

The Denver OBSERVER

Newsletter of the Denver Astronomical Society
One Mile Nearer the Stars

Image copyright 2007 Joe Gafford

"It's Elementary, my dear Watson . . ."

Comet 17P/Holmes has been a welcome addition to the night sky. Joe captured this image on November 4, 2007 at the EGK dark site using an SBIG ST-2000XM CCD camera on a 10-inch f/4.5 Newtonian telescope. He made two 5/5/4/5-minute LRGB mosaic exposures plus a shorter exposure over the core for detail. Be sure to check out the Holmes gallery on Page 7.

CELESTIAL HOLIDAY GREETINGS

D E C E M B E R S K I E S

Inside The Observer

We start off the last month of 2007 with our Annual Holiday Potluck on December 1. Let's hope that skies will be clear and we can set up a scope or two outside.

Who knows what our surprise visitor Comet

Holmes will be doing then? Probably it will still be easily visible and astonishing in its sheer size, a naked-eye fuzzy-star object on the north side of Perseus. Club members will be chatting and showing their images of Holmes via denverastro@yahoogroups.com. If you have ever wanted an excuse to show something astronomical to your neighbors, this is it. I roused several of my neighbors late in Game 4 of the Series to see it and no one complained. At 60 power it filled up the field. Incidentally, the answer as to which of

last month's options was true—"There are canals on Mars" or "The Rockies would win the Series," turned out to be "Neither." Too bad on both counts. Mars was better when it had canals. I had always wanted to ice skate down a canal in the Martian winter.

Speaking of the Red Planet, it is our other big observing news of this month, shining red and perhaps as bright as the Christmas star of 2000 years ago. The night of closest approach is Dec. 19th, with opposition five days later on Christmas Eve. Mars is up at a good observing angle in the east by 11 P.M., right in the middle of Gemini. When you're done looking at Mars you'll be able to swing over to the south to catch Orion and M42. As the month wears on Mars will drift up towards Auriga, and on

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1	Last quarter moon
9	New moon
13-14	Geminid meteor shower peak
17	First quarter moon
22	Winter Solstice
24	Full moon
31	Last quarter moon

Continued on page 3

President's Corner

The DAS annual potluck will be held on December 1st at the Columbine Unitarian Universalist Church starting at 6:00 P.M. This is the same place as last year—a great venue. Directions and details appear in an article on page 3.

The annual auction was a success. We netted \$737.80 on \$5,077.90 in exchanges. The auction takes 10% of proceeds, with this years amount approaching 15%. Special thanks to Ron Hranac for acquiring ten 6x30 binoculars and donating the binoculars back to the club for our outreach activities. Special thanks to Dan Wray for wrangling the event and Ivan Geisler for his auctioneer's skills!

Comet 17P/Holmes has spurred many of us to get outside, observe and take astro-photos. This Dark Sky Weekend saw members and guests at the EKD Dark Site. The weather was iffy in the early evening, with some high haze off and on, but the view of the comet was three dimensional under dark skies. This was my first time observing at the site, and I offer a hats off to all that have made a wonderful place to spend a very productive evening.

Mars will be making its closest approach to Earth on the evening of the 19th of December, and will be at opposition on the 24th. Your presents may be a few nanoseconds late if Santa tests each of those new telescopes we requested on Mars



Wayne Green, DAS President

for us! We look forward to seeing those new and old telescopes, new and old accessories on the lawn at Chamberlin at the Mars Madness Open House on the January 12, 2008.

Nominations are open for the next slate of board members and officers. The nominating committee consists of: Wayne Kaaz, Dennis Cochran and Ivan Geisler. Please send all nominations to these people. Nominations are open

Continued on page 3

DAS Schdule

DECEMBER	JANUARY
<ul style="list-style-type: none"> 1 DAS Holiday Potluck (<i>Begins at 6:00 P.M.</i>) 5 First day of Chanukah 7-8 EGK Dark Site Weekend 15 Open House at Chamberlin Observatory (<i>Begins at 5:00 P.M.</i>) 21 E-Board meeting at Chamberlin Observatory (<i>Begins at 7:30 P.M.</i>) 25 Christmas Day (No Public Night) 	<ul style="list-style-type: none"> 1 New Year's Day (No Public Night) 5-6 EGK Dark Site Weekend 12 Open House at Chamberlin Observatory (<i>Begins at 5:00 P.M.</i>) 18 General Membership Meeting at D.U.'s Olin Hall (<i>Begins at 7:30 P.M.</i>) 25 E-Board meeting at Chamberlin Observatory (<i>Begins at 7:30 P.M.</i>)

Public nights are held 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. at Chamberlin Observatory
Costs to non-members are: \$3.00 adults, \$2.00 children.
Please make reservations via our website (www.theddas.org) or call (303) 871-5172.

