

The Denver OBSERVER

A Publication of the Denver Astronomical Society

June 2012



Joe Gafford took this image with his 10" F4.5 setup at the Glen Canyon Dam overlook at Page, AZ.

JUNE SKIES

BY DENNIS COCHRAN

Last month we talked about the Venus transit starting after 4pm on the 5th, that can be observed with a solar-filtered telescope. The small disk of Venus crossing the face of the sun should only be viewed thru a filtered scope like a PST or one with a mylar filter on the front, or thru a #14 welder's glass. And the latter may not filter out infrared and ultraviolet rays well enough for prolonged viewing but will work for short peeks at the sun. Even dark glasses made specially for group viewing of an eclipse or transit may not be safe for long looks. So keep your eyes safe and enjoy a rare natural spectacle. Like most astronomical events, this will be a quiet one. Incidentally, we will support the transit telescopically at Chamberlin Observatory as well as at the Denver Museum of Nature & Science's west terrace with its excellent western horizon.

First contact is at 4:10 according to Astronomy's transit article on p. 50 of the June issue.

Virgo the Maiden and Saturn the wanderer (planet, in Greek) are front-and-center in the evening sky this month. Saturn is right above Spica, the brightest star in Virgo. The moon will visit this

"Remember our Bad Things discussions? Most of them happen in summer. Aieeah!"

region twice, on the 1st as a waxing 3/4 moon and on the 29th as a waxing half-moon. North of this area will be bright Arcturus at the bottom of Bootes the Herdsman. To the right of this brightest June star is the region we have mentioned so often, the Virgo cluster of galaxies in the space between the west end of Virgo and corner shape of Coma Berenices, Bernice's Hair. Majestic Leo the Lion is west of that with a few galaxies of his own. Below Arcturus one might encounter

Napoleon's Hat, an asterism similar in size and shape to the famous Coathanger group.

Above that, towards the North Celestial Pole, is the Big Dipper, the middle part of the even bigger asterism called the Great Bear, or Ursa Major. Just below the bottom the the pan toward the northwest end is the Owl Nebula, an exploded star we call a planetary nebula for obscure historical reasons, and M108, an edge-on spiral galaxy between the Owl and the Beta Star of the Dipper. At the other end of the pan's bottom is the Gamma star and another galaxy, a barred spiral called M109.

Back at Arcturus, move eastward and down a bit to explore the region of the triangular snake's head of Serpens Caput. Directly south of it is Serp Cap's brightest star Alpha, while back up towards the head and a bit farther west is its dimmer Delta star. This is a binocular double. Then, from Serp Cap Alpha one can slide down-right to find the globular cluster M5, just east of an outlying bunch of galaxies in Virgo.

Now look at Libra the Scales on your sky
CONTINUED: JUNE SKIES PAGE 2

Calendar

June

General Meeting.....	1
Full Moon.....	4
Open House,	
Transit of Venus, 4:05 p.m.....	5
E-Board.....	8
Last Quarter Moon.....	11
Dark Sky Weekend.....	16-17
New Moon.....	19
Open House, Saturn.....	23
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July

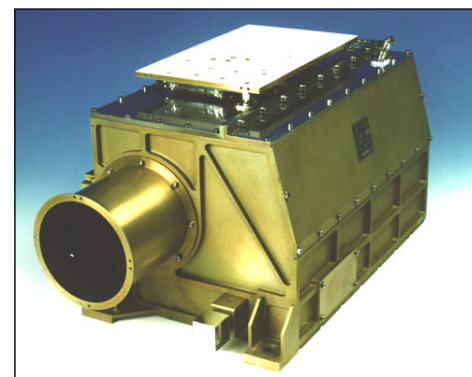
Full Moon.....	3
Inuendence Day.....	4
General Meeting.....	6
Last Quarter Moon.....	10
E-Board.....	13
New Moon.....	18
Dark Sky Weekend.....	21-22

DAS JUNE MEETING

Roger Clark will be conducting this month's talk for the General meeting titled: "The Cassini Mission to Saturn, Results from the Visible and Infrared Mapping Spectrometer (VIMS) and Other Instruments"

VIMS is an imaging spectrometer able to make images from the UV to infrared (350 to 5,000 nm, visible = 400 to 650 nm). In the infrared, VIMS peers through the Titan haze like it is not there. As a spectrometer, VIMS identifies composition, enabling maps of chemistry to be made. Results from VIMS are changing our understanding of the Saturn system and processes in the outer Solar System. Roger will also discuss the

Cassini extended mission and the end-of-mission plan.



