

DENVER OBSERVER

Newsletter of the Denver Astronomical Society

One Mile Nearer the Stars



The Milky Way is captured at Wolf's Run during Rocky Mountain Star Stare 2001. Image: © Sandy Shaw, 2001

An Equinox Spectacle

Monks Mound, the largest mound at Cahokia Mounds State Historic Site in Illinois, is built on a sixteen-acre base that rises in four steps to about 100 feet high. To its west are large posthole circles that Dr. Warren Wittry interpreted as "woodhenge"—these could have been used to mark alignments with solstices and equinoxes over a two hundred-year period from about 900 A.D. to 1100. The town's leader probably resided at Monks Mound, and from there could witness the spectacular illusion of the mound giving birth to the sun during equinox sunrise.—Ed.

Equinox Heralds Autumn

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SEPTEMBER SKIES 2001

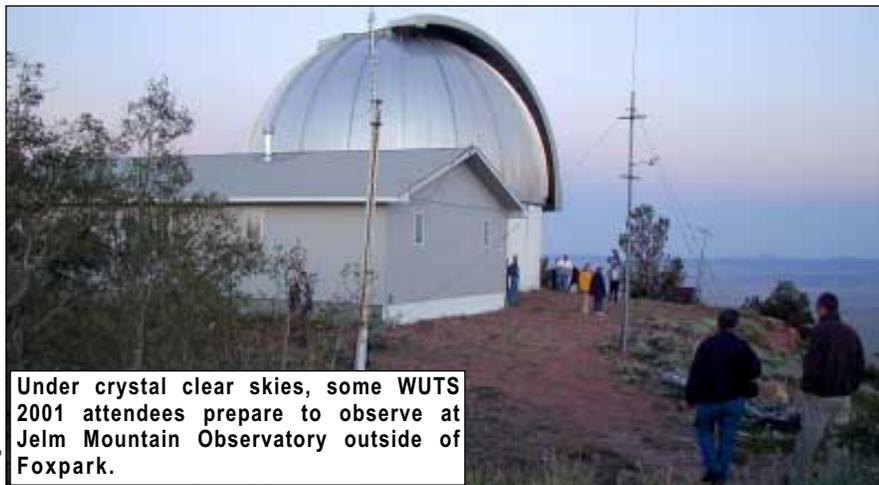
Saturn showcases September with what should be a spectacular early morning occultation by the last quarter moon on the 10th. Feel free to pray to the weather gods for clear skies that morning! The new moon weekend is a close second with a celestial lineup of Saturn, Jupiter, Venus, and the barely visible moon. Mars is dimming to the approximate brightness of some of the brightest stars in the sky as it skips across the "teapot" in Sagittarius. And, Venus heralds the dawn while Mercury struggles with the setting sun. Binoculars may help to spot that fleet-footed and often elusive planet near Spica mid-month. May your skies be dark and your starlight bright.—Ed.

- 2 Full moon
- 10 Moon occults Saturn in early morning hours (6:25A.M. MDT) Last quarter moon
- 17 New moon
- 22 ..Autumnal Equinox (5:06P.M. MDT)
- 24 First quarter moon



Left: Built by Sim Picheloup of Houston, Texas, the Bino-chair at Star Stare was unique and very comfortable.

Image: ©Ron Pearson, 2001



Under crystal clear skies, some WUTS 2001 attendees prepare to observe at Jelm Mountain Observatory outside of Foxpark.

PRESIDENT'S CORNER

I just had my first summer visit to the Dark Sky Site. The weeds have been mowed and the site is great! A number of us were there the night of the Perseids peak, and the meteors were wonderful. Those of you who have not been to the DSS are really missing something. Remember, you do not need to own a

scope. Members with scopes out there are usually ready to share an eyepiece or two. **GET OUT THERE AND HAVE SOME FUN!!!**



Big news—on October 20 the

DAS will host the biggest Colorado Astronomy Day ever. We will have the usual star party, a planetarium, four great guest speakers during the day and lots more. Currently, Dr. Jeff Hester (HST astronomer) and Dr. Ben Clark (Mars Odyssey mission) are on the speaking agenda. This will be a great event.

Orion Telescopes has donated an 8-inch Dobsonian to raffle (thank you Orion and Cathy Havens). Proceeds will go to the Dark Sky Site. Thanks also to Steve Solon for managing the raffle. Tickets go on sale at the August Open House.

