

OBSERVER

Newsletter of the Denver Astronomical Society
One Mile Nearer the Stars

Image copyright 2006 Joe Gafford

A High-Flying Bird

Very difficult to observe telescopically, the Pelican Nebula (IC5067-70) in Cygnus reveals itself with long-exposure photography or CCD imaging. Joe Gafford beautifully captured this image at Rocky Mountain Star Stare 2006 with an SBIG ST-2000XM CCD camera through a 10-inch f/4.5 Newtonian. It is a mosaic of four images, 10 minutes each, red filter only. The big bird's beak is facing left.

SIZZLIN' SUMMMER NIGHTS

Inside The Observer

<i>President's Corner</i>	2
<i>Schedule of Events</i>	2
<i>Society Directory</i>	2
<i>Meeting Speaker</i>	3
<i>Hunting Pluto</i>	4-5
<i>NASA's Space Place</i>	6
<i>Astronomical League Update</i>	7
<i>Membership Info</i>	back page

AUGUST SKIES

These lazy warm evenings give the whole family the chance to lie under the stars in lawn chairs and count meteors. The Perseids can be spectacular. Below is a list of the shower dates. The RA

and Declination refer to the 'radiant', or apparent source-area in the sky, of the meteor shower. If you trace back along the path of a meteor, and find it crosses the general RA and DEC listed in

Shower	Date Range	Peak	RA	DEC	Speed ZHR
South Iota Aquarids	Jul 25-Aug 15	Aug 4	22:16	-15 34	2
North Delta Aquarids	Jul 15-Aug 25	Aug 8	22:20	-05 42	4
Perseids	Jul 17-Aug 24	Aug 12	03:04	+58 59	90
Kappa Cygnids	Aug 3-Aug 25	Aug 17	19:04	+59 25	3
North Iota Aquarids	Aug 11-Aug 31	Aug 20	21:48	-06 31	3
Pi Eridanids	Aug 20-Sep 5	Aug 25	03:28	-15 59	4
Gamma Doradids	Aug 19-Sep 6	Aug 28	04:36	-50 41	5
Alpha Aurigids	Aug 25-Sep 5	Sep 1	05:36	+42 66	10

2 First quarter moon
9 Full moon
11-14 Perseid meteor shower
15 Last quarter moon
23 New moon

this table, then chances are that meteor is associated with the debris trail that causes the shower!

This time of year places Sagittarius and several other constellations that frame the Milky

Continued on page 3

President's Corner

The annual picnic was a great success this year. Plenty of folks turned out, the food was great and the weather was pleasant. Many thanks to Keith Pool for herding us in the right direction. We took a little time to recognize the great effort that Carla Swartz put forth on DAS's behalf, by presenting her with a well deserved plaque. Thanks to John Doran and his company, Epilog Laser, for donating the plaque—engraved with their company's product. Larry Brooks was on hand to give Carla her plaque, after all he was responsible for roping her into amateur astronomy to begin with! Carla also received a great portrait of herself with the Chamberlin 20-inch telescope.

Recognizing people is something we probably do not do often enough. All the members that make each Open House a great success, the people that work on behalf of everyone to organize events, do the outreach work, make a great

dark sky site, and steer DAS away from the rough spots in the road. So I say thank you to a lot of people, from a lot of people. We have one of the best amateur groups in the AL. Speaking of the AL, ALCON 2006 is coming



Wayne Green, president of the DAS, at Haswell CO, where an abandoned dish sits well away from city lights.

up and I am headed to Dallas/Ft. Worth to take in the event. I will be attending the business meeting, so if there are any issues I should be taking before the AL let me know before the end of the month. The meeting is 3-6 August.