VIMS – Visible and Infrared Mapping Spectrometer. wwwvims.lpl.arizona.edu

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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

FROM: JUNE SKIES PAGE 1

chart, south of Serp Cap Alpha. The Sigma star of Libra hangs down from the west end of the scales. (Lower case sigma looks like a small 'o' with a cowlick.) West of it, going towards the Pi star of Hydra at the tip of the water snake's tail, is the almost-star-like globular cluster NGC 5694 situated on the other side of our galaxy. The head of Scorpius rises from the southeast to haunt the coming months. Our scorpion is not scary, however, being in the thick part of the galaxy and near its center in Sagittarius. And look for M13 in the keystone of Hercules, almost overhead.

Check out the June S&T's big photo-map of the moon on p. 41. There the mare, interpreted as seas by the ancients who didn't guess that they were lava flows, are

labeled, and 280 other features, mostly craters, are identified with numbers. Aristillus is #43 and Eratosthenes is 72; these two craters were pointed out by Charles Wood in his moon column of P. 54. This map is a handy resource for moon-learners. The way the features are numbered is such that they go from left to right in strips, for instance the 70's are about 40% of the way down and go all the way across.

The time of warm nights is upon us and we can observe in comfort after waiting for the sky to get dark at 9pm. Remember our Bad Things discussions? Most of them happen in summer. Aieeah! Except, really, they seldom happen.

PRESIDENT'S CORNER BY RON PEARSON

We're about to play the 2nd game of our astronomical double-header. It doesn't get any better than witnessing a solar eclipse and a few weeks later seeing a planet as big as Earth transit across the face of our star for the last time in our lives; that's an event I hope you don't miss. Standing on the 1,000 year old ruins of Pueblo Bonito in Chaco Culture National Park, watching the annular eclipse on May 20th drove home just how important watching the sky has been and still is to the many people on our small blue planet. I believe many of us are attracted to the 'hobby' of astronomy because by watching the sky and what's up 'there' we get a real sense of being part of the vast Universe. Whether you gaze at small faint fuzzies in your Dob under a dark sky or lay back on a lawn chair and stare up at the milky way, you have the idea in your head of the vast distances and "billions and billions" of stars and galaxies out there; and, for a brief time, on those good nights, are transported into that view in your eyepiece.

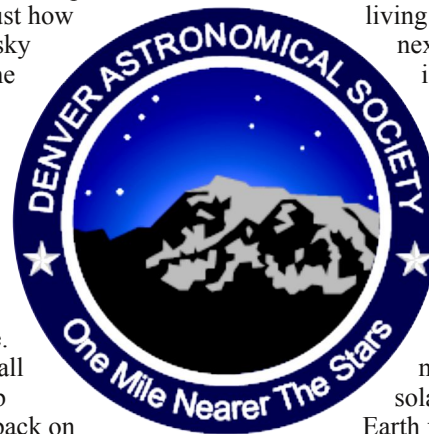
Nothing gives you that sense of "Cosmos" like a solar eclipse. So while standing with many other modern peoples, some with telescopes and some using just their hands to see the "ring of fire" on the 1000 year old ruins of Pueblo Bonito—aligned so precisely to the rising and setting of the solstice Sun—the connection is again made with not only those ancient people that lived in this corner of North

America but also with ancient Greeks and Celts and many others who watched the sky; slowly realizing there is a certain order to things in the sky and perhaps life on Earth is not due to the random acts of capricious gods. Some of them realized that maybe they could use what they observed to plant and harvest their crops and navigate their ships or caravans to distant lands to trade with others living 'over the hill' or on the next continent or Pacific island.

Soon we get to use our telescopes and filters to watch the 2nd game of 'space-ball'. We'll see another planet passing between us and our star the Sun. That event, not nearly so long ago, was used to measure the size of our solar system and remove the Earth from the throne at the center of everything. Today our modern societies use that information to navigate their craft to explore those other planets and moons in hopes we might trade our efforts for more knowledge and understanding even if there is no one there to trade with, currently. But maybe in a 1,000 more years there will be and the "hoop of the Earth" will be expanded forever outward.