I hope your skies are clear—Larry Brooks, Lbrooks100@aol.com.

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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.

DAS Schedule

SEPTEMBER

- 7 E-Board meeting, 8 P.M.
- 13-16 DAS Star Party at North Sterling Reservoir (See Pg. 3)
- 14-16 Dark Sky Site Weekend
- 21 General Meeting at Olin Hall, DU, 7:30 P.M.—Speaker, Bryan White, “3-D Nitescapes.”
- 22 Open House

OCTOBER

- 5 E-Board meeting, 8 P.M.
- 12-14 Dark Sky Site Weekend
- 19 General Meeting at Olin Hall, DU, 7:30 P.M.—Speaker, Alan Stern, Southwest Research Institute
- 20 Colorado Astronomy Day
- 27 DAS Auction (setup at 11 A.M., auction begins at 1 P.M.)

Public Nights are held every Tuesday and Thursday from 8:30 P.M.

at Chamberlin Observatory

Costs to non-members are: \$2.00 adults, \$1.00 children
Please call (303) 871-4333 for reservations.

www.denverastro.org

DAS To See Stars at North Sterling Reservoir

Just a reminder—

Join your fellow DAS members on **September 13, 14, 15, and 16** at the Chimney View Campground at North Sterling Reservoir. Full details are in the August issue of the *Denver Observer*. If you're a new member and/or didn't receive your August newsletter, please retrieve the PDF file on the DAS website.

The Longmont Astronomical Society uses this site frequently and thinks the skies there are fabulous.

We hope to see you there!

Note from the editor:

Newsletter contributions (ccd and film astrophotos, members with telescopes, star party candid, short observing anecdotes, observing and imaging tips, etc.) are welcome and encouraged. This is your chance to strut your stuff! **Please submit by the 15th of each month as follows:**

Film: Glossy prints by mail** or scanned and uploaded (high res.) to the listserve upload area.

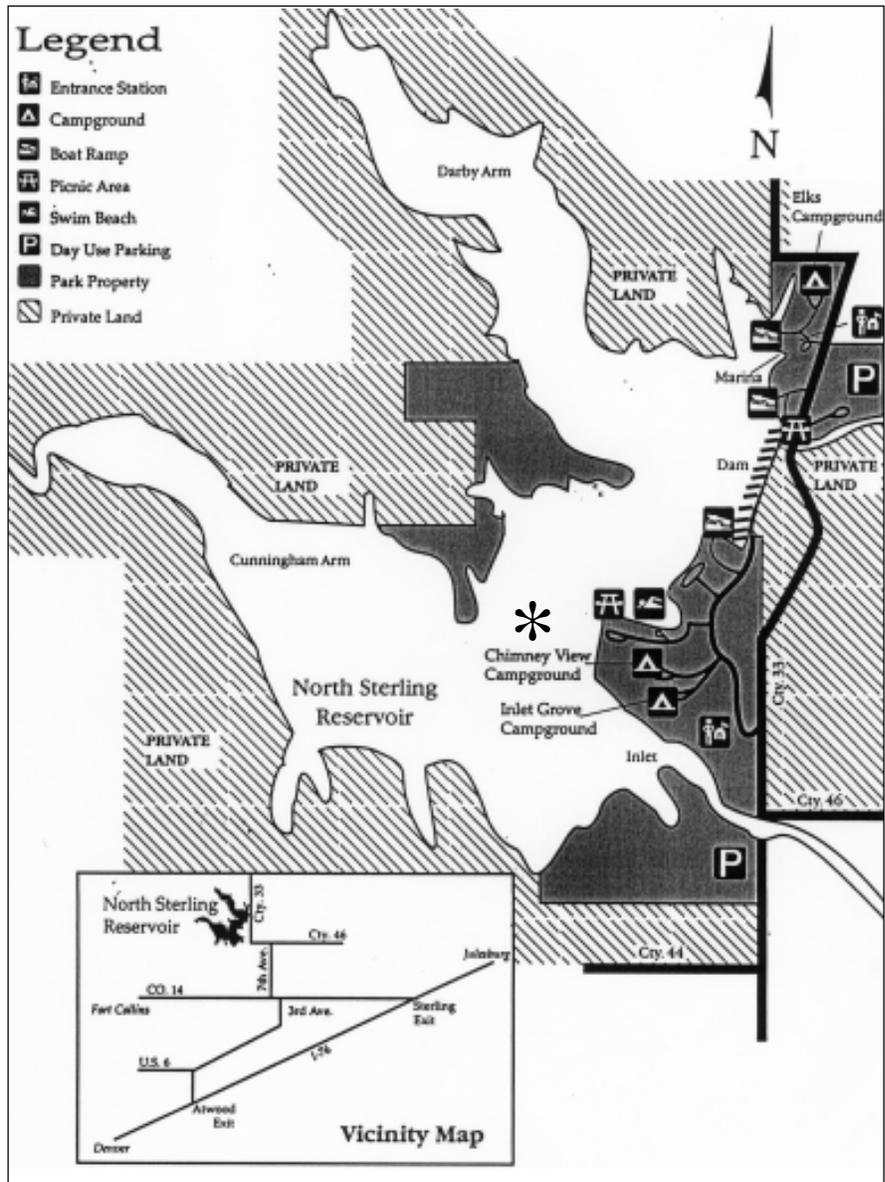
CCD: Uploaded to the listserve upload area (resolution as high as possible, please).