Ron Mickle is revitalizing the amateur science aspects of the DAS with a science program. A number of members want to share and develop skills related to making scientific measurements and feeding these forward through professional/amateur col-

Continued on page 7

DAS Schedule

AUGUST

- 5 *Open House at Chamberlin Observatory (Begins at 7:30 P.M.)*
- 11 *General Meeting at D.U.'s Olin Hall (7:30 P.M.)*
- 18 *E-Board meeting at Chamberlin Observatory (8 P.M.)*
- 26-27 *EGK Dark Site Weekend*

SEPTEMBER

- 8 *General Meeting at D.U.'s Olin Hall (7:30 P.M.)*
- 15 *E-Board meeting at Chamberlin Observatory (8 P.M.)*
- 16-24 *Okie-Tex Star Party*
- 23-24 *EGK Dark Site Weekend*
- 30 *Open House at Chamberlin Observatory (Begins at 7:30 P.M.)*

Public nights are held every Tuesday and Thursday evenings beginning at the following times: October 1 - March 31 at 7:00 P.M. April 1 - September 30 at 8:30 P.M. at Chamberlin Observatory. Costs to non-members are: \$3.00 adults, \$2.00 children. Please call (303) 871-5172 for reservations.

Society Directory

President:

Wayne Green (303) 530-1023

Email: wgreen@infosavvy.org

Vice President:

Darrell Dodge (303) 932-1309

Email: dmdodge@aol.com

Secretary:

Stuart Hutchins (303) 697-4353

Email: stuart-atm@earthlink.net

Treasurer:

Brad Gilman (720) 488-1028

Email: Brad.Gilman@echostar.com

Executive Board Members

Jack Eastman	Bill Ormsby
Joe Gafford	Ron Pearson
Frank Mancini	David Shouldice
Ron Mickle	Dan Wray

Steve Solon, Past President
President Emeritus, Larry Brooks

Committees

ALCor:

Jerry Sherlin (303) 680-6894

Email: sherlinj@msn.com

EGK Dark Site Chair:

Wayne Kaaz (303) 840-1549

Email: kaazmos@earthblink.net

IDA Representative:

Dr. Robert Stencel

Public Outreach:

Ron Mickle

Restoration and Maintenance:

Ron Pearson

Finance:

Frank Mancini

Van Nattan Scholarship Fund

P.O. Box 150743

Lakewood, Colorado 80215-0743

Colorado Astronomy Day:

Darrell Dodge

Annual Picnic:

Keith Pool

Newsletter:

Observer editor, Patti Kurtz (720) 217-5707

The Observer is available in color PDF format from the DAS website.

Website:

Darrell Dodge and Patti Kurtz

DAS Information Line:

(303) 871-5172

DAS Correspondence:

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 8 P.M. at Chamberlin Observatory. Please see the Schedule of Events for meeting dates. All members are welcome.

the das . org

Stepping into the Realm of Science and Research

by Darrell Dodge

Brian Warner, owner and operator of the Palmer Divide Observatory near Monument, Colorado, will be the speaker at the August general meeting. In the tradition of William Herschel, Mr. Warner is an amateur-turned-professional astronomer who only recently earned a Master of Astronomy Degree (at James Cook University, Australia) after years of active research in the area of asteroid and variable star lightcurve photometry.

The August program promises to be fascinating and should be especially interesting to members who want to extend their observational astronomy or imaging activities into the realm of science and research.

Mr. Warner will discuss his current research under contract with the Space Sciences Institute in Boulder to measure lightcurves of asteroids to explore their spin, shape, and (at times) binary nature. His work has characterized hundreds of faint asteroids and resulted in the discovery of three new objects. Brian will also demonstrate the methods and tools used in this research, including the MPO Canopus software that he developed for lightcurve measurements and period analysis. The Canopus program is now widely used by amateur and professional asteroid and variable star observers.

August Skies

Continued from page 1

Way on the meridian during the evening hours. These constellations have far too many objects to list here, but here are some easy pickings for an evening under the stars, counting meteors! These are all binocular objects.

Now is also the time to remind people that there is a transit of Mercury on November 8, 2006 starting around noon and ending after sunset here in Denver area (lower table). Make your plans now.—*Wayne Green and Ron Mickle*



We'll Miss You, Carla!