Thanks to those ancients we can now predict precisely what is going to happen up in the sky and not just navigate to the planets but plan our observing according to

CONTINUED: PRESIDENT'S CORNER PAGE 3



FROM: PRESIDENT'S CORNER PAGE 2

"dark sky weekends", and 1st quarter moon Open houses, as well as those summer "star parties", monthly meetings and board meetings. We have some great star parties coming up and great speakers during the bright phases of the Moon. I hope we'll see you at those meetings. We kick off summer with our long-time member and friend, Dr. Roger Clark, who has been working so many hours and years on the NASA Cassini mission to the ringed-giant Saturn that we hardly see him anymore. Roger will share with us the latest in real-time findings of the giant moon Titan and other mysteries of that great ringed-planet that graces our sky watching this summer. We've had some

great views of Saturn with the 20-inch Clark telescope from down here. In July we'll take a bit of a break to have an afternoon picnic to celebrate the 118th year of that great 20-inch telescope in Chamberlin and have good food, clear skies and a warm night of watching the sky from the south lawn during the Open House. So we can see you more often, I hope you'll align your life and activities around these astronomical schedules as the ancients did. Unlike some practices of the ancients, you'll only be asked to sacrifice a favorite picnic food and chant a toast to the clear, dark and starry skies above.

Clear skies and "Keep looking up"!



Partially eclipse Sun and sky watchers before the annular "Ring of Fire" at 1000 year old Pueblo Bonito in Chaco Culture NHP. photo © Ron Pearson, 17mm f.l. lens partly filtered with eclipse 'glasses'.

HEADS-UP

It's almost time for our summertime picnic! On July 28th, we'll get together at Chamberlin for food and fun, followed by our usual July Open House night. It's free, and no reservations are required.

Everyone is encouraged to bring a salad or dessert, and DAS will supply the drinks and a tasty barbecue.



DAS Events

June 2012 Events

General Meeting DU's Olin Hall, 7:30 p.m.....	1
Transit of Venus at Chamberlin Obs. and DMNS 4:00 to 8:00 p.m.....	5
E-Board Meeting Chamberlin Obs. 7:30 p.m.....	8
Rocky Mountain Star Stare.....	13-17
Dark Sky Weekend.....	16-18
Father's Day.....	17
Grand Canyon Star Party, South Rim.....	16-23
Open House Chamberlin Obs. 8:00 p.m.....	23

July 2012 Events

General Meeting DU's Olin Hall, 7:30 p.m.....	6
E-Board Meeting Chamberlin Obs. 7:30 p.m.....	13
Dark Sky Weekend.....	21-22
DAS Picnic 4:00 p.m.....	28
Open House Chamberlin Obs. 8:00 p.m.....	28

Public nights are held at Chamberlin Observatory Tue and Thur evenings beginning at the following times:

3/15 – 4/14 at 8:00 p.m.;
4/15 – 8/31 at 8:30 p.m.;
9/1 – 9/30 at 8:00 p.m.;
10/1 – 3/10 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.*

BEGINNER'S BIT: THE SUMMER MILKY WAY

BY LISA JUDD

During the summer months, the southern part of the sky is known by many that aren't dedicated telescope nuts – just enjoyers of naked-eye viewing from campgrounds or boats. The beauty of the Milky Way in that area is not only striking, but contains lots of Messier objects within easy reach of even the most modest binoculars.

For those learning constellations, Scorpius and Sagittarius will appear just above the southern horizon at Denver's latitude, so make sure you have no light pollution or treeline obstruction in that direction. The Scorpion is S-shaped, with a red heart and a T-shaped head and the two stinger stars at the other end; Sagittarius looks like an unmistakable teapot. Easy acronym – S-shaped Scorpion and Sagittarius in the South in Summertime (SSSSS). The thickest, richest part of the Milky Way looks like steam coming out of the teapot's spout, and there are many things to see in the steam.

To start, find M7 left of the scorpion's stinger tail - a nice round open cluster that marks one of my favorite examples of an object that's great in binocs but boring in a scope (along with M41 next to Sirius in winter). M6 is northward, though still

around the scorpion's tail; this is the Butterfly Cluster. Just above and to the right of the heart of the teapot's steam, the Lagoon Nebula (M8) is probably the largest, easiest object to see; in fact it looks much like the Andromeda Galaxy in the fall. Many people mistake this for the Trifid (M20), when in fact the Trifid is much smaller and slightly above the Lagoon. Returning to the steam trail, there's the large Sagittarius Star Cloud (M24), about 3 moon-widths thick and shaped like a fat peanut. In a scope, there are two dark nebulae on the edge that look like footprints.

