the **Moon**. It's bright enough to be easy to see through the eyepiece, even for most kids.

Denver Astronomical Society open houses are held on the Saturday closest to the first quarter moon, which ensures great views of craters, mountains, and other features near the terminator. With a good lunar map handy and a little patience, it's sometimes possible to point out to the novice ob-

server the approximate location of the Apollo 11 landing site. But for the majority of folks, just seeing all of those craters for the first time makes for a big "wow."

Next on my list is **Saturn**, and it's all about the rings.

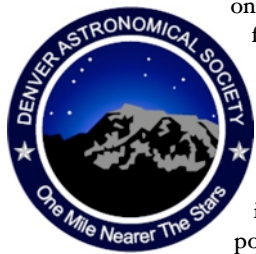
On more than one occasion some have asked if they were looking at the real thing or a picture.

Right behind Saturn on the list is **Jupiter**. Most people can spot the northern and southern equatorial belts, and they often get a kick out of seeing some or all of the Galilean moons. If the timing is right and the seeing cooperates, a shadow transit provides an opportunity to let folks know that tiny black dot is a shadow of one of Jupiter's moons.

Here are a few other goodies from my list in no particular order, largely because these objects provide good "wow" factor for some, and "um, ok" for others.



DAS President Ron "Mr. Wizard" Hranac getting ready for 2012's trick-or-treaters.



Continued on Page 6

DAS SCHEDULE

OCTOBER

- 4-6 EGK Dark Sky weekend
- 12 DAS Colorado Astronomy Day at Chamberlin Observatory (Details forthcoming!) and Open House (Open House begins at 6:30 P.M.)
- 19 DAS Auction (Setup begins at 11:00 A.M., 1:00 P.M. bidding)
- 25 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 31 Hallowe'en

NOVEMBER

- 1-3 EGK Dark Sky weekend
- 3 Daylight Saving Time Ends
- 9 Open House (Open House begins at 5:00 P.M.)
- 11 Veterans Day
- 15 General Membership Meeting at Olin Hall (Begins at 7:30 P.M.) Members Show-n-Tell
- 22 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 29-1 EGK Dark Sky weekend

Open House costs: If the skies are clear, \$2 per person (\$5/family), and \$1 per person in the event of inclement weather.

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

April 9 - October 1 at 8:30 P.M.

October 2 - April 8 at 7:30 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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|-----------------|-------------|
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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

OCTOBER SKIES

(CONTINUED FROM PAGE 1)

Andromeda herself. Cetus and Perseus, the other two in the Andromeda cast, come a bit later. Right below the Great Square is the circlet of Pisces the Fish. Some of us—and we're real snobs—remember when the word "fish" was both singular and plural, just like "deer." The head of the swan—or bottom of the Northern Cross—is the colorful double star Albireo. It's always good for public viewing because it's easy to find, doesn't need much magnification and has obvious colors, and demonstrates temperature differences in those colors. Albireo is surrounded by nebulosity for the imagers to try, and a faint cluster is just to the south. Farther south and a bit east, at $20^{\text{h}} 0^{\text{m}} +22^{\circ}$ is the famous Dumbbell Nebula, an over-viewed planetary nebula like the Ring Nebula in Lyra.

Back up in the bird, the dimmer η (eta) star marks the middle-neck, and below it is a hard-to-see planetary, NGC 6857, at $20^{\text{h}} 02^{\text{m}} +34^{\circ}$ —can you make it out? Farther down the swan at its body, the γ (gamma) star, we again have nebulosity surroundings and this time an open cluster to its south, M29. There is also a planetary nebula southwest of it: NGC 6881 at $20^{\text{h}} 12^{\text{m}} +38^{\circ}$. At the back of the bird is the α (alpha) star, Deneb, a member of the Summer Triangle. To its left at about $21^{\text{h}} 0^{\text{m}} +45^{\circ}$ is the North America-Pelican pair—a huge photogenic area of nebulosity. Last month we spoke of the Veil Nebula's circle straight south of these nebulae at about $+31^{\circ}$. Finishing the flight line of Cygnus, and trailing behind is the open cluster M39 at $21^{\text{h}} 30^{\text{m}} +49^{\circ}$. And yes, between it and Deneb is the planetary nebula NGC 7048 at $21^{\text{h}} 18^{\text{m}} +47^{\circ}$.