At July's annual picnic, Carla Swartz received awards of appreciation for her years of dedication and hard work with the DAS. She is moving to Los Angeles, California. From President Emeritus Larry

Brooks (right) and DAS president Wayne Green (left) she received a plaque from the DAS, and a portrait of herself with the 20-inch Alvan Clark from the Public Night Committee.

Image copyright Joe Gafford

Brian's observatory is equipped with a 20-inch ScopeCraft Richey-Chretien telescope and two fork-mounted 14-inch Meade Schmidt Cassegrains. The three instruments are fitted with large-format CCD cameras and are automated to allow efficient acquisition of images throughout the night for later analysis.

Brian is also the author of *A Practical Guide to Lightcurve Photometry and Analysis*, one of the Patrick Moore astronomy guide books, and is an assistant editor and contributing author of the *Minor Planet Bulletin*.

More information on the PDO and Mr. Warner's activities is available at his Web site: <http://www.minorplanetobserver.com>

CORRECTION

We regret misspelling Francis Ohmer's name in the article "Mr. Public Night" that appeared in the June issue of *The Observer*. We will run a corrected reprint in the September issue.

M15	Globular Cluster	Pegasus
NGC 457 (ET Cluster)	Open Cluster	Cassiopeia
Double Cluster (NGC 869 & 884)	Open Cluster Pair	Perseus
M13 (Hercules Cluster)	Globular Cluster	Hercules

Event	Universal Time	Position Angle
Contact I	19:12:04	141°
Contact II	19:13:57	141°
Greatest Transit	21:41:04	205°
Contact III	00:08:16	269°
Contact IV	00:10:08	269°

updates

Hunting Pluto

by Bryan Wilburn

Pluto, on average, sits roughly 31.14 AU (2,894,685,038 miles) from the Sun. While many objects in the night sky are large and bright, Pluto is not. This poses a problem in finding it. The solution is to use an accurate GOTO telescope mount system or accurate charts. Even with a GOTO, you may have trouble actually identifying this dim, minute target.

A number of us have access to laptop or desktop computers with software that can pinpoint the position of Pluto, but they may not be 100% accurate. Purchased software products have algorithms and/or data that may be old. Downloading the latest planet positions from the JPL Web site and requesting star data from SIMBAD gives you up-to-date information on the position and characteristics of this planet.

In a hunt for Pluto, your first stop should be the Jet Propulsion Laboratory's Horizons website—your tax dollars at work. JPL has a number of services for amateur astronomers, from its planetary visual simulators to very accurate ephemeris generators. JPL's Horizons web-interface is found at <http://>

ssd.jpl.nasa.gov/horizons.cgi. You'll need to review the categories that allow you to set options such as the observation location, time and other variables to get the most accurate data possible. By selecting Kit Carson as my observing site (and then driving to Cheyenne WY), and a start time of midnight Saturday night/Sunday morning, I received the following coordinates for 2006-Jul-16 07:00 UTC: JPL Horizons (rounded up to the next second): RA: 17h 37m 44s, DEC: -15°45'03" with a surface brightness of 13.90 magnitude. Software Bisque's *The Sky* Equatorial 2000: RA 17h 37m 50s, Dec -15°44'51" was not in full agreement, but very close, with a difference in RA of 6s and DEC, 12"—overall, an acceptable variance.