Further up the steam are M's 16, 17 and 18. M18's a nice star cluster, though it doesn't have a name, and M16 is the Eagle Nebula featuring (in a larger telescope) the "pillars of creation" made famous by an early Hubble photo. M17 is known either as the Swan Nebula or the Omega Nebula – if you can imagine two kissing swans, one bright and one a very dim reflection, together they might look like the capital greek letter Omega. Continuing into the dim constellation Scutum you'll find a large cloud that could almost cover the teapot, with the impressive Wild Duck cluster within it.

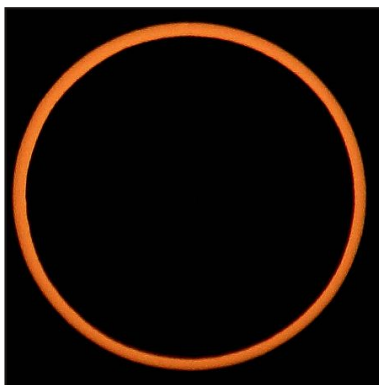
If you follow the Milky Way across the sky, through Aquila and Cygnus (along the stem of the Northern Cross), northward of the whole Summer Triangle into Cetus and Cassiopeia, you may notice it comes back down through Perseus and – if you wait long enough in the year – down through Auriga and Gemini and Orion. This is the Winter Milky Way, somewhat tamer than the summer but full of just as many Messier clusters and an impressive network of nebulae. With a little thought and constellation knowledge, you can compare the plane of our galaxy's disk against the ecliptic (the plane of the solar system) and the celestial equator (the plane of just planet earth). Outside of the plane of the Milky Way is where you'll find smatterings of galaxies, concentrated in the spring in Leo/Virgo and in the fall in Sculptor/Fornax, but our own Milky Way is clusterland.

☆☆☆

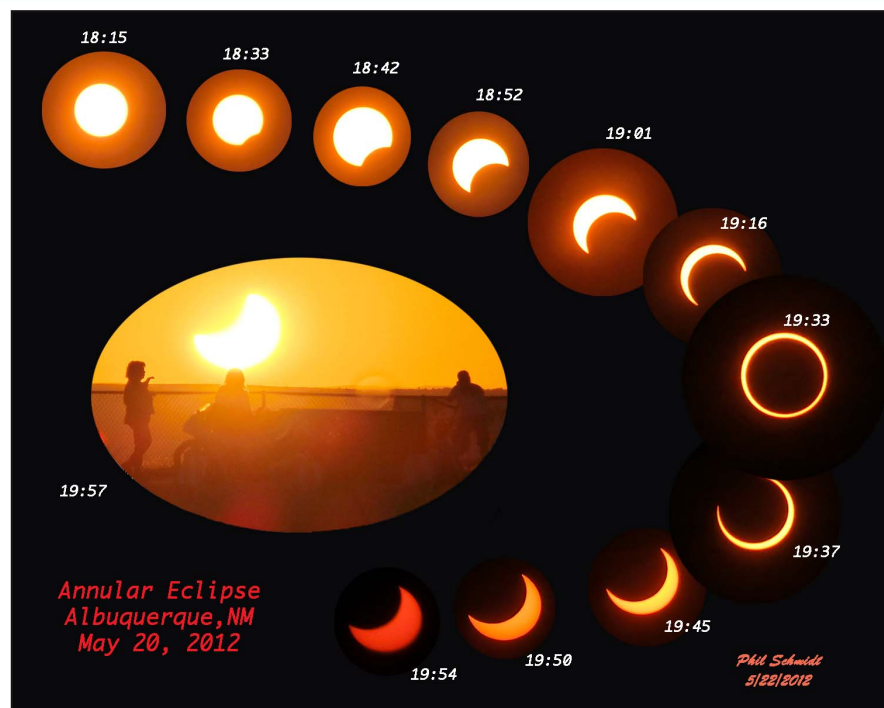
As with anything I contribute, addenda, questions, comments and corrections are welcome. My email address is lm_judd@hotmail.com.