Yet another stellar blow-up is at IC 5117 at $21^{\text{h}} 35^{\text{m}} +45^{\circ}$. East and a bit south of M39 is the Cocoon Nebula, IC 5145, at $21^{\text{h}} 50^{\text{m}} +37.5^{\circ}$. But wait! There's another obscure planetary at the top of the chart I'm perusing:



DOUBLE CLUSTER IN PERSEUS

Visible with the naked eye as a hazy elongated patch between the left side of the "W" of Cassiopeia and the sword of Perseus, the famous double cluster is comprised of two relatively young (12.8 million years) and close (7,300 light-years) open clusters, both of which are blue-shifted because they are traveling toward the Earth. NGC 869 (on the left) is the more dense and NGC 884 has the more varied star colors. Darrell Dodge made this image on November 20th, 2011 using his Canon 450D and AstroTech AT8IN imaging Newtonian. A total of 25 90-second RGB images were stacked and processed with Nebulosity and CS2. The many different star-colors in these clusters make views through Newtonian telescopes especially fine.

Image © Darrell Dodge

NGC 7008 at $21^{\text{h}} 02^{\text{m}} +54^{\circ}$. Now for something a little different: way below the γ (gamma) star of Cygnus, through Vulpecula the Fox to just below the borders of Delphinus and Sagitta are yet two more planetaries, unknown and unloved: NGC 6905 and 6806, at $20^{\text{h}} 25^{\text{m}} +15^{\circ}$ and $20^{\text{h}} 15^{\text{m}} +20^{\circ}$. Finally, halfway back towards the γ (gamma) star at $20^{\text{h}} 18^{\text{m}} +30.5^{\circ}$ is NGC 6894. Phew! I'm planetaried out. Have fun with this! ★

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's 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.

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



PHOTOGRAPHING COMET ISON

by Roger N. Clark

Comet ISON (C/2012 S1) is scheduled to put on a spectacular show in the early morning skies this November and December. While we do not yet know how spectacular it will be, by all estimates it will be a very beautiful sight and can make for some stunning images. The comet should display a tail many degrees long, somewhere between 10 to more than 45 degrees depending on its performance after its close encounter with the sun, as well as your local sky conditions. Best views are expected to be in early December in the eastern skies before morning twilight starts, but in case it does not survive its closest approach to the sun, be sure to catch it in late November as it first approaches perihelion.

With this article, I'll explore some information on wider field night sky photography with digital cameras. Now is the time to refine your techniques with some night sky imaging. At times, the comet will be relatively low to the horizon so there is the opportunity to include horizon elements in the scene—a mountain peak or the comet's reflection in a lake. But including the night scene along with the night sky poses extreme challenges because while the sky is moving due to the rotating Earth, the landscape is static if you are using a fixed tripod (or the reverse if your camera is on a tracking mount).

Including both the landscape and sky in an image, called a nightscape, requires one of two methods. 1) Short exposure times so the relative motion between sky and land is minimized. One could make several short exposure times then align and add them in post processing. 2) Make two exposures—one that tracks the stars, and a second that's fixed for the land—then merge the two images together. Even this method requires short exposure times so the

image pair minimizes movements between the two exposures. 2a) This becomes even more difficult if one tries to also image a reflection of the night sky on a lake. The stars in the reflection are moving differently than in the sky, so if you want to track the stars in the sky, the reflection also needs to be tracked, but the rotation axis needs to be changed between sky and reflection. Changing polar alignment about a reflected celestial pole in the dark and completing it fast is indeed a challenge. It is simpler to just make short exposures so that tracking requirements are minimal to not needed. Ripples on the lake can mask star trails or tracking errors, but that also reduces the intensity of the reflection. I intend to try methods 1, 2 and 2a on the comet.

All of the previous issues, combined with digital camera technology, place some constraints on digital camera settings and lenses that one might use. Here, I'll explore some of these issues.

ISO

The first thing to remember is that ISO on a digital camera does not change sensitivity. Digital cameras, from small point-and-shoot (P&S), to pro DSLRs have one sensitivity, and all are pretty much equal with similar quantum efficiencies if made in the same era. Some P&S cameras have thinned, back side illuminated sensors, so are actually more sensitive than DSLRs. But P&S cameras have small lenses and it is the lens that gathers light (more below). ISO is a post sensor gain, and one needs to use a high enough ISO to boost the small signal from the sensor above the noise from downstream electronics. However, boosting ISO too much means reduced dynamic range and thus loss of colors in brighter stars. The optimum is usually in the range of ISO 800 to 3200, depending on the camera. More on optimum ISO settings can be found in my article on ISO at: <http://www.clarkvision.com/articles/iso/>.