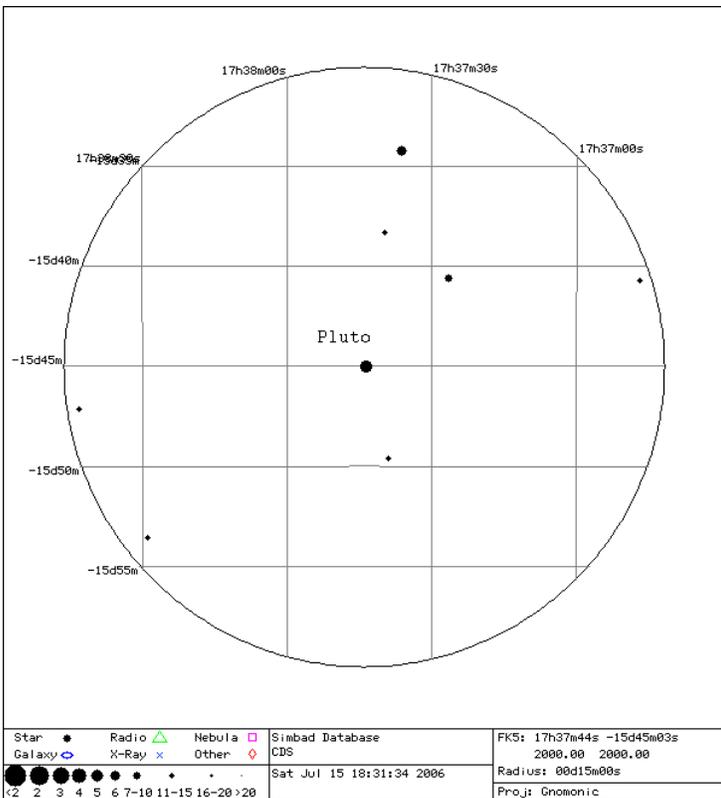
The next step in the hunt should be the SIMBAD site at: <http://simbad.u-strasbg.fr>. If you're hunting Pluto, you'll have to select the "by coordinates" option because SIMBAD doesn't bother with planets. At this point it helps to know the FOV (Field Of View) of your scope. With my C8, a 25mm Plossl eyepiece and a focal reducer, I have roughly a 1/2° FOV. On the SIMBAD page, I select the "25 next objects," FK5 epoch 2000, Equinox 2000 and then hit Submit, then Plot. The resulting display (below left) will give you the view you get from Denver's light polluted skies. The next step will be to generate a "dark sky chart." Select the star nearest your target in the plot; unfortunately, you can't select empty sky.

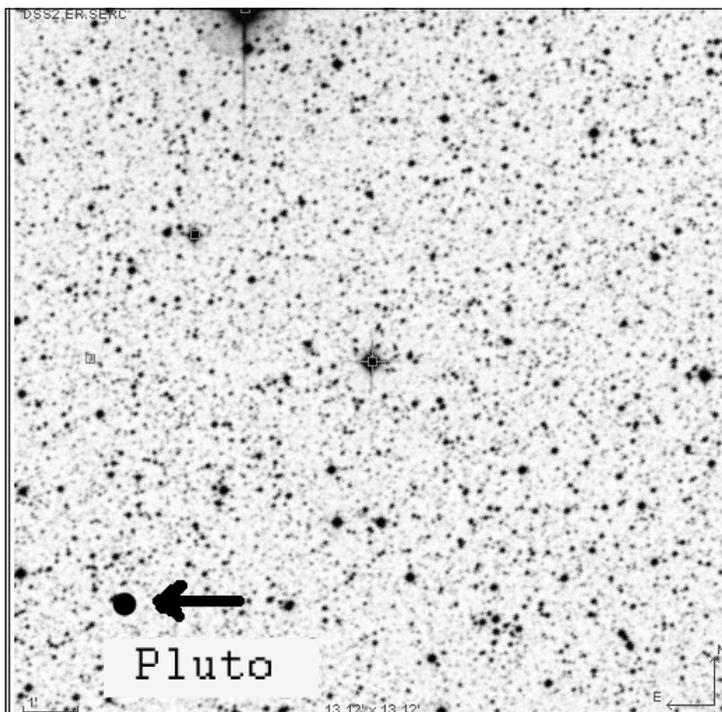
In the next screen, scroll down to the bottom of the window and select the right-hand Aladin Java Applet button. It will take a minute or two to load but you'll soon see an image offered only from very dark skies, with stars down to 17th magnitude. The advantage of this screen is that you get a readout of exactly where your cursor is pointed. By selecting the Tag button on the menu to the right, you can place a crosshair right where Pluto should be and print out the chart (Page 5, upper left) In the chart provided here, I've inserted Pluto. There are many more options on the Aladin applet, but I'll let you dig around and discover them on your own.

You can also use the SIMBAD Aladin web pages to get fairly good depictions of Messier objects, as well as other DSO targets, such as an image of M16.