Society Directory

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Executive Board Members

Jack Eastman	Ron Pearson
Joe Gafford	David Shouldice
Frank Mancini	Bryan Wilburn
Ron Mickle	Dan Wray

Steve Solon, Past President
President Emeritus, Larry Brooks

Committees

Van Nattan-Hansen Scholarship Fund

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IDA Representative:

Dr. Robert Stencel

Public Outreach Committee:

Ron Mickle (Chair)
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Student Astronomy Committee:

Naomi Pequette (Chair)

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Denver Astronomical Society
Chamberlin Observatory C/O Wayne Green
2930 East Warren Avenue
Denver, Colorado 80210

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.

theddas.org

DAS Holiday Potluck!

WHEN: Saturday, December 1st from 6-9 P.M.
WHERE: Columbine Unitarian-Universalist Church (CUUC)
6724 South Webster Street,
Littleton.

Bring your best culinary potluck creations (salads, casseroles, light meat dishes, desserts and breads) to this traditional end-of-year gathering. The DAS will provide liquid refreshment, eating utensils, and ham and turkey meat servings. You'll experience the very best of com-

pany and enjoy a photo review of the year's highlights as well as some traditional holiday music.

The DAS participation prize drawing will be held at the potluck, covering the last three months of DAS outreach and volunteer activities during 2007.

The church is located several blocks east of Wadsworth Boulevard, on the south side of Coal Mine Road.

Driving Directions:

The easiest way to get there is to take C-470 to the Wadsworth exit and proceed north on Wadsworth to Coal Mine Road. Turn right (east) on Coal Mine, proceed down the hill to Webster St. (traffic light), turn right, then first left into CUUC.

Directions from other locations:

From Santa Fe South: Turn west (left) on Mineral (becomes West Ken Caryl), north (right) on Pierce Street; west (left) on Coal Mine. Proceed down the hill to the first traffic light. Turn left onto Webster St. then first left into CUUC.

From Santa Fe North: Turn west (right) on Bowles, south (left) on Platte Canyon, west (right) on Coal Mine. Proceed to first traffic light past Pierce Street. Turn left onto Webster St., then first left into CUUC.

From C470 North or West: Exit at Bowles Ave. Head east, then turn south (right) on Wadsworth Blvd. (then see above).

Volunteers Needed

Volunteers are needed to help set up before (starting at 3P.M.) and clean up after the potluck. E-mail Darrell Dodge at dmdodge@aol.com.

President's Corner (continued)

Continued from page 2

until the actual voting during the February meeting.

A reminder, we did not order 2008 Royal Astronomical Society of Canada handbooks

this year, instead asking S&S Optika to bump their order for us. Handbooks and the RASC calendars are in now.—*Wayne Green*

December Skies (continued)

Continued from page 1

the 23rd, the day after the Winter Solstice, it will be right next to the full Moon. By the light of the Solstice Moon I will be at Stonehenge sacrificing a chicken—OK, eating a pre-cooked chicken—if only in my imagination. It is probably not a coincidence that Christmas and the Solstice are essentially at the same time. You can use the slow but noticeable change of position of Mars to illustrate the difference between planets and stars. Remember that "planet" means "wanderer" in Greek. All the ancient peoples knew that the planets were a special kind of star that changed positions like a wandering herd of animals. In those days they had dark skies and not much else to do at night except notice these things.

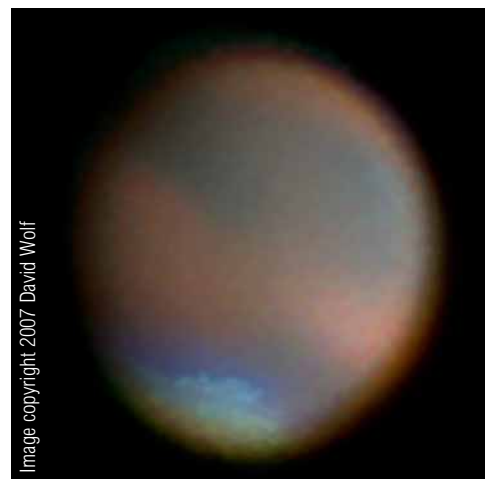
If you like to stretch out on a chaise lounge and look at the sky whilst bundled up in your warmest clothes or a sleeping bag, reaching frequently for your thermos jug and your binoculars (not at the same time), the Geminid meteor shower will be peaking nine nights before the

Solstice, on the night of the 13-14th. The Geminid meteors are debris from the asteroid Phaethon which just may be the three-mile wide core of an old comet.