ECLIPSE PICS

BY DAS MEMBERS



Eclipse shots from Mesa de Sol – David Tondreau©; Abluquerque, NM



Composite image taken from Albuquerque, NM by Dr. Phillip Schmidt© a member of both Austin and Denver Astronomical Societies.

TRY THE AL SUNSPOTTER OBSERVING PROGRAM

BY DARRELL DODGE

With the Sun approaching its maximum period in 2013 and exhibiting a lot of activity variations almost every day, this is the perfect time to try the Astronomical League's Sunspotter observing program. I found this to be one of the most enjoyable and educational programs when I did it during the last solar maximum in 2003. It is a white-light program, but apparently, a separate hydrogen-alpha program is under development.

To perform and complete the Sunspotter program, you are required to make two sets of drawings, identify and label major sunspot phenomena, and classify the Sunspot groups for each day you observe. The drawings do not have to be works of art, and you might be amazed at how easy it is to do them. Photographs can't substitute in this case because the act of drawing really helps you see the dynamic nature of sunspots, which change virtually from minute to minute. The first set is five detailed sketches of sunspot groups. The second set is 20 or more sketches of the entire solar disk during two 29-day solar rotations, with a minimum of 10 drawings per rotation. These drawings show the way that sunspots twist, turn, grow and decay over the course of a day or two.

While there's no size requirement for the telescope used in the program, I would suggest something larger than 60mm. I did the program with a Celestron 9.25-inch Schmidt-Cassegrain with a full-width glass solar filter and was rewarded with nice big

images with lots of detail to draw from, but anything from 80mm on up would probably be fine.

A complication in completing the Sunspotter program is that the helpful observing guide ("Observe and Understand the Sun") is no longer available. This guide provides useful information on solar phenomena, and how to count sunspots and classify sunspot groups. However, the most critical information in the guide is contained in two very easy-to-understand articles (one by Walter Scott Houston, et. al. and another by Richard Hill) that are contained on 10 pages. Your DAS ALCor will be more than happy to provide you with a personal copy of those articles.

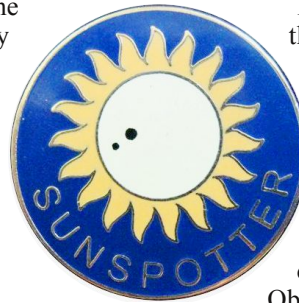
The AL provides a reasonable daily Solar Disk Drawing form on its Web site, with a large disk on which to outline the sunspot penumbrae and shade in the umbrae. The form provides spaces to classify all the sunspot groups on the disk and a smaller disk on which to show the McIntosh classification letters. You then do a sunspot count, compute the Wolf Number, and other information blanks (date, time, etc.). One of your sketches (in either the first or second set of drawings) should show the "Wilson effect," which is the offset of the umbra in the center of a large spot from the penumbra caused by the spot being at the edge of a limb of the Sun. Don't

worry about the technical sound of these data requirements. They are really very easy to learn with the observing guide. Weather conditions and your schedule may prevent daily observing, but you only need 10 days for any given rotation. You need to submit a minimum of 20 whole disk drawings for the two rotations. I found it best to set up my telescope where I could view the sun early in the morning before I went to work.

I found that the trickiest part of the program was determining where the Sun's north pole is on any given day. Using your mount declination or slow motion controls is a simple way to do this, factoring in the Earth's tilt relative to the Sun. Use the drift method to determine east and west.

Observing at the same time every day simplifies matters. However, there is no harm in checking the Spaceweather photo for the day to verify. Or, use the Solar Rotation Applet at <http://www.jgiesen.de/sunrot/index.html>. Of course, using professional images to do the program would definitely be a "no-no."