The final step is to get a reference chart from your own favorite sky software. In my case, it's Software Bisque's *The Sky* Serious Amateur. Everyone has their favorite, so I won't try to tell you what, if any, is the best. The first step is to set the computer time to the same timeframe you used for the JPL ephemeris. Then open the application and locate Pluto on the display. Once located, zoom in to get a display similar to that of your scope. It's

Using SIMBAD's website, Bryan plotted Pluto's position from Denver's light polluted skies.





Bryan created a dark sky chart using SIMBAD's Aladin web pages to insert Pluto.

even better if the software allows you to set up FOV indicators (lower right). With a FOV indicator you'll be able to directly compare your software, the SIMBAD display, Aladin charts and what you see in the telescope.

Armed with charts, it's time to go into the field for some observing. Once the scope mount is set up and polar aligned, I add a focal reducer to widen the FOV, going from 2043mm to just over 1200mm. I also increase the apparent brightness by changing the f ratio from f/10 to f/6.3, gaining about 2 1/2 times more light. Without a GOTO computer, you'll need to star hop. In the case of Pluto, I start at magnitude 1 Antares in Scorpius, glowing with a distinct orange hue against the night sky.

From there, I swing the scope up and to the left at a 45° angle to locate magnitude 2.4 Sabik, the kneecap of Ophiuchus. About 6° to the left of Sabik, you'll find the base star to start your search for Pluto, SAO 6 in Serpens Cauda, a magnitude 3.5 star at RA: 17h 37m 53s, Dec: -15°39'56". On July 15, 2006 at 07:00 UTC, Pluto lies about 1/4° south of this star.

My directions will be in "Real Time;" you'll have to adjust for the type of scope you have, as the orientation will vary. With a C8, focal reducer and 25mm eyepiece, if I center the scope on SAO 6, Pluto should be in the lower center edge of the FOV with the star diagonal straight up—close but not there yet. Below and to the right of SAO 6, the next brightest star in the FOV is magnitude 5.9 SAO 160701, RA: 17h 37m 36.205s Dec: -15°34'15.737". From that star, look 45° down and left. There, you should see another dim star, GSC 6248:170. Just below and to the left of this star you should see two magnitude 12 stars stacked verti-

From the Editor:

Thanks are in order to all the wonderful contributors of this issue for their writing and hard work behind eyepieces and cameras. The quality of images I've received over the last year has been extraordinary.

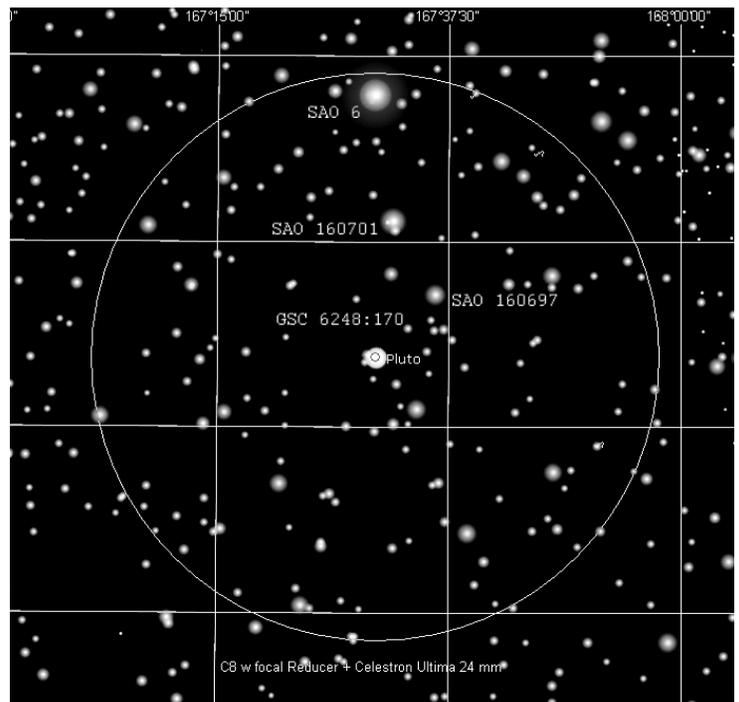
Special thanks to Steve Solon for his gracious, accurate and fast (!) proofreading and editing of most of the articles printed in every *Observer*. Thank you, thank you!—Patti Kurtz