PIXEL SIZE, SENSOR SIZE, SENSITIVITY AND F/RATIO MYTHS

Common myths in photography include pixel size, sensor size, and faster f /ratios (low f -number) mean greater sensitivity and more light. In fact, faster f /ratios deliver greater light density, but not necessarily total light from the subject. Most astronomers know that larger apertures show fainter stars in a telescope. Larger apertures deliver more light from the subject regardless of f /ratio and size of the object. Of course, for a given focal length, a faster f /ratio has a larger aperture diameter. **Table 1** shows the faintest star recorded with a typical modern digital camera. Similarly, the pixel and the sensor act simply like buckets to hold the light delivered by the lens. The lens aperture diameter is the key to collecting light.

CLEAR APERTURE IS THE KEY

The lens is what delivers the light and the larger the lens the more light that is delivered from the subject to the sensor. This is true regardless of f /ratio. The key to collecting the most light is a larger lens. For a given sensor and focal length, the field of view is also set. This, of course leads to the fastest lens for a given focal length. **See Table 1.**

LENSES

As comet ISON will likely appear many degrees across, wide angle lenses will probably be needed. Unfortunately wide angle lenses generally have poor star images when operated wide open. I do not recommend lenses shorter than about 24 mm focal length for nightscape photography. There are few such lenses faster than $f/2.8$, and they have tiny clear



Figure 1. The San Juan Mountains of Colorado. The light on the landscape is all natural and from the night sky: light from stars, the galaxy, and airglow. The sky background appears striped red and green from airglow, molecules in the Earth's atmosphere excited by solar ultraviolet radiation. Green airglow is caused by oxygen atoms. Roger used a Canon 1D Mark IV 16-megapixel digital camera with a 24 mm $f/1.4$ lens at $f/2$, ISO 1600. A combination of five exposures was made: three tracked one-minute exposures mosaicked for the sky, and two 2-minute exposures with fixed tripod, mosaicked for the landscape, then the sky and land combined. Tracking was accomplished with an Astro Trac Tracking mount.

Image © Roger Clark

Table 1

Lens Focal Length (mm)	f/ratio	Aperture Diameter (mm)	Exposure Time (seconds)	Zenith faintest star (magnitude)	Near horizon faintest star (magnitude)
15	2.8	5.4	30	9.7	8.1
24	1.4	17.1	30	12.2	10.7
24	2	12.0	30	11.4	9.9
28	2.8	10.0	30	11.0	9.5
35	1.4	25.0	30	13.0	11.5
35	2	17.5	30	12.2	10.7
50	1.4	35.7	30	13.8	12.3
50	2	25.0	30	13.0	11.5
100	2	50.0	30	14.5	13.0
200	2.8	71.4	30	15.3	13.8
300	2.8	107.1	30	16.2	14.6
300	4	75.1	30	15.4	13.9

Zenith Faintest star = 2.5*LOG (8.5 * Aperture diameter² * exposure time in seconds)
 Near Horizon Faintest Star ~ Zenith Faintest star - 1.5

apertures so will not gather much light (e.g. see the 15 mm lens entry in Table 1). It will be better to use f/2 or f/1.4 lenses in the 24 to 50 mm range. Clear apertures of at least 12 mm diameter will do a nice job of collecting light. In my recent experience with lenses, most f/1.4 lenses do not operate well at 1.4, but can be okay at f/2. The exception is the new Sigma 35 mm f/1.4 DG HSM lens (available in both Canon and Nikon mounts, maybe others). The Sigma 35 mm has better star images to the corners at f/1.4 than does my Canon 24 mm f/1.4 operating

at f/2. With an aperture diameter of 25 mm with the Sigma 35 mm f/1.4, versus 12 mm for a 24 mm lens at f/2, the Sigma would deliver four times the light from the subject in the same exposure than the 24 mm. The 35 mm f/1.4 will be my lens of choice for the comet. If the comet is larger than the field of view with this lens, I'll make a mosaic.

