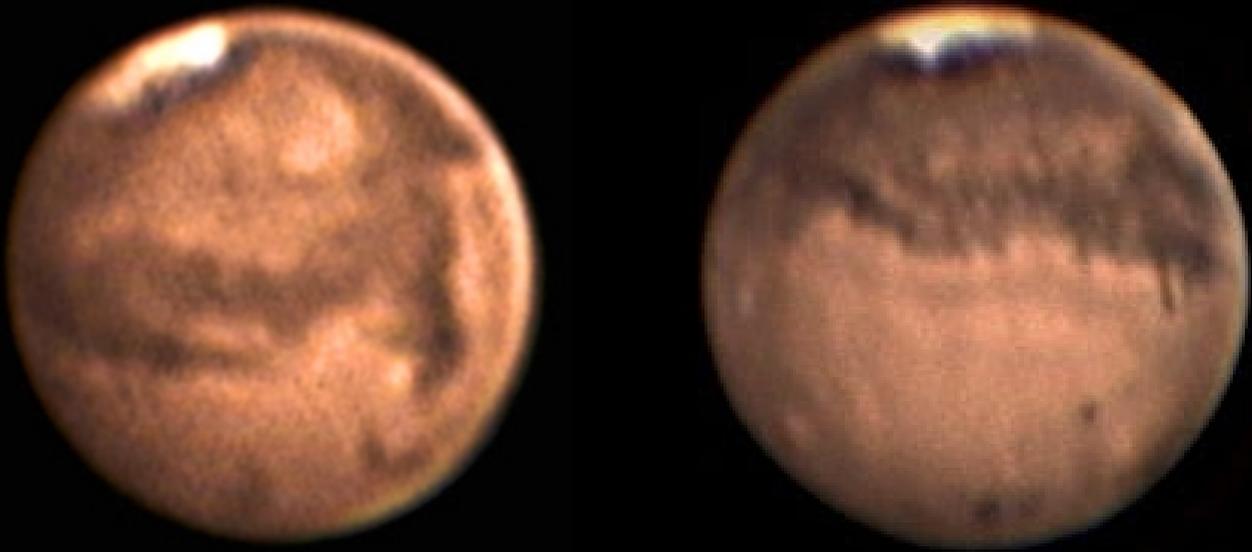


OBSERVER

Newsletter of the Denver Astronomical Society
One Mile Nearer the Stars



Celebrate Mars

With Mars at its closest to Earth in more than fifty thousand years, shutterbugs were out in force. From left to right: August 8, 2003 and August 17, 2003: 16-inch telescope, 2x barlow stacked on 2x barlow and Phillips ToUcam, 70 frames and 180 frames stacked, respectively. Photographed at the Charles Douglas Observatory near Warrensburg, Missouri. See more photos on Pages 4 and 5.

Image copyright 2003 Vic and Jen Winter

Mars Mayhem!

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SEPTEMBER SKIES 2003

Now that its closest approach is behind us, you may be tempted to stop observing Mars. Don't! It still looks terrific but will begin to shrink this month so be sure to take an opportunity to get another look or more. About 50 minutes before sunrise during the last week of September, watch Jupiter and the moon snuggle up close together. Additionally, Mercury lies

just left and below of the gas giant—for two weeks, you should be able to get them both in the same field of a wide-angle binocular view. Summer flew by this year and the evidence it's over is in the autumnal equinox on the 23rd at 4:47 A.M. MDT. Longer nights make for better observing, though, and if you stay up long enough, you'll glimpse Saturn around 1:00 a.m. Sparkling in Gemini the ringed planet's ring system is starting to flatten. And, don't forget about Colorado Astronomy Day on October 4—read about it on Page 6. Clear skies to you all—*Patti Kurtz*

3	.....	First quarter moon
10	.....	Full moon
18	.....	Last quarter moon
23	.....	Autumnal Equinox (4:47 A.M. MDT)
25	.....	New moon

PRESIDENT'S CORNER

By the time this article goes to print, the planning and preparation for Mars Madness will be a distant memory. Thanks to John Flemming and company for their integral role in the largest event we have hosted in several years. Through the efforts of the DAS, the public was treated to an experience they will never forget, not to mention an enlightening look into the world of amateur astronomy. Great job everyone!