If you have ever had trouble finding M31, the Andromeda Galaxy, the biggest member of the Local Group (the Milky Way being second biggest), look at page 54 of the December *S & T* where there is a photo of the Cassiopeia-Andromeda area of the sky. M31 is clearly visible in the top half, with the Double Cluster below Cassiopeia as an added bonus.

Finally, our December Open House is on Saturday the 15th. I believe that this is the day that Cathy traditionally holds a "How to Buy a Telescope" talk in the observatory. If it's cold enough we may all be in there with her. There should be a lot of people out on the field, too, wanting info on scopes that they hope to buy as gifts. This is your chance to indoctrinate them with your astronomical prejudices.—*Dennis Cochran*

The Red Planet taken from David's Chainlube Observatory on November 10, 2007. He used a Philips SPC900NC WebCam on a NexStar11 GPS at f/30. Best 50% of 1200 frames at five frames per second.



Image(ine) That

Part Two

Article and Images by Steve Solon

In last month's article, we explored the process of gathering the photons that make up celestial images. Now that we've collected all this data, make a pot of tea and settle in to create some on-screen wizardry.

If the intent of your imaging sessions is scientific, say, nova or minor planet searching, the

amount of assembling and processing will be reasonably minimal; color is not an issue, just good clear black and white images. If, however, your desire is to produce beautiful, detailed imagery, whether it be black and white or color, there are significantly more steps involved.

At this point, before we delve into the work,

it's important to note something that we sometimes lose sight of in our quest to image for the beauty of an object, and that is that **there are no standards**. Imaging is a form of art, and is subject, thus, to the whims and desires of the artist. Too often when talking with other imagers, I hear, "Well, mine's not as good as so-and-so's." or, "I'll never take anything good enough for the magazines." Remember that other folks' work is just that, *their* work. If they publish or display their images in any form, it's because they're pleased with what they've done; there is usually no intent to compete.

I've certainly admired astro images in the magazines for years, but I've never been discouraged by any of my results that "didn't look like theirs'." My very first astrophotograph many years ago was a 15-minute picture of M42 taken through an 8-inch SC on Kodak Gold 400 film. The guiding was horrible and the sky conditions were certainly less than perfect, but I was so excited I couldn't see straight for days.

That's what this imaging is about—producing results that are pleasing to you, the artist—period. If you're content with your work, share it to inspire others, but never to compete—that is not the essence of art. End of speech.

The initial processing stage of digital astroimages is called reduction, or calibration, by some. It involves the application of the dark frames, flats and flat darks to the light images. There are several programs that perform these tasks—Maxim DL CCD®, RegiStar®, etc. My

NGC 4217 (left)—taken with an SBIG ST-8e CCD camera on a 12.5-inch reflector mounted on a Paramount ME from Steve's observatory in Littleton. Two hours of luminance only.