EXPOSURE TIMES

I have found that exposure times of one minute at f/2 work very well with a digital camera in dark skies. The land, however, requires longer, about two

minutes at f/2. Figure 1 (previous page) is an example nightscape produced at f/2 and one-minute sky exposures. Imagine a comet hanging in the sky (unfortunately, comet ISON, when it is brightest, will be far from the Milky Way). With the 35 mm f/1.4, one can produce better images with only 30-second exposures, and comparable images with only 15-second exposures.

PROCESSING

With modern digital cameras made after circa 2008, there is in-sensor dark current suppression. Thus, there is no need for dark frame subtraction. Modern raw converters, like ACR in Photoshop, include lens profile corrections, and correct light fall off and some aberrations. Also corrected are hot and stuck pixels. Read your camera's manual, but some cameras such as Canon, update the hot/dead/stuck pixel list when you enable sensor cleaning manually from the menu. Do that before major night photography sessions. There is no longer a need for dark subtraction or flat field calibration (with profiled lenses). Convert your raw images in the raw converter (e.g. ACR in Photoshop) with: exposure=zero, brightness=zero, blacks=zero, enable lens profile correction, check the remove chromatic aberration box, and set vignetting to 100%. In the image editor, do not use the levels tool as it will clip bright stars. I only use the curves tool, and I also keep the min and max at the default position except for the lower left point to remove a bright sky (moving the lower left point subtracts levels from the image data), but be careful not to clip the sky (it should not be zero in the image file). For more information, see <http://www.clarkvision.com/articles/nightsapes/> and <http://www.clarkvision.com/articles/index.html#exposure>. ★

**ISON TIMETABLE
OCTOBER 2013**

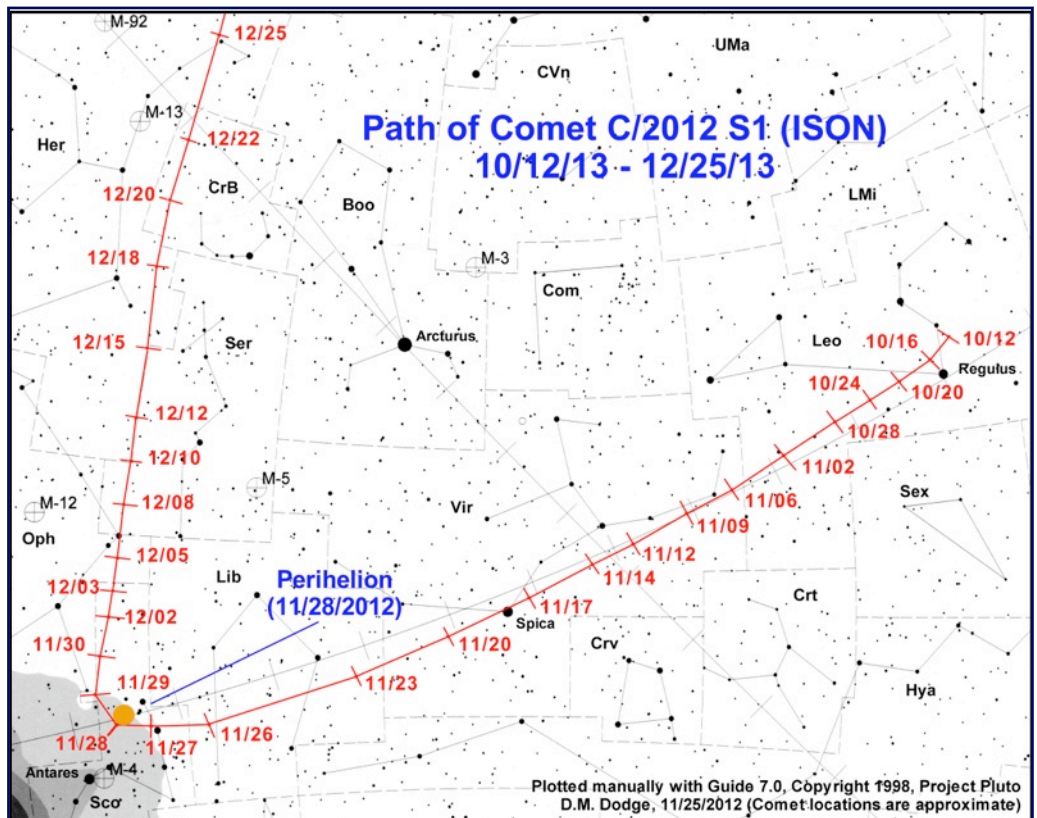
S&T linked to: <http://isonatlas.wordpress.com/october-2013/> where the following is posted:

"WHEN VISIBLE: Before Dawn

THROUGH: Small telescope at start of month, binoculars by month's end

... During October Comet ISON will be shining amongst and drifting through the stars of the "Sickle" of Leo. This is an arrangement of stars which looks like, as its nickname suggests, a sickle, but others think it looks more like either a back to front question mark or a fish hook. Whatever it reminds you of, ISON will be moving through it during October, and will be snuggling up to the planet Mars during this month. No doubt astrophotographers around the world will be filling their cameras memory cards with images of the comet and the Red Planet shining close together at this time. . . "

Bob Naeye, S&T editor-in-chief said, "Comets are notoriously unpredictable. ISON has not brightened as much as some people predicted, but it's still too early to know what kind of performance it will give us later this year."



MEET YOUR FELLOW ASTRONOMER

by Dena McClung

This DAS member profile features Stuart Hutchins, who has been a DAS member for 10 years. Stuart is a Public Night team lead, lecturer, and telescope operator. He has also served as Secretary.

Stuart first became interested in astronomy when, as a boy, he sighted and identified a radio signal reflecting satellite. He discovered his aptitude for science and math in the 9th grade. As a high school senior, he learned how lenses work in his physics class and found a natural fit between his interests in light and geometry, using the latter to diagram the former. In college, he took courses in physics and mechanical engineering before earning a bachelor's degree in electrical engineering at UT Austin, followed by a master's degree in electrical engineering at UC Berkeley.

Stuart's first job was at United Aircraft Research Laboratories in East Hartford, Connecticut. While pursuing more physics at nearby Columbia, he studied the microwave spectra of organic molecules, which have been used by radio astronomers to discover organic molecules such as formaldehyde and alcohols in deep space gas clouds. Radio astronomy has yielded just as much information, if not more, as that gathered from studying visual spectra.

Following that year, Stuart worked in the Physics department at UT as an electrical engineer building instrumentation for a Tokomak (experimental fusion device), followed by making temperature instruments for a small company, and then as a manufacturing engineer at Schlumberger Oil Well Services. He moved to Colorado in 1984, taking a job at COBE Laboratories as an

electrical engineer working on blood centrifuge equipment. One of his co-workers at COBE was David Shouldice, who would later introduce him to the DAS.

Stuart's main interest in joining the DAS was building telescopes. He had built his first one in 1970, using a 4 1/2-inch Edmunds mirror, and was happy to have the opportunity to build more telescopes starting 35 years later, joining the DAS community when others were doing the same. He taught a mirror-grinding class for DAS members for two years. Stuart describes himself as "not much of an amateur astronomer," but has a deep interest in cosmology, the structure of the universe, and collecting data on how physical processes work. He says that the Milky Way creates a sense of awe for him.

Stuart volunteers with the DAS to share what he has learned with others, as well as for a social outlet. His lecture is titled "Finding Ourselves in the Universe: Where We Are in the Galaxy, Where the Milky Way is in the Universe."

He also enjoys woodworking and cabinet-making, and is using those skills to remodel his home near Aspen Park. He is still building



STUART HUTCHINS

Image credit: Dena McClung

telescopes, including some for a fellow member. He enjoys sailing, cycling, hiking, canoeing and camping. He dabbles in robotics and likes remote control/model aircraft, boats and trains. He'd like to travel both here in North America and to Australia, where some of the world's oldest geological formations and fossils are found. ★

PRESIDENT'S MESSAGE (CONTINUED FROM PAGE 2)

Double star Albireo β (beta) Cygni: I call this pair—located in the constellation Cygnus—the “Cub Scout stars” because of their colors. Naked eye, Albireo looks like a single star, but through a telescope the pair is clearly visible, as are the two stars' subtle blue and gold colors. Arguably one of the prettiest doubles in the night sky, the stars' blue and gold can be enhanced by slightly defocusing the eyepiece.

The Ring Nebula: Also known as M57, the Ring in Lyra presents itself as a tiny, faint smoke ring in many telescopes, sometimes requiring averted vision to see reasonably well.

The Double-Double: Epsilon Lyrae, also in the constellation Lyra, looks like a dim, single star with the unaided eye, and in a low-power setup looks like a fairly run-of-the-mill double. Toss in some more magnification and each of the doubles is seen to be two close stars. Some people have difficulty seeing

all four stars, but when they do, the reaction often is one of surprise at just how close together they are.