On another note, I would like to remind everyone that as members of the DAS, you have access to a wonderful library. The library is open on Tuesday and Thursday evenings during public nights, after general meetings and during open houses. You can check out items for one month by recording your name and item(s) checked out in a notebook. Recent additions include:

- *An Intimate Look at the Night Sky*, by Chet Raymo, QB64 .R375
- *The Great Atlas of the Stars*, by Serge Brunier, QB65 .B7813
- *Seeing in the Dark: How Backyard Stargazers are Probing Deep Space...*, by Timothy Ferris, QB35 .F49
- *A Manual for Amateur Telescope Makers: Detailed Plans to Construct Three Different Telescopes*, Karine Lecleire, QB88 .L4313
- *Spaceshots: The Beauty of Nature Beyond Earth*, Timothy Ferris, TR713 .F47
- *Carl Sagan: A Life*, Keay Davidson



Mars on September 1, 2003
12-inch LX200 at f/10 with a 3COM Webcam and resized to 2X using a B-spline. Taken from Grand Lake.

Image copyright 2003 Chris Tarr



- *A Manual for Amateur Telescope Makers: Detailed Plans to Construct Three Different Telescopes*, Karine Lecleire, QB88 .L4313
- *Spaceshots: The Beauty of Nature Beyond Earth*, Timothy Ferris, TR713 .F47

- *Carl Sagan: A Life*, Keay Davidson

DAS Schedule

SEPTEMBER

- 5 E-Board meeting, 8 P.M.
- 6 **Open House—Mars at Opposition** (the Open House begins at 7:30.)
- 12 **General Meeting at Olin Hall, DU, 7:30 P.M.**—Speaker: Dr. Clark Chapman (Southwest Research Institute), “Craters on Mars: Implications for Water and Life.”
- 21-28 Okie-Tex Star Party
- 26-29 **Antique Telescope Society Convention**
- 27-28 **Dark Sky Site Weekend**

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) 281-9052 for reservations.

OCTOBER

- 3 E-Board meeting, 8 P.M.
- 4 **Colorado Astronomy Day**—Takes the place of the General Meeting. (See Page 6.)
- 11 **DAS Auction** (begins at 1:00 P.M.)
- 25-26 **Dark Sky Weekend**
- 31 **Halloween (Neighborhood Party begins at 6:00 P.M.)**

DAS Officers

President:

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Frank Mancini (303) 414-0300
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Dr. Robert Stencel

Chief Observer:

Jack Eastman

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Jack Eastman	Bill Ormsby
Joe Gafford	Sandy Shaw
Ivan Geisler	David Shouldice
Ron Mickle	Steve Solon
Larry Brooks, Past President	

DAS Information Line:

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Newsletter:

Denver Observer editor, Patti Kurtz
StarFire Creations Unlimited
(720) 217-5707

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

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.

www.denverastro.org

Careful Planning and Quick Improvisation Succeed in Space Biz

by Patrick L. Barry and Dr. Tony Phillips

On December 18, 2001, ground controllers at JPL commanded NASA's Deep Space 1 (DS1) spacecraft to go to sleep. "It was a bittersweet moment," recalls Marc Rayman, the DS1 project manager. Everyone was exhausted, including Deep Space 1, which for three years had taken Rayman and his team on the ride of their lives.

DS1 blasted off atop a Delta rocket in 1998. Most spacecraft are built from tried-and-true technology—otherwise mission controllers won't let them off the ground. But Deep Space 1 was different. Its mission was to test 12 advanced technologies. Among them: an experimental ion engine, a solar array that focused sunlight for extra power, and an autopilot with artificial intelligence. "There was a good chance DS1 wouldn't work at all; there were so many untried systems," recalls Rayman.

Nevertheless, all 12 technologies worked; the mission was a big success.

Indeed, DS1 worked so well that in 1999 NASA approved an extended mission, which Rayman and colleagues had dreamed up long before DS1 left Earth—a visit to a comet. "We were thrilled," says Rayman.