cally. Just to the right of these stars, if the sky is dark enough, you will see the faint dot that represents the magnitude 13.9 Pluto. Center the scope on Pluto. At this point, get out the pencil and paper and draw a sketch, or hook up the camera and shoot a CCD image. Then you can do it all over again 24 hours later to see if the target moved by about 5 arc minutes. If it did, you got Pluto. If not, back on the hunt.

Now, did theory work in practice? NO! Due to high winds, I elected to go up into Wyoming, getting some last minute weather tips from Wayne Green via cel phone as I drove. I set up the scope about 15 miles NE of Cheyenne, and started to polar align. By the time I got the scope settled in, Pluto was directly over Cheyenne, and I couldn't see it.

Back to the hunt...

A reference star chart from *The Sky* software allows for a FOV indicator to compare Pluto's location with the SIMBAD display and the Aladin chart.



NASA's Space Place: Celebrating 40 Years of Intent Listening

By Diane K. Fisher

In nature, adjacent animals on the food chain tend to evolve together. As coyotes get sneakier, rabbits get bigger ears. Hearing impaired rabbits die young. Clumsy coyotes starve. So each species pushes the other to "improve."

The technologies pushing robotic space exploration have been like that. Improvements in the supporting communications and data processing infrastructure on the ground (the "ears" of the scientists) have allowed spacecraft to go farther, be smaller and smarter, and send increasingly faint signals back to Earth—and with a fire hose instead of a squirt gun.

Since 1960, improvements in NASA's Deep Space Network (DSN) of radio wave antennas have made

possible the improvements and advances in the robotic spacecraft they support.

"In 1964, when Mariner IV flew past Mars and took a few photographs, the limitation of the communication link meant that it took eight hours to return to Earth a single photograph from the Red Planet. By 1989, when Voyager observed Neptune, the DSN capability had increased so much that almost real-time video could be received from the much more distant Planet, Neptune," writes William H. Pickering, Director of JPL from 1954 to 1976, in his Foreword to the book, *Uplink-Downlink: A History of the Deep Space Network, 1957-1997*, by Douglas J. Mudgway.



For over 40 years, the "Mars" 70-m Deep Space Network antenna at Goldstone, California, has vigilantly listened for tiny signals from spacecraft that are billions of miles away.

Mudgway, an engineer from Australia, was involved in the planning and construction of the first 64-m DSN antenna, which began operating in the Mojave Desert in Goldstone, California, in 1966. This antenna, dubbed "Mars," was so successful from the start, that identical 64-m antennas were constructed at the other two DSN complexes in Canberra, Australia, and Madrid, Spain.

As Mudgway noted in remarks made during the recent observance of the Mars antenna's 40 years of service, "In no time at all, the flight projects were competing with radio astronomy, radio science, radar astronomy, SETI [Search for Extra-terrestrial Intelligence], geodynamics, and VLBI [Very Long Baseline Interferometry] for time on the antenna . . . It was like a scientific gold rush."

In 1986 began an ambitious upgrade program to improve the antenna's performance even further. Engineering studies had shown that if the antenna's diameter were increased to 70 m and other improvements were made, the antenna's performance could be improved by a factor of 1.6. Thus it was that all three 64-m DSN antennas around the world became 70-m antennas. Improvements have continued throughout the years.

"This antenna has played a key role in almost every United States planetary mission since 1966 and quite a few international space missions as well. Together with its twins in Spain and Australia, it has been a key element in asserting America's pre-eminence in the scientific exploration of the solar system," remarks Mudgway.

Find out more about the DSN and the history of the Mars antenna at <http://deepspace.jpl.nasa.gov/dsn/features/40years.html>. Kids (and grownups) can learn how pictures are sent through space at http://spaceplace.nasa.gov/en/kids/phonedrmarcl2003_august.shtml.