Brocchi's Cluster: This open cluster in Vulpecula is best viewed through binoculars. The “wow” factor is the cluster's resemblance to a clothes hanger, hence its popular name, the Coathanger Cluster.

The International Space Station: If a visible pass of the ISS coincides with a DAS open house, it's fun to point out and emphasize a couple of facts: That bright, moving “star” is actually a fairly large spacecraft carrying a half-dozen astronauts around the Earth, zipping along at roughly 17,000 mph.

And finally, if you want to generate a little “wow” factor for your neighbors—and if the weather cooperates—set up a telescope in front of your house this Halloween. I've been doing that for the past several years, and the local trick-or-treaters and their parents love it! ★



JUPITER

On October 11, three of the giant planet's moons will cast their shadows on its surface. Jupiter's “Great Red Storm” is visible on the lower left quadrant in this image. Kyle used a Canon Powershot SD1400IS on an Orion Skyview Pro 8 telescope. He made an approximate one-minute video processed through RegiStax.

Image © Kyle Williams

JOB JAR

As always, DAS members haven't let us down! I'm proud to report that Luis Uribe, who's done a couple of our newsletters, has stepped up to be our external outreach coordinator. For any other members that like to go out and show eye-candy to schools and other groups, be sure to let Luis know you'd like to be on his list and what general part of town you live in, along with any other pertinent details like whenever you're unavailable or if you like to set your scope up next to your car. Additionally, our new quartermaster is board member Ed Scholes! Ed will be taking on the long-neglected duty of inventorying our club's property so that we can make use of it. If you'd like to borrow something, Ed's your contact man.

The current need for Public Night volunteers hasn't abated, though; that's usually a given as people rotate in and out, though we do have times when the teams are full. So, this month's job jar is devoted entirely to that. For those that don't already know, this isn't the same as the monthly Open House we have at Chamberlin on the Saturday night closest to the first quarter moon. Public Night is a much more frequent event, composed of small teams that do outreach at Chamberlin every Tuesday and Thursday night. The public makes reservations through a web-based application

(which caps attendance at 30 people), and then pay their money at the door. One person gives an informal lecture downstairs, while the team's lead readies the big scope upstairs with one or more trainees—and there's always need for someone to collect the money, communicate between the floors, and babysit the front door while the public is upstairs looking through the scope.

As club members, anyone is welcome to drop in and help—and no, you don't have to pay the fee, just identify yourself as a club member. If you're looking for something to do on a weeknight, these can be pretty fun, and if the team has it covered you're welcome to just watch or learn from the lecture or observe someone training. Tuesday teams serve once a month and Thursday teams twice a month, so if you fall in love with a particular team and would like to commit to joining one, that'll earn you the special nametag (if you don't already have one). Public Nights happen rain or shine—the lecture goes ahead anyway, and if there's nothing to look at through the scope, we give a history tour of the building instead. After you've seen someone do it once or twice, it isn't hard to learn.

DAS ANNUAL AUCTION!

Saturday October 19th

Bring your astronomy related equipment to the DAS auction at Chamberlin Observatory.