And that's when disaster struck. DS1's orientation system failed. The spacecraft couldn't navigate!

What do you do when a spacecraft breaks and it is 200 million miles away? "Improvise," says Rayman.

Ironically, the device that broke, the 'Star Tracker,' was old technology. The DS1 team decided to use one of the 12 experimental devices—a miniature camera called MICAS—as a substitute. With Comet Borrelly receding fast, they reprogrammed the spacecraft and taught it to use MICAS for navigation, finishing barely in time to catch the comet. "It was a very close shave."

In September 2001, DS1 swooped past the furiously evaporating nucleus of Comet Borrelly. "We thought the spacecraft might be pulverized," Rayman recalls, but once again DS1 defied the odds. It captured the best-ever view of a comet's heart and emerged intact.

By that time, DS1 had been operating three times longer than planned, and it had nearly exhausted its supply of thruster-gas used to keep solar arrays pointed toward the Sun. Controllers had no choice but to deactivate the spacecraft, which remains in orbit between Earth and Mars.

Rayman has moved on to a new project—Dawn, an ion-propelled spacecraft that will visit two enormous asteroids, Ceres and Vesta, in 2010 and 2014. "Dawn is based on technologies that DS1 pioneered," he says.

Even asleep, DS1 continues to amaze.

Find out more about DS1 at <http://nmp.jpl.nasa.gov/ds1>. For kids, go to <http://spaceplace.nasa.gov/ds1dots.htm> to do an interactive dot-to-dot drawing of Deep Space 1.

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



This was the final image of the nucleus of comet Borrelly, taken just 160 seconds before Deep Space 1's closest approach to it. This image shows the 8-km (5-mile) long nucleus from about 3417 kilometers (over 2,000 miles) away.

Charts Courtesy: NASA

Sky & Telescope Increase

The subscription rate for Sky & Telescope has increased to \$32.95. If you have any questions or wish to subscribe, contact Chuck Carlson, Treasurer.

Note from the editor:

Thanks to **Patrick Ryan** who edited and produced the June and July Observers! Also thanks to **Sandy Shaw** for this month's "AstroQuiz," and to all the photographers shooting Mars for the last couple of months.

Newsletter contributions (ccd and film astrophotos, members with telescopes, star party candid photos, short observing anecdotes, observing and imaging tips, etc.) are welcome and encouraged. This is your chance to strut your stuff! **Please call me for submission instructions.**

**Patti Kurtz

(720) 217-5707

All articles and images are © the author or photographer, and may not be reproduced without their written permission—Ed.

Sky & Telescope sends only one notice before subscriptions end. The DAS sends only one issue of The Denver Observer after dues expire. The cost of magazines (Astronomy and Sky & Telescope) is in addition to the annual dues. For questions concerning memberships, please contact DAS Treasurer, Chuck Carlson (cbcarlso@du.edu). See the back page of this newsletter for more information.

AstroQuiz
(Look for the answer in this issue.)
Q. Who is Asaph Hall?
AstroQuiz is contributed by Sandy Shaw.

M A R S



June 28, 2003

This Mars Photo was taken with a Meade LX200-12inch and 2x Televue Powermate with a Nikon D1x digital camera. The picture is a single image taken at 1/40 sec with an equivalent ISO of 400 at f/20 with no filter. Processing was done with Picture Window Pro® 3.1h.

Image copyright 2003 John Chapter



August 2, 2003

A cooperative effort using the 20-inch Clark at Chamberlin, ST-7. 10-inch aperture stop, a red #25 filter, and an ND filter.

Image copyright 2003 Gary Jensen

Summons

By Robert Francis

*Keep me from going to sleep too soon
Or if I go to sleep too soon Come
wake me up.*

*Come any hour Of night.
Come whistling up the road.*

*Stomp on the porch.
Bang on the door.*

*Make me get out of bed and come
And let you in and light a light.*

*Tell me the northern lights are on
And make me look.*

*Or tell me the clouds Are doing
something to the moon They never
did before, and show me.*

See that I see.