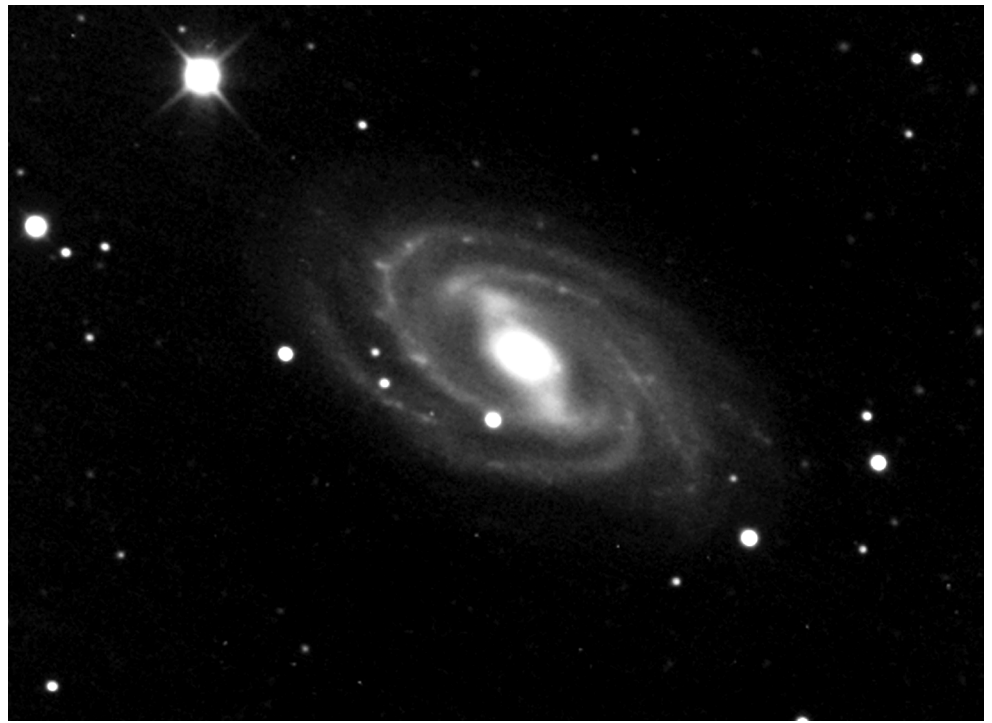


choice is CCDSoft®—I’ve used it for years, from the early days when it was known as CCDOps. I’ve also used the same toothpaste since the 70s; if it works, why change?

One function of CCDSoft® that I especially enjoy is that it applies your *reduction frames* to your lights in one fell swoop—you just supply the proper folders. For a working example, let’s create a master folder and call it “7331-Stephans.” Within this folder, create the subfolders necessary for CCDSoft® to perform its magic: Lums, Lum darks, Lums reduced, Lums aligned, Reds, Red darks, Reds reduced, etc. If you take sets of images on consecutive nights, label a second folder “____ – B” or something similar.

To begin reduction, go to *Image>Reduce>Image Reduction*. In this window, plug in your darks, flats and flat darks by highlighting the appropriate folder title on the left and clicking Add Frames on the right. This opens a browser where you search for your folder of reduction images—Lum darks, for example—highlight all the files and click Open. This will place your darks in the “Dark frames” folder of the Image Reduction window. Follow suit with your “Flat frames” and “Dark frames for flats only.” When all the reduction frames have been plugged in, click Reduce Folder. This opens a window where you select the *Folder to reduce*—“Lums”, for example—and select the *Folder to save reduced images*—“Lums reduced”—then click Reduce. CCDSoft® will apply the reduction sets to all the light images and save them in the Lums reduced folder.

Now the images must be aligned. CCDSoft® employs a very powerful multi-point alignment technique in which the brightest single pixels of three separate stars in an image are randomly selected—these same pixels are then found in each of the reduced images and aligned to each other. I’ve found the accuracy to be tremendous. Click *Image>Align>Align folder of images*. In the upper



M109—taken with an SBIG ST-8e CCD camera on a 12.5-inch reflector mounted on a Paramount ME from Steve’s observatory in Littleton. 1.5 hours of luminance only.

box, browse for your “Lums reduced” folder as the *Folder to align*, then browse for your “Lums aligned” folder as the *Folder to save aligned images*. A reminder: If you shoot a set of images on the east side of the pier with a German-Equatorial mount, then flipped the mount to continue on the west side after your target has crossed the meridian, the camera’s chip has flipped vertically and horizontally, as well—thus, the west-side images will have to be *flipped* before they can be aligned with the rest. Open each one, click *Image>Flip>Flip Horizontal*—repeat for *Flip Vertical*; save the changes. Now, click Align. Some of the aligned images will have dark edges where overlapping has occurred—this is not a concern; don’t do any cropping at this juncture.

It’s time to weed out the images that, for whatever reason, didn’t turn out so well. Their inclusion in the combining process will degrade the final image; how picky you want to be is up to you. Open your “Lums aligned” file. I’ll usually open six images at a time. If you’ve shot

at bin 1x1, you’ll need to reduce the size of the image to see it all; press Alt-2, then click on the + magnifying glass icon in the Toolbar. Now look at a few stars for roundness and check for any satellite tracks, passing jets, etc., making note of the offending image numbers. Continue with the rest of your aligned images and scrutinize them as well. When you’re finished, open the “Lums aligned” folder and delete the bad images; this removes them from the equation when you combine and is why I suggest shooting more images than you think you’ll need—if you’ve shot two hours worth of 3-minute images and you have to delete five bad ones, there’s fifteen minutes of data down the tube—always over-shoot.