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

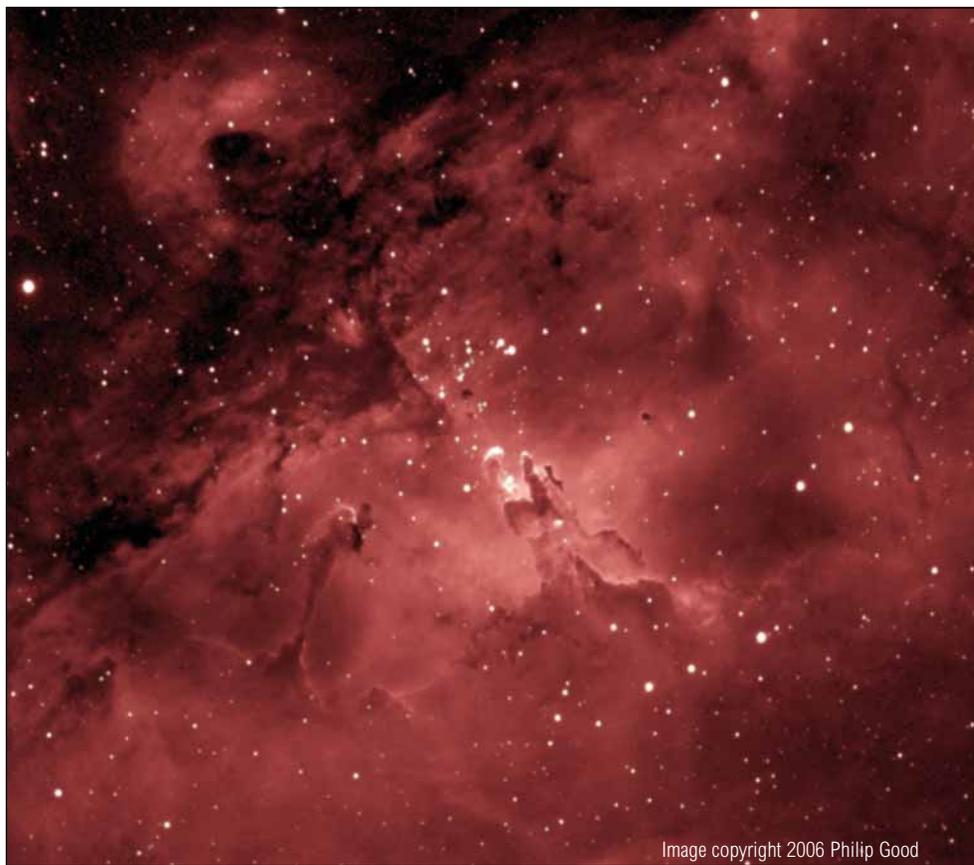


Image copyright 2006 Phillip Good

Phillip Good began this image of M16, The Eagle Nebula, at the 2006 Rocky Mountain Star Stare and finished it up the following weekend from his nearby property near Hartsel, Colorado. The Eagle Nebula is a young open cluster of stars and an associated diffuse emission nebula region catalogued as IC 4703. Phillip took this with an SBIG ST-2000XM CCD camera through a Stellarvue SV115mm refractor mounted on a Takahashi EM200 mount using 10x10 minute exposures through a 6mm hydrogen-alpha (H α) filter. The grayscale image was mapped to a more dramatic color image (see *Observer* PDF version) using Photoshop and Astronomy Tools for Photoshop.



Colorado AL Summit Meeting

by Wayne Green

The Mountain Area Research Section (MARS) region of the Astronomical League (AL) includes Colorado. A Colorado Summit was hastily put together to discuss MARS regional issues prior to heading to ALCON 2006 in Dallas early in August. We had Active Teens Of the Museum (ATOM) from the Denver Museum of Nature and Science, DAS, Boulder Astronomy and Space Society (BASS), and Gene and Debbie Schermerhorn (astrogril.org) in attendance. The meeting was held Saturday afternoon at Chamberlin. Thanks to Dr. Stencel for the use of the observatory on short notice.