*Talk to me till I'm half as wide
awake as you And start to dress
wondering why I ever went to bed
at all.*

*Tell me the walking is superb.
Not only tell me but persuade
me. You know I'm not too hard
persuaded.*

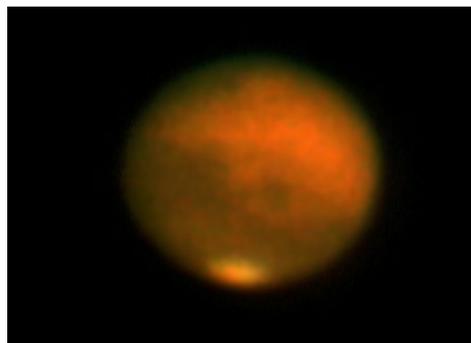
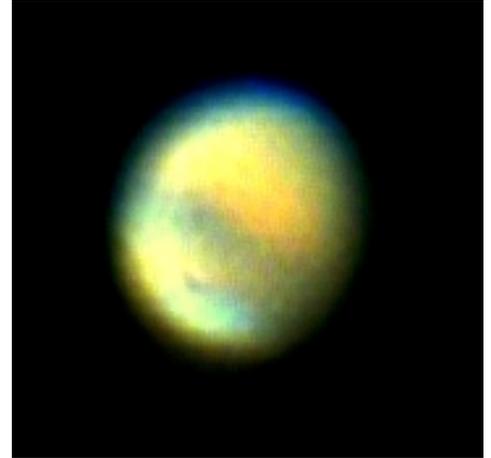


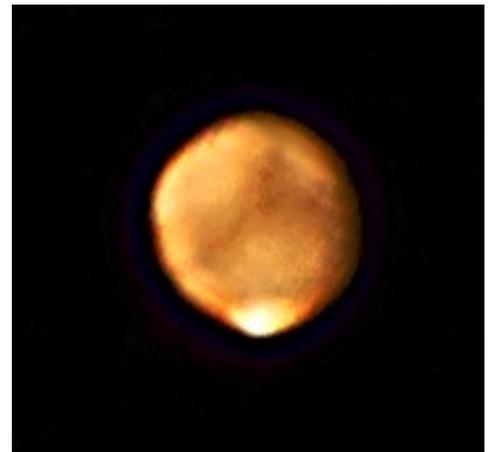
Image copyright 2003 Chris Huston



July 11, 2003

12.5-inch newtonian with 5x powermate (f/30) and ToUCam webcam with I.r. blocking filter. This is the result of automatic registration in Registax and stacking 90 manually selected frames from the same .avi file, then processing using the wavelets functions in Registax. Some minor gamma and contrast tweaking.

Image copyright 2003 Ron Pearson



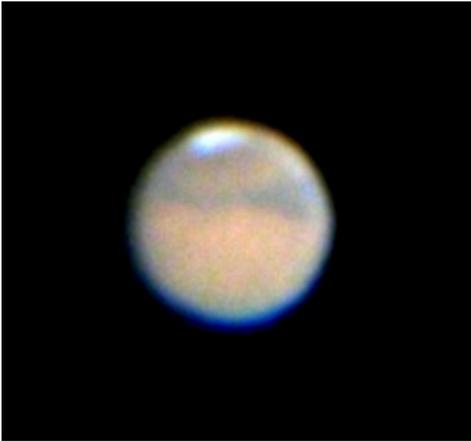
August 10, 2003

500mm f/4 +1.4x+2x=1400mm at f/16-22, 1/45 sec ISO 200, Canon 10D camera, stationary on tripod. Contrast stretch, unsharp mask. Image enlarged 4x; 4 images stacked.