Text: Articles should be no more than 250 words, please. Paste into an email and send to me at: pkurtz@starfirecreations.com.

If you don't receive a confirmation email from me, I didn't get your email. Also, be sure to let me know if you've uploaded a file. Thank you!

**Patti Kurtz (call for mailing address)
(303) 948-5825

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North Sterling Reservoir

Directions - From Main Street in Sterling, turn north on North 7th Avenue, follow the sign 12 miles to the reservoir.

MEMBERS NEED TO KNOW . . .

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 (chcarlso@du.edu). See the back page of this newsletter for more information.

DAS Bookstore and More (!)

The Sun in the Church: Cathedrals as Solar Observatories "...is so loaded with the history of astronomy that an adequate review would need as much space as the Introduction to the book, 23 pages." Read this month's feature (pgs. 4 and 5) by Marsh Harris and find what else our enterprising member discovered within its pages.



updates

The Sun in the Church: Cathedrals as Solar Observatories

a Book Recommendation by Phillip (Marsh) Harris

All photos by Marsh Harris

The Sun in the Church: Cathedrals as Solar Observatories, J. L. Heilbron, Professor and Vice Chancellor Emeritus, University of California, Berkeley. Published by Harvard University Press, 1999 (about \$35.00).

This is not so much a book review, as it is a book recommendation. The book is so loaded with the history of astronomy that an adequate review would need as much space as the Introduction to the book, 23 pages.

The introduction begins, “The Roman Catholic Church gave more financial and social support to the study of astronomy for over six centuries, from the recovery of ancient learning during the late Middle Ages into the Enlightenment, than any other, and, probably all other, institutions—the basis of its generosity to astronomy was not love of science but a problem in administration. The problem was establishing and promulgating the date of Easter” (Page 3).

To this day, Easter is celebrated on the Sunday after the first full moon after the vernal equinox. But without an almanac, if one waits till daylight and darkness are equal (assuming an accurate clock is available), it is already too late to do much planning for a major event of the church! The key to the problem lay, in part, in observing and recording the position of the sun for extended periods of time.

The long history of finding the Sunday of Easter is well covered and documented by the author, along with related and background history. It reached new heights from about 1600

to 1800 along with other major advances in astronomy and as recently as 1850, when accurate mechanical clocks began to be widely available, sundials and meridiana continued to provide accurate solar time for very large numbers of people.

A *meridiana* (Italian, meaning sundial or meridian line) consists of a hole in a ceiling or wall that allows the bright image of the sun to be seen on the floor. This is a Camera Obscura! It was most useful when the sun’s image was observed at noon solar time. It was found that the higher the hole above the floor, the more accurate the positions on the floor could be marked. Also, for accuracy, the floor needed to be very level (the north-south line on the floor was termed a “rod”). The rod and nearby floor were used for making permanent markings showing the positions of the



The Mini Meridiana

The Pinhole, rod, and image viewer (trolley) are placed close together for photographing. The pinhole and viewer are set for the Equinox position.