The main topic was strategies to deal with a new dues policy implemented by the AL, with discussion centered on all the ways that it does not seem to work for us. An additional concern was raised over the privacy policy of AL in spreading affiliated

clubs membership rosters beyond use by AL headquarters.

We discussed the role that AL Certificate Programs help our clubs meet member's needs and expectations. We discussed possible changes to observing program to better meet modern personal time requirements. Steve Hartung of BASS and Naomi Pequette of ATOM and DAS had a very well considered approach to helping new members become acquainted with amateur astronomy in general and observational techniques in particular.

Darrell Dodge and Debbie Schermerhorn had good ideas for the MARS website based on Darrell's work with DAS website and Debbie's excellent AstroGirl.org site. A new web domain has been acquired for MARS and may be found at *AL-MARS.org*. This page will be fleshed out in the coming weeks.

Stuart Hutchins, and Gene Schermerhorn shared different approaches to the role of GOTO scopes with beginning astronomy. Steve Hartung made a compelling argument that we need to develop a way that leverages GOTO capabilities as a way of introducing the sky to new amateurs, underscoring the importance of developing programs at the club level, with support from AL Regional and National levels for this action.

The meeting was very productive, developing ideas to take to ALCON business meeting. A good history of the issues and process was presented by Jerry Sherlin, the DAS ALCOR, past AL president, and long-time member of the Astronomical League. A laundry list of details have been developed to take to ALCON 2006.

I walked away from this meeting convinced that DAS is poised to become one of the greatest astronomy clubs in America.

A follow-up Summit Meeting is being planned for 9 September after ALCON to bring the new topics back to MARS.

I want to thank all those that were able to attend and also those that emailed their input despite the short notice.

Astronomical League Update



One of the most tangible benefits you receive from your Astronomical League membership comes from the League's observing awards program. These are only available to members of the Astronomical League. There are now over 15 programs and the details of each can be found by going to the League's web site (www.astroleague.org) and clicking on "new observing clubs". New programs and awards are being added almost every year. The programs vary in degree of difficulty from the simple "Universe Sampler" to more advanced programs such as the Caldwell and Herschel Objects. Over the past few years programs have also been added specifically for people who observe

with only binoculars or live in light polluted cities.

Wouldn't you say that observing the sky was one, or perhaps THE, reason you became interested in astronomy? It certainly was for me some 53 years ago (and back then you pretty much had to build your own scope). The League's observing programs offer you organized and interesting observing programs which, upon completion, reward you with a nice certificate and pin and, perhaps just as important, allow our observing chairman, Jack Eastman, to amuse us with glowing tales about what a great observer you are. Now who could turn down an invitation like that.—*Jerry M. Sherlin MARS Regional Representative and ALCOR, Denver Astronomical Society—sherlinj@msn.com*

President's Corner

Continued from page 2

laboration. Variable Star work is the starting point, with other people interested in asteroid measurements, recording double stars, scientific imaging and a host of other activities related to data gathering. Contact us to get involved. We will be working during the week, after the Public Night meetings (easier in the winter, when the event starts and ends earlier). We want to see these refined skills taken to the Dark Site, and to backyards around the DAS area.

The best days and nights of summer are before us, after this rain gets out of the way. So keep looking up!—*Wayne Green*

astronomical league

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 participates in **NASA's Project Astro** program.

The DAS' credo 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.



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Public Outreach Fund \$
Total Amount Paid \$
<i>Please make donations to the Dark Sky Site Fund payable to the DAS EGKDS Fund and mail to Steve Solon, 9774 W. Elmhurst Place, Littleton, CO 80128-5199. Please make other amounts payable to the Denver Astronomical Society and mail along with this completed form to Brad Gilman, DAS Treasurer, 7003 S. Cherry St., Centennial, CO 80122-1179.</i>	



Denver Astronomical Society

c/o Chamberlin Observatory
2930 East Warren Avenue
Denver, Colorado 80210

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