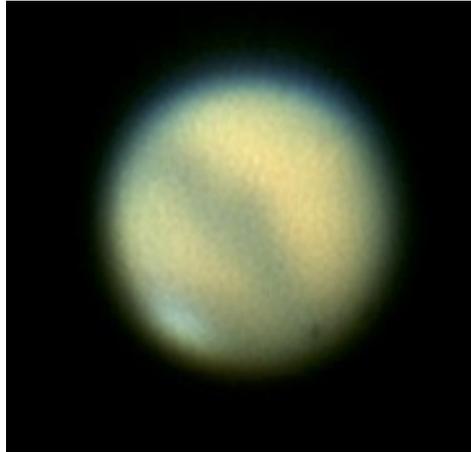
www.clarkvision.com

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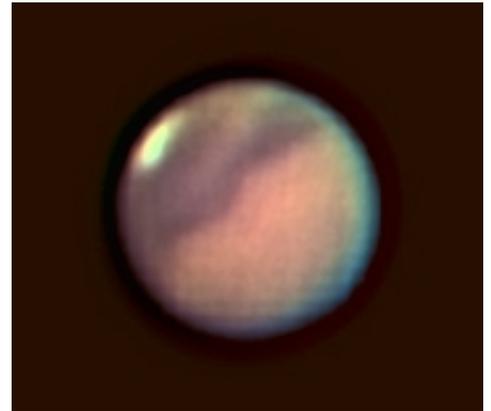
August 13, 2003
From Bert's driveway with his Casio.
Image copyright 2003 Bert Harless



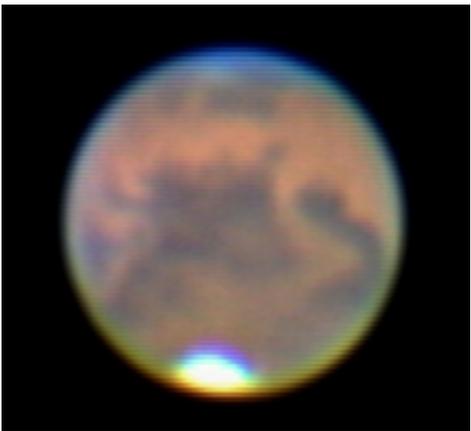
August 15, 2003
This is a stack of 82 frames out of 685 or so @10fps; stacked and processed using Registax program. Taken with ToUCam on 12.5-inch newtonian @ f/30 (5x televue powermate on f/6 prime focus)and Edmund I.R. block filter.

"I believe the dark band is Sinus Meridiani region with Tharsis area in upper right, but I havent double checked that yet. The dark area around the south polar cap is 'melt-line' area showing amount of shrinkage."

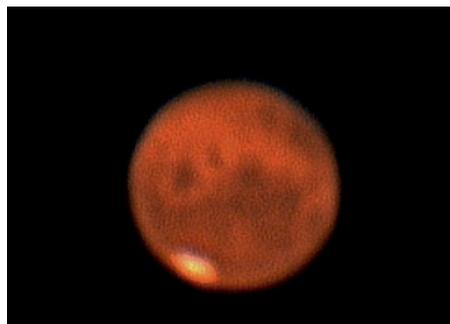
Image copyright 2003 Ron Pearson



August 16, 2003
20-inch Alvan Clark (Chamberlin Observatory) at prime focus with ToUcam & I.R. block filter. Stacked and processed in Registax.
Image copyright 2003 Ron Pearson



September 1, 2003
12-inch LX200 at f/20 with a 3COM Webcam and resized to 2X using a B-spline. Taken from Grand Lake.
Image copyright 2003 Chris Tarr



August 31, 2003
Image copyright 2003 Ron Pearson

Correction
An article published in the August Denver Observer inadvertently omitted the name of one of the authors. "Mars Midnight Madness" was written by John Flemming and Sandy Shaw.

A Total Solar Eclipse at Midnight? How weird is that?
ANTARCTICA 2003 with David Levy
You can't get there without us.
www.mythictravels.com
affiliated with
Astronomical Tours

o b s e r v e r s d e c k

Directions to the E.G. Kline Dark Site

The DAS Edmund G. Kline Dark Site is about 60 miles east of the "mousetrap" in downtown Denver.

Take I-70 east to the Deer Trail exit (exit 328), turn left at the end of the exit ramp, and turn left again on CR 217 (after the Texaco station). Take CR 217 just over 1/2 mile, and turn right (east) onto CR 34. Stay on CR 34 about 6 miles until you get to CR 241. Turn left (north) onto CR 241 and continue about 1.5 miles – you'll see a culvert with a wide gate on the right (east) side of the road.