By all means, try this program. You'll enjoy it, I'm sure. Full details about the Sunspotter Club are on the AL Web site at <http://www.astroleague.org/al/obsclubs/sunspot/sunspotcl.html>



MORE ECLIPSE PICS

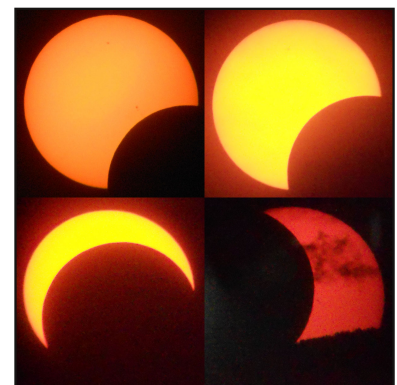
BY DAS MEMBERS



Sun setting on the western horizon from Page, AZ. Note the red color associated with the Sun's low altitude and atmospheric absorption. Image taken by Ron Mickle©



First Contact shot with a Celestron 5" F/6 with Sony alpha 550 Digital camera at Prime focus and 1000 Oaks Solar Filter by Brad Gilman©



Taken from Stenger Soccer Complex in Arvada, CO with 90 mm Dob, 25 mm obj, Sony digital camera by Luis Uribe. The bottom right captures the Sun, Moon, cloud and the Rockies.

WINDSCREEN PASSES TEST AT THE DARK SITE

BY DARRELL DODGE

An annoying characteristic of the DAS EGK Dark Site can be the pesky south wind that often starts to blow at 10 or 11 pm and then steadily increases until Dobsonian scope users, imagers, and even people with heavy equatorial mounts throw up their hands and head for the warming hut or their cars. Often these winds occur when the sky is clear, and they are usually worst during the prime observing hours of 10pm to 3 am.

Our general impression that these winds are often from the South is confirmed by actual wind data from the "Deer Trail Wind Resource Summary" of 2004-2005, conducted under the Colorado Anemometer Loan Program at a site a few miles north of Deer Trail. (to find it online, Google "Deer Trail Wind Rose.") The results of the summary indicate that winds are overwhelmingly from the quadrant SE to SW. In fact 52.7% of the winds are from that direction, with virtually 30% of the winds coming from the narrow SSW-S direction. Experience at the site indicates that winds from the north, east and west are often associated with clouds, precipitation, passing fronts, wind storms, or local thunderstorms and are thus less critical to observing. This indicated the feasibility of a



The prototype windscreen allowed accurate auto-guiding in winds up to 28 mph. The final version will have spaced hooks on the uprights to allow screen height adjustments for observing near the horizon.

windscreen oriented east-west, blocking the winds from the south, significantly reducing the complexity and cost.

The idea of windscreens at the site has been discussed for years, but recent development was facilitated in early 2012 when DAS member Cliff Simpson mentioned to me his use of a porous, polyethylene material designed for sports applications at his former observing site in the Wet Mountain Valley. With my experience in wind energy research and witnessing catastrophic failures of primitive "drag-type" devices, I've always been skeptical of the use of tarpaulins or even wooden screens, which would result in extremely high wind loads, risk of failure, and damage to expensive astronomical gear. My futile attempts to use my van to block winds while imaging indicated that a wind screen would have to be very high (at least 7-8 feet) to avoid buffeting at the tip of a telescope tube. The porous windscreen material, which would significantly reduce those loads, (and also offered the possibility of adjustable height to allow observing near the horizon), seemed like the answer.

In February of this year I obtained an oversized (14-foot) fully-grommeted windscreen for the test and, after an extensive discussion of support strategies, received an OK from the DS Committee to proceed with a test. We decided on steel conduit supports that could be easily removed, rather than the permanent wood poles that Cliff had used. For the initial test, the poles were to be inserted over garden stakes pounded 24 inches into the dense, sandy soil at the site. David Delassus fabricated three 10-foot galvanized steel conduit uprights with hooks to hold the screen, and selected appropriate stakes. The windscreen grommets were to be affixed to the poles by carabineers and short bungee cords.

The first trial was on a windy day in mid-March, the week before the Messier Marathon. I installed the stakes, poles, and windscreen in the early afternoon.

Handheld anemometer measurements indicated that the southerly 10-25mph winds were reduced to 1-2 mph in the exact center of the 10x10-ft pad and 2-4mph at the outside edges of the pad. In addition, the porous nature of the screen allowed it to bulge softly, eliminating buffeting and also reducing the turbulence that can occur downwind of the edges of solid obstructions. David was the first person to use the screen with his 12-inch Dobsonian and he pronounced it a success.

Bad weather during April prevented a test of the final configuration: replacing the center upright with a crossbar at the 8-foot height. This configuration was designed to increase the stability of the screen, allow use without guy ropes, and minimize billowing. The test was finally conducted on the night of May 21-22 in SE winds of 10 to over 25 mph and was a complete success. Plans to fabricate and install additional windscreens will be developed by the DS Committee in coming months.