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

sun's image during a whole year, and for succeeding years.

A famous Meridiana was built in the Cathedra of San Petronio in Bologna, Italy in 1655. It was constructed under the direction of Giovanni Domenico Cassini (Cassini I). It was adjusted by Cassini in 1695, and has had numerous repairs over the centuries. It was viewed in our times by the author who gives it credit, in part, for inspiring this book and says, "There is something romantic, even sublime, in witnessing the faithful rendezvous of sun and rod arranged centuries ago." (Page 22). It is the central object described in great detail by the author, but I will leave those details for the reader to find because I want to turn to a project that resulted from reading this book.

Several years ago, I used pinhole images of the sun to project the year-round image of the sun in the shape of the analemma (figure eight). I wondered if I could make a *mini-meridiana* do some of the things that a giant one could do in a cathedral? I am sure this has been done many times, but it is new to me!

The San Petronio Meridiana has a pinhole about 2.7 cm (about 1 inch) in diameter at a height of about 27.1 m (about 89 feet) vertically above the vertex (point vertically below the hole). The image of the noon solar sun on the cathedral floor stretches a distance of about 67 meters (almost 220 feet) from the vertex. My mini-meridiana has a pinhole about 0.2 cm (5/64-inch) in diameter. It is 1.760 m (66 inches) above the vertex. The winter solstice image is calculated to fall at 3.456 m (about 11 feet) from the vertex, so my patio is large enough to accommodate my meridiana.

My patio is open to the sun (no enclosed dark room). I have provided a pinhole that can be adjusted so that it is always perpendicular to the sunrays

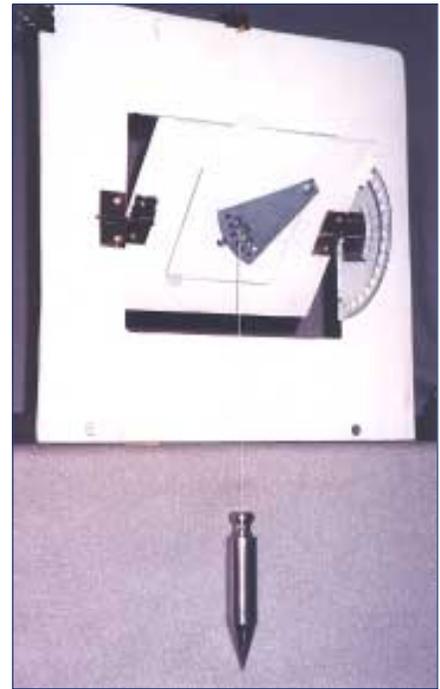
and always at the same place. The image falls on a surface that is also perpendicular to the sunrays resulting in perfectly round image. With this arrangement, I can mark the sun's center at exactly noon, sun time, and measure quite accurately the distances needed to calculate some of the things that Cassini and others did long ago. I have not tried to measure or adjust for the sun's parallax.

I established a near true N-S line (the rod) by several recordings of the center of the noon sun. The U.S. Naval Observatory's MICA15 "Multiyear Interactive Computer Almanac", has been useful in helping to find the sun's transit time and other information. The Almanac gives transit times to the nearest minute and I am looking for more accurate information. If anyone knows of such a source I would like to have the information.

Using pinhole "optics", and related mathematics, I can calculate the size of the image (verify it by measurement), calculate the approximate diameter of the sun, calculate the current distance to the sun to within less than 0.5 percent of the sun distance given by the Almanac. I can also measure the sun's apparent altitude, its true altitude, and I don't know what else, yet!

This project has been fun so far. I hope I can sustain the "fun" until I get a full year's recordings and have established the exact position of *an 11-foot length of my meridian*. Then, I'll have to check that by the stars!

I have written a QuickBasic program to do some of the calculations relating to the project. The program is 'specific' for my value of 'h' (height above the floor), but it can be changed easily to fit any value of h. I will be glad to share this program with anyone who wishes to see it. —Phillip (Marsh) Harris, E-mail: harris83@att.net



The Pinhole board (above). A plumb bob is suspended from a tack near the top of the board, and extends through the pinhole, normally to the floor about six feet below. The triangular metal piece at the center contains a selection of six different pinhole sizes from 3/64- to 8/64-inch. It can pivot on the upper right screw and rotates so that any one of the six sizes can be brought into use. Close images are normally sharper using the smaller size pinholes, but distant images (near Winter solstice) require a larger hole to provide more light for the image. Below is the image viewer set for Summer Solstice. The spot is a simulated sun. In use, the center of the sun is marked at the intersection of the card and the rod.



observers deck

Directions to the Dark Sky Site

The DAS Deer Trail Dark Sky Site (DSS) is about 60 miles east of the "mouse-trap" 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 DSS from Denver, arrival from the North (for after-dark arrivals):

Take I-25 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.