Directions to the site from Denver, arrival from the North (for after-dark arrivals):

Take I-70 eastbound to exit 316 (Byers). Turn left at end of ramp which puts you on eastbound US-36. Take US-36 east 17.2 miles to CR 241. Turn right (south) onto CR 241 and continue for 6.2 miles. The DSS entrance is on the left between two tall posts.

Note: Travel distance from Denver using the North route is actually 3.9 miles shorter than the traditional route. The first 5 miles of CR 241 going south from US-36 is narrow and somewhat rough. Be careful.

Warming Hut Rules

- The last people on the site must turn off the lights and the heat.
- A microwave will be provided for warming food. Please clean up after yourself.
- No pots and pans, appliances, or other supplies are to be left in the shed.
- No personal supplies are to be left in the shed overnight.
- Do not donate furniture or other things unless you clear it with the D.S.S. committee first.
- No food left overnight in the shed.
- No sleeping overnight in the shed.
- Quick naps are permitted if you feel you might fall asleep on the way home. We would prefer you get your nap rather than falling asleep on the road. However, we don't want it to become a tent for camping.
- Clean up after yourself before you leave the site.
- Please clean up all food that drops or is spilled, otherwise it will attract mice and insects.

Colorado Astronomy Day October 4, 2003

We're gearing up and getting ready for Colorado Astronomy Day to be held on Saturday, October 4, 2003! Join Denver and the DAS for a day filled with space and astronomy activities and great speakers at the Denver Museum of Nature & Science. The main activities begin at 11:00 A.M. Follow with a starry-filled night (we hope, weather permitting) at the University of Denver's Historic Chamberlin Observatory at 7 P.M. This year's speakers

include **Dr. John Bally** of the University of Colorado and **Mr. Bryan White**. Both gentlemen have spoken for the DAS in the past with rave reviews. Following is a line up of speakers and events:

- Opening ceremonies with speakers **Dr. Laura Danly** (DMNS Curator, Space Odyssey Exhibit) and **Dr. Robert Stencel** (Director of UDHCO). **12:00 noon.**
- **Bryan White's** interest in astronomy coin-

Dark Sky Site Courtesy

Please remember that white light disrupts the eye's dark adaptation and can ruin astrophotography. Following these simple guidelines will improve the experience for all:

- ★ Upon arrival at the site, check to see if sign in has been instituted at the warming hut. We hope this will help alleviate problems members may be experiencing in trying to find a place to set up.
 - ★ Drive carefully on the road, there are blind spots in the low area and you will find cattle on the road at times.
 - ★ Try to arrive before dark.
 - ★ If you have to arrive after dark, turn off headlights when turning into site.
 - ★ Turn off all dome and trunk lights. If a light can't be turned off, pull the fuse, use layered red brake light tape or just duct tape over it.
 - ★ When you drive in, position your car so you can drive out directly instead of using your back up lights.
 - ★ Use only dim red flashlights. Never shine a flashlight in someone's face or on their scope.
 - ★ Please wipe your feet carefully before using the warming hut.
 - ★ Please chip in and do some cleaning up in the hut or at the observing sites. It is the responsibility of all users to keep the place nice.
 - ★ Serious astrophotographers may wish to use the South field since it is somewhat isolated from the rest of the area.
 - ★ If you are the last person to leave the site, turn off the lights and the heaters in the warming hut. Then, lock the warming hut and close the gate to the site.
 - ★ Members are responsible for educating their guests as to the rules.
 - ★ Prospective members, out of town astronomers, and others may be guests one time.
 - ★ Members can bring family any time and personal friends on a limited basis, but should not abuse the privilege.
 - ★ Groups of five or more guests must be cleared through the President or Vice President prior to visiting the Dark Sky Site.
 - ★ There is no sleeping in the warming shed overnight. However if you need to nap for a short period, you can use the shed. We would rather you fall asleep there rather than at the wheel on the way home.
 - ★ You may warm drinks in the microwave—it is not there for warming food and cooking since we have no water to clean up. If you spill, please clean up after yourself
- OTHER SUGGESTIONS:**
- ★ Wear warm clothing. The nights can be extremely cold in the winter and surprisingly cold in the summer.
 - ★ Bring your own power such as a battery and/or an inverter since the power sites are limited. Also bring extension chords.
 - ★ Hot drinks can help you survive the night!
 - ★ When approaching the telescope of someone who does not know you, introduce yourself and ask before looking through the scope. Most members (with the exception of astrophotographers when they are taking pictures) will be happy to share their scopes.
 - ★ Bring your own toilet paper in case that in the porta-potty runs out.

edmund g. kline dark site

Welcome New Members!