New DAS Members April & May 2012:

Abe Alizadeh	J. Jacobsen
John Babos	Digby Kirby
Alan Baxter	James Landis
Steve Carmer	David Langston
Jennifer Carroll	Chris Langston
P. Chadbourne	Scott Leach
Robert G. Church	Justin Modra
Tom Dadisman	Lansing Mullis
Hunter Davis	BL Nipper
Larry Davis	Kenneth Piner
Miles Davis	Mary Snyder
Travitt Hamilton	Joe Wainwright
Randy Ice	Karen Wheeler



JPL AWARDS DAS

BY BRAD GILMAN REPORTING

Earlier this month Brad Gilman reported that the Denver Astronomical Society had recied an award from JPL. Posted below is the letter that accompanied the certificate.

Jet Propulsion Laboratory
 California Institute of Technology
 4800 Oak Grove Drive M/S 606-100
 Pasadena, California 91109-8099

December 15, 2011

Denver Astronomical Society
 Ron Pearson, Chamberlin Observatory
 2930 East Warren Ave
 Denver, CO 80208

Dear Ron,

The Space Place Team is pleased to award the Denver Astronomical Society the enclosed certificate of appreciation. As an active *NASA Space Place Astronomy Club* partner, you encourage science and technology education throughout your community. Reaching this audience with the message that science, technology and learning about space are fun is crucial; you and your organization play a vital role in this endeavor. Through your public events, you not only educate, but you also inspire your audiences, both young and old. Through your use of hands-on activities and experiences for children, you play a key part in developing tomorrow's scientists.

Please accept this certificate of appreciation with our gratitude.

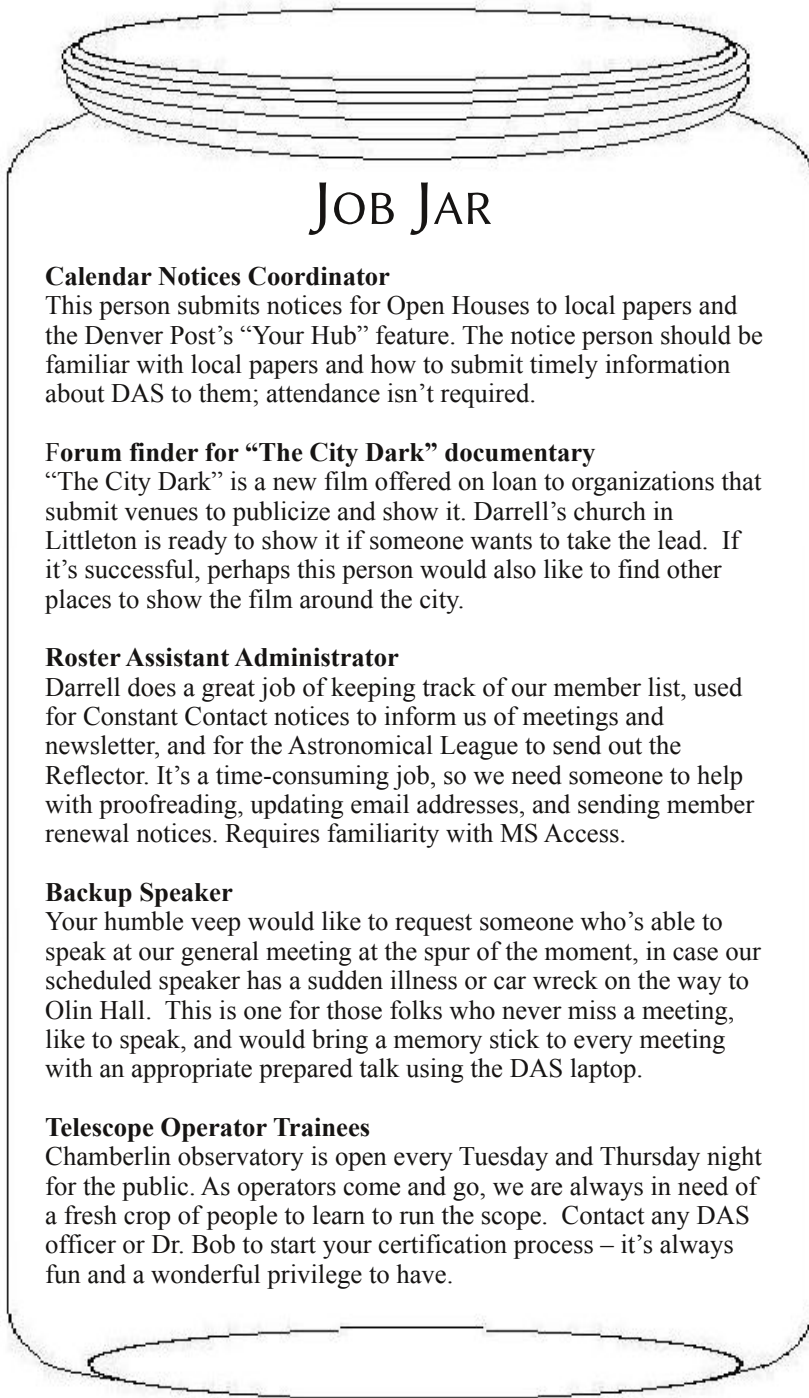
Sincerely yours,
 Laura K. Lincoln
 Outreach Coordinator