We’re down to the home stretch in CCDSoft®—ready to combine. Click *Image>Combine>Combine Folder of Images*. This opens a browser window; highlight the “Lums aligned” folder and select the *How to combine*

Continued on page 6



Image(ine) That (continued)

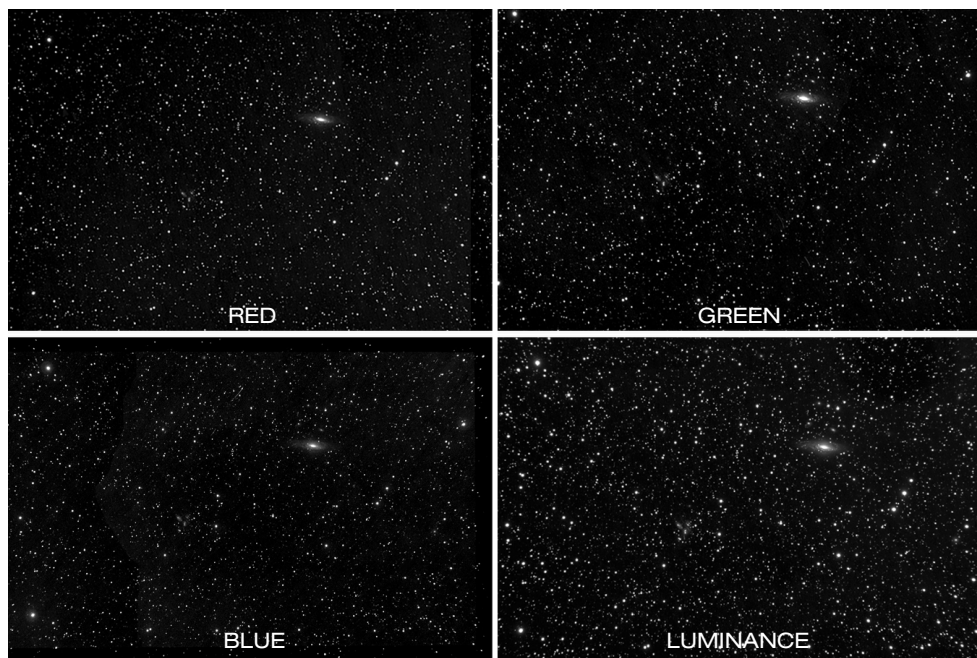
Continued from page 5

method. For faint objects, select Add—this creates a cumulative brightness combination of the pixels in each aligned image. For bright objects, M42 for example, select Average—this method averages the brightness of neighboring pixels and helps reduce burning. A trick I've used for bright luminance images is to save both an Add *and* an Average and combine them later as separate layers for the luminance in Photoshop.cs®—interesting details emerge and you can further control bright areas.

Click *Combine*. Your combined image appears on the screen, and trust me—you will be astounded by what you see. Let's face it—a single reduced image doesn't show a lot of stuff, but the combination of 20, 30 or 40 images?—now *that's* something.

There are always some stubborn illuminated pixels that need to be dealt with; at this point, perform a *repair*. In your combined image, click *Image>Repair>Remove Cold Pixels*—select Strong and click *OK*. Do the same for the hot pixels. Each of these functions creates a new image when completed, so your original is left intact.

CCDSOFT® contains some marvelous tools for further processing—histograms, sharpening, etc.; experiment as you like. I prefer to perform these functions in Photoshop.cs.®—it allows greater range and flexibility. For right now, the only further work I'll do is apply a very mild *deconvolution* to the image. This sharpening algorithm has the effect of shrinking bloated stars from the *outside in*. Be wary though—it can be overused and the result is flat, shadowed stars and glaring sharpness. Click *Image>Sharpen>Richardson-Lucy*. Begin with a *Sigma* of 2, *Number of iterations* at 5 and *Kernal size* at 4—click *OK*. You'll see a



subtle sharpening—*subtle* is the key; experiment *carefully* with this tool.