The following folks joined the Denver Astronomical Society during the last few months. Welcome new members!

- Andreas J. Cadd
- Lou Caldrello
- Gautham Copakumar
- Tom Griffiths
- Robert Joyet
- Alesia Martin
- Ken Notari
- Marilyn Olson-Burns
- Robert Rushforth
- Peter M. Shipman
- Carol Skidmore
- George Whitney
- Sonya-Mae Yeager-Meeks
- Lloyd Zufelt

decided with the discovery of Comet Mrkos, which he says he and his father spotted the night before astronomers announced their findings to the public. He began photographing comets, stars, and aurora borealis. His pursuit has led him to the far northern territories of Canada, to southern Florida, and numerous places in between to photograph, in “three-dimensional glory, the wonders of the night sky.” Bryan will regale us with his *“Nitescapes 3D.”* 1:00 P.M.

• **Dr. John Bally** received his undergraduate degree from the University of California at Berkeley in 1972. In 1980 he received his Ph.D. from the University of Massachusetts at Amherst. For 11 years he worked with the group at AT&T Bell Laboratories that discovered the Cosmic Microwave Background—his research was focussed on the formation of stars and the molecular component of the in-

President's Corner

Continued from page 2

month you graduated from high school.

We do accept donations, which are tax deductible, and are considering several plans for expansion of titles. If you have any thoughts on raising funds to purchase additional books and pricey items, please email me at csastrogirl@aol.com or Jerry Sherlin, DAS Librarian, at SHERLINJ@aol.com.

Thanks to both Jerry Sherlin and Pauline Ide, for the countless hours they have spent organizing and cataloging items. Their dedication has made the library an inviting environment for us to relax in and read a book.—Carla Swartz

Sandy Shaw

Master Observer Certificate Recipient

At our last general meeting, Chief Observer Jack Eastman, presented Sandy Shaw with the Master Observer Certificate awarded by the Astronomical League. The award was the culmination of the successful completion of the following individual certificates: Binocular Messier Club, Deep Sky Binocular Club, Southern Skies Binocular Club, Lunar Club, Universe Sampler Telescope Club, Universe Sampler Naked-Eye

Club, Messier Club, Herschel 400 Club, Urban Club and the Double Star Club. In addition, Sandy has also completed the Asteroid Club and the Caldwell 70-object certificates. She also finds time to be the Astronomical League Coordinator for the DAS, which makes her an excellent resource for discussing her experiences and the various observing certificates available. Congratulations Sandy! —Carla Swartz

terstellar medium. Today he is a member of the faculty in the Astrophysical and Planetary Sciences Department at the University of Colorado in Boulder and uses the Hubble Space Telescope as well as ground-based instruments to probe star and planetary system birth.

A dynamic speaker that enthralles audiences from all walks of life, Dr. Bally will present *“The Revolution in Astronomy: Our Changing View of The Universe.”* 2:00 p.m.

As the museum's **Space Odyssey** is in full swing, we'll enjoy all it has to offer as well as Solar Observing on the Sky Terrace. Also at our disposal is the IMAX theater with three films, including “Space Station,” and Gates Planetarium's “Cosmic Journey.” If you haven't already seen the new planetarium, you're in for a treat! Admission prices for the museum are \$9 (adults), \$6 (seniors aged 60+ and juniors aged 3-18). Admission for museum members is free. Combination packages are available for museum entrance, IMAX, and Gates. Please check the museum website at <http://www.dmnms.org> or call (303) 322-7009 for complete pricing.

We need volunteers with solar scopes (or telescopes with solar filters) for viewing on the Sky Terrace. If you'd like to volunteer, please email pkurtz@starfirecreations.com or call (720) 217-5707.