The Astronomical League and You

The Amateur Space Telescope

I have just returned from the Astronomical League's national convention in Frederick, Maryland, and while it was a small convention it was one which saw the beginning of several new and exciting projects.

Perhaps the most exciting was the operational beginning of the International Space Station Amateur Space Telescope project (ISSAT). No less a company than Boeing Aircraft has proposed this and approached the League to design and manage the program. During the convention the Chairman of the project, Mr. Orville Brettman, met with NASA officials at the Goddard Space Flight Center and they are definitely "on-board" for the mission. Flight date is sometime in 2006.

The proposed instrument is still in the concept stage but will be a 14-inch, probably classical or Dall-Kirkham-type cassegrain, of somewhere between $f/30$ and $f/50$. The size and focal ratio will be determined by the container it must fit into for launch. Mr. Dan Joyce, former chief of the Adler Planetarium optical shop, is a principal designer of the optics.

Although the project has been talked about for the past year, it needed a knowledgeable and dynamic leader and working team (which it now has) and the blessing of NASA to get it out of the starting block. Other than Mr. Joyce, some of the names you might recognize include Richard Berry, Dr. Don Parker, and Dr. Douglas Hall of Vanderbilt University. The project has a web site and we invite you to keep in touch with this incredible undertaking at <http://www.issat.org/>. —Jerry M. Sherlin, Public Relations Coordinator, ISSAT Project

Telescope Raffle to Benefit Dark Sky Site

Hello, one and all — Well, we'll try it again... the 'annual' Christmas Raffle in 1997 really didn't become an annual happening, but we were all busy doing other things at the time... sort of. Nonetheless, that first raffle was a smashing success.

We're going to try and bolster the Dark Sky Site fund with millions of dollars by raffling off an eight-inch Orion SkyQuest Dobsonian telescope between now and the Open House on December 22nd. Tickets are \$10.00 and there are actually first and second prizes to be given away this time, so if you needed motivation to part with your hard-earned cash, three possible prizes oughta do it.

The raffle is open to DAS members and the public alike, and tickets will only be sold at the Open House gatherings (see the blue schedule for dates).

Cathie Havens from S&S Optika has put together her usual superb observ-

ing package to go with the telescope, so even novice astronomers will have a wonderful experience. So come one and all and take a chance; you'll benefit the DSS and make the pursuit of astronomy by the DAS membership more enjoyable under black skies.—Steve Solon

S & S OPTIKA

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Astronomical Supply Store
5174 So. Broadway;
Englewood, CO 80110
(303) 789-1089

Hours: Tuesdays, Wednesdays,
and Fridays: 10 A.M. - 6 P.M.
Thursdays: 10 A.M. - 8 P.M.,
Saturday: 10 A.M. - 4 P.M.
Closed Sundays and Mondays
www.sandsoptika.com

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

Colorado Astronomy Day

The Denver Astronomical Society will host the best-ever Colorado Astronomy Day on October 20, 2001. Mark your calendars now—this promises to be a terrific full day and evening for the entire family. Besides high-profile speakers, astronomical vendors, door prizes, and activities and prizes for kids, we'll have food and a star party following (weather permitting). All proceeds from ticket sales for daytime events will go toward improvements at the Dark Sky Site. We'd appreciate volunteers. If you can help, please fill out the following form and mail to Larry Brooks at 3686 So. Depew Street #8, Denver, CO. 80236, or contact Patti Kurtz at (303) 948-5825 or e-mail: pkurtz@starfirecreations.com. Be sure to check our progress at the DAS website.