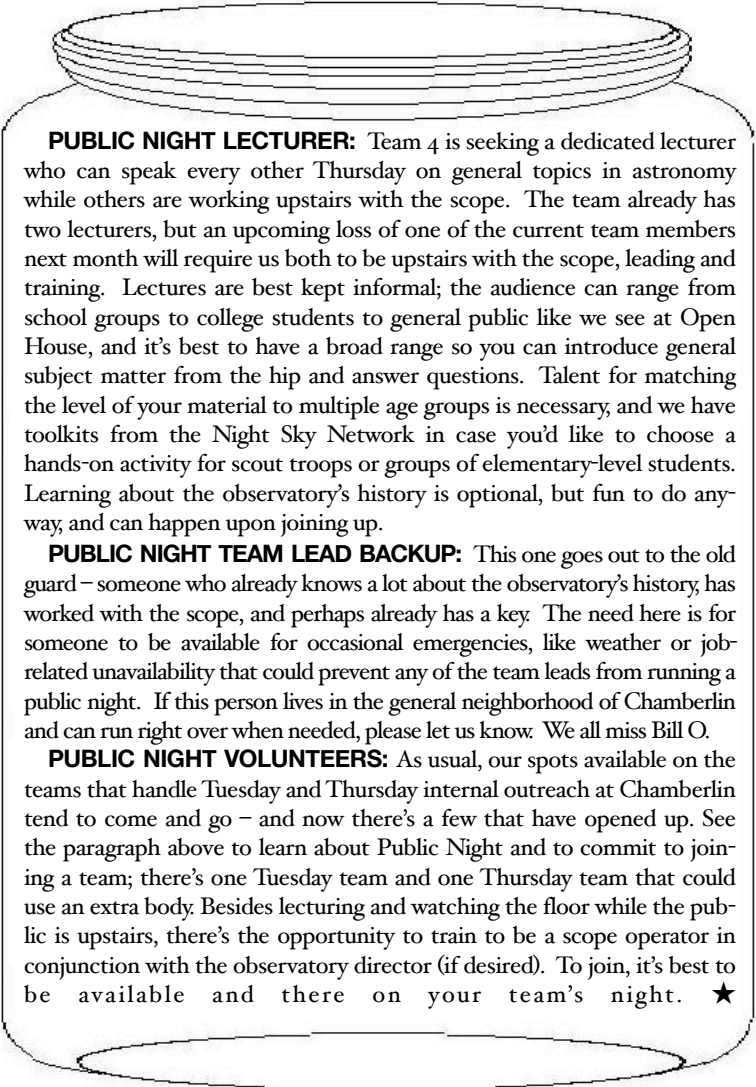
Set up and preview begins at 11:00 A.M.
with the auction at 1:00 P.M.

There is a 10% minimum seller's donation that goes to the DAS. Greater donations are appreciated.

WELCOME NEW DAS MEMBERS!

Brandon Christensen
Taylor Deiaco
Susan Haeffner
Daniel Holmes
Thomas Leet
Shounak Mitra
Doug Pieschel
Ian Thompson

Correction: In my article, "The Majesty of Yesteryear's Planetarium," (August 2013 *Observer*) I had forgotten to cite Brian Bell, of the Griffith Observatory, who supplied some of the old guidebooks to the Griffith Observatory and Charles Hagar's booklet *The Zeiss Planetarium*—Invaluable resources for the article. Also, thanks to Tim Havens (S&S Optika) for his help in scanning some of the photographs of the instruments. The reference to the 12-inch Zeiss should have been to the *Observer* for January 2010, Page 4, not 2012. —F. Jack Eastman



PUBLIC NIGHT LECTURER: Team 4 is seeking a dedicated lecturer who can speak every other Thursday on general topics in astronomy while others are working upstairs with the scope. The team already has two lecturers, but an upcoming loss of one of the current team members next month will require us both to be upstairs with the scope, leading and training. Lectures are best kept informal; the audience can range from school groups to college students to general public like we see at Open House, and it's best to have a broad range so you can introduce general subject matter from the hip and answer questions. Talent for matching the level of your material to multiple age groups is necessary, and we have toolkits from the Night Sky Network in case you'd like to choose a hands-on activity for scout troops or groups of elementary-level students. Learning about the observatory's history is optional, but fun to do anyway, and can happen upon joining up.

PUBLIC NIGHT TEAM LEAD BACKUP: This one goes out to the old guard – someone who already knows a lot about the observatory's history, has worked with the scope, and perhaps already has a key. The need here is for someone to be available for occasional emergencies, like weather or job-related unavailability that could prevent any of the team leads from running a public night. If this person lives in the general neighborhood of Chamberlin and can run right over when needed, please let us know. We all miss Bill O.

PUBLIC NIGHT VOLUNTEERS: As usual, our spots available on the teams that handle Tuesday and Thursday internal outreach at Chamberlin tend to come and go – and now there's a few that have opened up. See the paragraph above to learn about Public Night and to commit to joining a team; there's one Tuesday team and one Thursday team that could use an extra body. Besides lecturing and watching the floor while the public is upstairs, there's the opportunity to train to be a scope operator in conjunction with the observatory director (if desired). To join, it's best to be available and there on your team's night. ★



**THE UNIVERSITY OF DENVER'S
HISTORIC CHAMBERLIN
OBSERVATORY**

On the evening of September 17, 2013, Martin Yeager took some great photos of Chamberlin. See them here: <https://www.dropbox.com/sh/0j0hid38z5gapfi/84moRK9Q1>,

*Image © Martin Yeager
Courtesy of the University of Denver's
Historic Chamberlin Observatory*



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