Getting Legal

The EGK Site Committee submitted the corrections required by the Arapahoe County Bldg Dept review, on July 22, 2003. A permit was issued for the EGK-Dark Site on August 8, 2003 for the following work: Temp. Bldg, Vault Privy, Concrete Pads, and Electrical.

Part of the work will require a new gate at the North Parking area in front of the Temp. Bldg. (Warming Hut). This will be a “FIRE ACCESS ONLY” gate. The north parking area will also receive a 6-inch gravel road base to comply with the Fire Code Access requirement to the Temp Bldg.

The DAS will have 180 days to complete this work. At this time the vault for the privy has been ordered and will be installed in the next 3 or 4 weeks. The Arapahoe County Road Maintenance will be installing a DAS purchased culvert at the new gate location. This new gate is not intended to be used by the membership for access to the site for star parties. Please continue using the gate at the south end of the site. If you have any questions, please email me at kaazmos@bewellnet.com. For those who would like to help in the construction work, please contact Ted Cox or Steve Solon.—Wayne Kaaz

Astro-Quiz Answer

A. In August 1877 American astronomer Asaph Hall announced his discovery of the two tiny Martian moons. Hall selected the Greek names Phobos for the inner, larger satellite and Deimos for the outer one, writing that “These are generally the names for the horses that draw the chariot of Mars, but in [the Iliad] they are personified by Homer, and mean attendants, or sons of Mars.” Phobos and Deimos have been variously translated as Fear, Terror, Panic, Rout and Flight. Two commonly used terms derive from these Greek words; “phobia” from phobos, and “dire” from deimos. Mariner 9 obtained the first close-up images of the Martian satellites; its pictures of battered and lopsided asteroid-like fragments suggested that Phobos and Deimos might be gravitationally captured minor planets. Another theory of the moons' origins is that they may be debris remaining from the initial accretion of Mars during formation of the solar system.—Sandy Shaw

updates

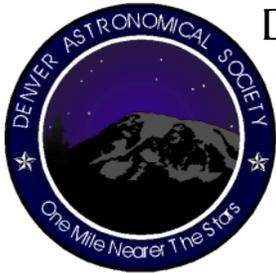
About the Denver Astronomical Society

The DAS is a group of amateur and professional astronomers that share a mutual interest in the heavens. The DAS operates the University of Denver's Chamberlin Observatory, along with its prized 1894 Alvan Clark 20-inch refracting telescope. Our members have been involved with the first public planetarium at the Denver Museum of Science and Nature and the Smithsonian Astrophysics Observatory's "Moon Watch" program. The DAS successfully petitioned to have the Chamberlin Observatory listed on the National Register of Historic Places.

Our Credo is to provide members a forum for increasing and sharing their knowledge, to promote and educate the public about astronomy, and to preserve the historic telescope and observatory in cooperation with the University of Denver. To these ends we have established three tax deductible funds: the Van Nattan Scholarship Fund, the Chamberlin Restoration Fund, and the DAS Dark Sky Site Fund. This last fund was established in order to construct and maintain observing facilities near Deer Trail in eastern Colorado.

Please call our Info Line at (303) 871-5172 and drop by the General Membership meetings. Become a member and enjoy speakers, facilities, events, and our monthly newsletter, *The Denver Observer*.

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: _____	
(Associates 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: \$30	Associate: \$10 (Age 22 and younger)
..... \$	
Astronomy Magazine/\$29	
Sky & Telescope Magazine/\$32.95	
..... \$	
Van Nattan Scholarship Fund	
..... \$	
Chamberlin Restoration Fund	
..... \$	
Total Amount Paid	
..... \$	
Please mail Dark Sky Site donations to: DAS Treasurer, Chuck Carlson, at the address below. (Make checks payable to the Dark Sky Site Fund).	
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Denver Astronomical Society

c/o Chamberlin Observatory
2930 East Warren Avenue
Denver, Colorado 80208

SEPTEMBER'S MEETING

SEPTEMBER 12:

General Meeting at Olin Hall, DU, 7:30 P.M.—Speaker: Dr. Clark Chapman (Southwest Research Institute), "Craters on Mars: Implications for Water and Life."

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