Name: _____

Phone Number for best contact time: _____

Best time to contact you (circle one): Day Evening

Email Address: _____

Within which area(s) are you most interested in volunteering (circle those that interest you)

- Speakers (are you able to transport speakers if necessary?)
- Kid Stuff
- Vendors and Sponsors
- Food vendor
- DAS Booth
- Registration Table
- Star Party
- Website
- Printing and Publications
- Freebies (Door prizes, etc.)

For Sale

12.5-inch JMI Split-Ring Equatorial with all the extras. Call Larry Brooks at 303 986-5255 or e-mail Lbrooks100@aol.com

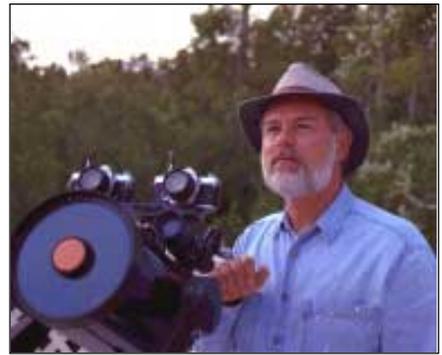
Dark Sky Site Guidelines

The Dark Sky Site (DSS) is for the use of DAS members and their guests. If you are neither, please contact an officer of the DAS for a "guest pass," and read the DSS Guest Policy (below). Please remember that any light disrupts your eye's dark adaptation and can ruin astrophotography. Most members (astrophotographers may be the exception) are happy to share views from their telescopes, however, please introduce yourself and ask permission upon approaching a telescope owner. Please follow these simple guidelines to maintain a positive experience for everyone:

- ★ Try to arrive before dark. If you must arrive after dark, please turn off headlights when turning into the site, and try to arrive from the north.
 - ★ Don't park on the graded graveled roads.
 - ★ Turn off or disable all dome and trunk lights in your car (or cover with layered red tape or duct tape)
 - ★ Use only dull RED FLASHLIGHTS.
 - ★ NO OPEN or CHARCOAL FIRES.
 - ★ If you're the last person to leave, close the gate.
 - ★ If you leave before everyone else, ask for assistance in getting out of the site without headlights.
- Other suggestions:**
- ★ Wear warm clothing.
 - ★ Bring your own toilet paper in case that in the porta-pottie has run out.

DARK SKY SITE GUEST POLICY

The DAS Dark Sky Site, while for the exclusive use of the membership for serious observing, will allow visitors on a limited basis. Groups or classes wishing to use the DSS may do so only with prior arrangement through the DAS president or vice president.



Photographer: © Unknown 2001

Bryan White will share his 3-D slide program, complete with 3-D glasses, at the September 21 meeting.

"Nitescapes 3-D" Comes to September Meeting

The Denver Astronomical Society heartily welcomes Bryan White and his "Nitescapes 3-D" program to the September 21, 2001 general membership meeting.

Bryan saw his first naked-eye comet in 1957 (Comet Mrkos) from a small country farm where he lived, and since then, astronomy has been his hobby. He started taking astronomical photographs when Comet Halley returned in 1985, and thought of taking 3-D photos in 1996 at the Winter Star Party while photographing Comet Hyakutake and Comet Hale-Bopp.

In 1995 he travelled 10,000 miles around the country and photographed Hale-Bopp in 3-D. His slide show, "Nitescapes 3-D" is an 80-slide representation of more than 1,500 images taken during the trip. He's been published in Sky & Telescope and Astronomy, as well as 3-D National Magazine. Some of his displays are in several museums in Florida and the Denver Museum of Nature and Science is using his work in several displays.

General Meeting Parking

It will still cost us \$1 to park in the "O" lot during the meeting. However, you can park on the street to the south of Olin Hall (Wesley) for free, and perhaps find a place on Iliff, although it's more restrictive.

observers deck

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/\$29.95	
..... \$ _____	
Dark Sky Site Fund Donation \$ _____	
Van Nattan Scholarship Fund \$ _____	
Chamberlin Restoration Fund \$ _____	
Total Amount Paid \$ _____	
Complete this form, or a copy, and mail it with your check or money order payable to The Denver Astronomical Society; DAS Treasurer, Chuck Carlson; 1521 So. Vine St.; Denver, CO 80210	



Denver Astronomical Society

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

SEPTEMBER'S

SPEAKER:

Get ready for the blue
and red glasses with
Bryan White's
"3-D Nitescapes!" See
Page 7.

join us