DAS ACTIVITIES AND POSITIONS

BY LISA JUDD

I'm happy to report that we have a nice influx of new Chamberlin Operator trainees! So far, we still need people that might like to try the following volunteer opportunities:



JOB JAR

Calendar Notices Coordinator

This person submits notices for Open Houses to local papers and the Denver Post's "Your Hub" feature. The notice person should be familiar with local papers and how to submit timely information about DAS to them; attendance isn't required.

Forum finder for "The City Dark" documentary

"The City Dark" is a new film offered on loan to organizations that submit venues to publicize and show it. Darrell's church in Littleton is ready to show it if someone wants to take the lead. If it's successful, perhaps this person would also like to find other places to show the film around the city.

Roster Assistant Administrator

Darrell does a great job of keeping track of our member list, used for Constant Contact notices to inform us of meetings and newsletter, and for the Astronomical League to send out the Reflector. It's a time-consuming job, so we need someone to help with proofreading, updating email addresses, and sending member renewal notices. Requires familiarity with MS Access.

Backup Speaker

Your humble veep would like to request someone who's able to speak at our general meeting at the spur of the moment, in case our scheduled speaker has a sudden illness or car wreck on the way to Olin Hall. This is one for those folks who never miss a meeting, like to speak, and would bring a memory stick to every meeting with an appropriate prepared talk using the DAS laptop.

Telescope Operator Trainees

Chamberlin observatory is open every Tuesday and Thursday night for the public. As operators come and go, we are always in need of a fresh crop of people to learn to run the scope. Contact any DAS officer or Dr. Bob to start your certification process – it's always fun and a wonderful privilege to have.

EVEN MORE ECLIPSE (AND OTHER) PICS

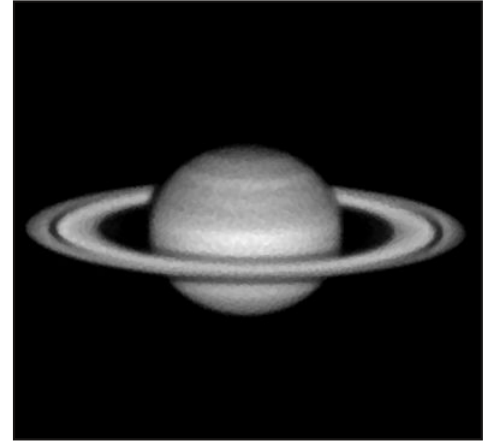
BY DAS MEMBERS



This eclipse image is one frame of the data movie showing several Bailey's beads, or the light shining through valleys along the side of the Moon. David Bender and Wayne Green observed the eclipse from Highway 93 in Nevada with a 4" Takhashi, Losmandy mount with Astrometrics drive, Samsung security camera and a KIWI GPS timestamp generator.



Eclipse shot taken by Patricia Kurtz.



Tuesday, May 8th, after Pub Night, Ron Pearson had one of the best night of seeing he'd ever had with the Clark 20" telescope. Camera - PGR Scorpion monochrome FW 800, prime focus on the 20-inch w/ IR blocking filter, 30fps. Captured and processed with AstrolIDC on MacBook Pro. Stack of about 130 frames from 1200.



The Denver Astronomical Society
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