Create a new folder called *LRGB* and save the finished Lum image in this folder in its original FITS format. As you process the R, G and B images, save the finals in here, as well. One last folder, “Aligned LRGB”, will hold your finished images after you align them to each other—again, click *Image>Align>Align folder of images*, browse for and highlight the “LRGB” folder as the *Folder to align*, and “Aligned LRGB” as the *Folder to save aligned images*, then click *Align*.

For the combining of the luminance and color images with one another, I prefer, again, to use Photoshop.cs.®. There are more tools and a greater variety of functions within those tools. If, however, you'd like a preview of your work, CCDSOFT® can combine them very well. Open each of your aligned final images, L,R,G and B, then click *Image>Color>Color Combine* or click on the Color Combine icon in the toolbar—Viola!

In our third and final installment, we'll put all this work together in Photoshop® and discuss the delicacies of the various tools available,

along with some suggestions on personal preferences. As always, send your questions to: galaxyshots@att.net.

See you next month for another freshly brewed pot of tea.

Welcome New DAS Members:

Nathan Gilmore
Sara Simons
Donald Enloe
Lawrence Fry
Nick White
Robert Bruner
Robert Knodel
Peter E. Krause
Phillip May
Lisa MacDonald
Sebastian Varquez-Carson
Adam Chance
Tom Stephens
Richard M. Krumbein



Comet 17/P Holmes Gallery

From the DAS website:

“On October 24, 2007, astronomers in Japan, Persia and Europe reported that Comet 17/P Holmes was undergoing a spectacular eruption. The 17th magnitude comet brightened almost one million-fold during the 24-hour period from October 23-24, becoming a naked-eye object in the evening sky. In late October the comet could be seen as a yellow 2.5 magnitude “fuzzball” in the constellation Perseus which was rising around sunset and high in the north-eastern sky by midnight. The coma of the comet doubled in size on October 25. The comet had acquired a blue ion tail by November 4th and looked as big as the full moon a few days later.”

As usual, DAS astrophotographers rose to the occasion and here are some of their images. Thanks, guys, great work!—Ed.

Steve Solon

On November 7, 2007, Steve used an 80mm refractor to make this image. It is an LRGB composite totaling one hour.



David Wolf

From his Chainlube Observatory in Englewood on November 4, 2007, David used a modified Canon RebelXT at ISO 800 and a Stellarvue SV102. The images—32 subsX60 seconds each.



Joe Gafford

On October 31, 2007, Joe used an Olympus E-500 camera on a 10-inch Newtonian at f/8.1.

Fred Milenovich

Using a Nikon D70 camera with a 300mm Nikon EDIF lens at f/4.5, Fred shot a single 30-second guided exposure on November 4, 2007.



About the Denver Astronomical Society

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 a 501(c)(3) tax-exempt corporation and has established three tax-deductible funds: the Van Nattan-Hansen Scholarship Fund, the Public Outreach Fund, and the Edmund G. Kline Dark Site Fund. To contribute, please see the bottom of the membership form for details.

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



APPLICATION FOR MEMBERSHIP TO THE DENVER ASTRONOMICAL SOCIETY	
New <input type="checkbox"/>	Renewal <input type="checkbox"/>
Name: _____	
Address: _____	
City, State, Zip: _____	
Phone numbers: Home () Work ()	
E-mail Address: _____	
Occupation: _____	
Other Interests: _____	
(Students Only) School: _____	Grade: _____
Do you want to download the newsletter in PDF format from our website instead of by postal mail?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do you want the above information excluded from the yearly roster?	
Yes <input type="checkbox"/>	No <input type="checkbox"/>
<i>Please Circle All That Apply:</i>	
Regular Membership: \$35	Students: \$12 (<i>Students under age 23</i>) \$ _____
Astronomy Magazine/\$34 and/or Sky & Telescope Magazine/\$32.95	\$ _____
Van Nattan Scholarship Fund	\$ _____
Public Outreach Fund	\$ _____
DAS Dark Site Fund	\$ _____
Total Amount Paid	\$ _____
<i>Please send all checks to Brad Gilman, DAS treasurer, 7003 S. Cherry St., Centennial, CO 80122-1179. Please make donations to the DAS Dark Site with a separate check, payable to the "DAS Dark Site Fund." For DAS Membership and other funds, including new-member magazine subscriptions, please make amounts payable to the "Denver Astronomical Society." DAS RENEWALS ONLY: you may now send your Sky & Telescope subscription funds directly to the magazine's subscription service, using the renewal form sent to you.</i>	



Denver Astronomical Society

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