The
DENVER OBSERVER
JANUARY 2001
Newsletter of the Denver Astronomical Society
One Mile Nearer the Stars


Image: ©Debra Sorg, 2001

Open Orion's Treasure Chest

The great Orion heralds the winter skies and is undoubtedly recognized by most people. Because it's so prominent in both northern and southern hemispheres, it figures significantly in the cosmologies of cultures around the world.

This magnificent constellation harbors star clusters, bright gaseous regions, and stars ample enough for any naked-eye, binocular, and/or telescopic observer. Many astrophotographers begin their foray into the film or digital imaging experience by honing their skills on M42 — the Great Orion Nebula. This enormous stellar nursery has given scientists a wealth of information and theories on stellar evolution.

Happy New Millennium

Inside The Observer

President's Corner 2
Schedule of Events 2
Officers 2
Observers Deck 3, 4
Updates 5
Directions 6
Urban Observer 7
For Sale 7
Membership Info 8

JANUARY SKIES 2001

Throughout January, our gas giants, Jupiter and Saturn, continue their dance around the bull, Taurus — the Hyades and Pleiades are two-stepping close-by. In the western sky, resplendent Venus glitters brightly for several hours after sunset. To its lower right, Mercury makes its appearance towards the end of the month. If you're an early riser, you should see Mars high in the south before sunrise. Watch the moon as it glides past Jupiter and Saturn early in January, moves above Mars on the morning of the 16th, below Mercury by the 25th, then below Venus on the 27th and 28th. Its beautiful conjunction with Venus on the 28th should not be missed.

2 ..... First quarter moon
3 .... Peak of Quadrantid meteor shower
9 ..... Full moon,
Total lunar eclipse for eastern Canada
16 ..... Last quarter moon
24 ..... New moon

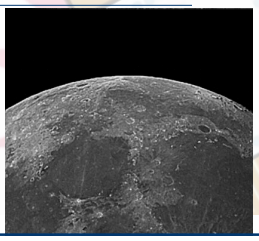
It's a marvelous month for a moon-dance.

Image: ©John Polhamus, 2001

PRESIDENT'S CORNER

THE DARK SKY SITE NOW HAS A WARMING HUT! — *See photo on Page 6.*

Total cost for the purchase, delivery, and set up was $5,375. We still have some work to do. The electricity needs to be hooked up, and we'll be replacing the existing fluorescent light with incandescent red lights. Timers will be put on the electric heaters so the heat is not left on accidentally. Barring any problems, the electrical work should be finished by December 18th or so. Additionally, we are looking for folding chairs and a table. If you have these items and you would like to donate them, please let me know.

Tentative rules for the warming hut are listed on Page 5. These temporary rules will be reviewed at the next E-board meeting. Your input is necessary and very much appreciated.

A good time was had by all at the Holiday Party. From left to right: Marilyn Pearson, Sherry Geisler, Grace Ormsby, Kay Anderson, and Brenda Wray. Image: ©Patti Kurtz, 2001

The Dark Sky Site is becoming a first-class site. The projects planned for spring include installing a vault toilet and more public cement pads Many thanks to both users and non-users who have contributed to its progress. Thanks also to the E-board and the Dark Sky Site Committee members for their hard work in making these improvements reality.

On another subject, nominations for club officers and E-board will be made at this month's meeting. If you're a nominee, please make yourself available afterwards so that others can meet and talk with you.

Best wishes to all for a happy and glorious New Millennium. — *Larry Brooks*

D.A.S. Schedule

JANUARY

5 E-Board meeting, 8 P.M.
6 Open House (How to use your scope)
19 General Meeting at Olin Hall, D.U. 7:30 P.M. - Nominations meeting
26 - 28 Dark Sky Site Weekend

FEBRUARY

2 E-Board meeting, 8 P.M.
3 Open House
16 General Meeting at Olin Hall, D.U. 7:30 P.M. - Elections
23 - 25 Dark Sky Site Weekend
24 Open House - Kiowa Observatory

Public Nights are held every Tuesday and Thursday from 7:00-9:00 P.M. at Chamberlin Observatory
Costs to non-members are: $2.00 adults, $1.00 children
Please call (303) 871-3222 for reservations.

D.A. S. Officers

President:
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Jack Eastman

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Joe Gafford — Ron Pearson
Patti Kurtz — Debra Sorg
Greg Marino — Dan Wray
George Jones, Past President

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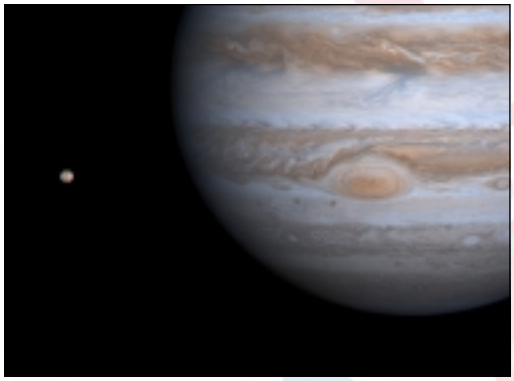
The Observer *is available in color or b&w PDF format from the D.A.S. website.*

The Executive Board conducts the business of the D.A.S. at 8 P.M. at Chamberlin Observatory. Please see the Schedule of Events for meeting dates. All members are welcome.

www.denverastro.org

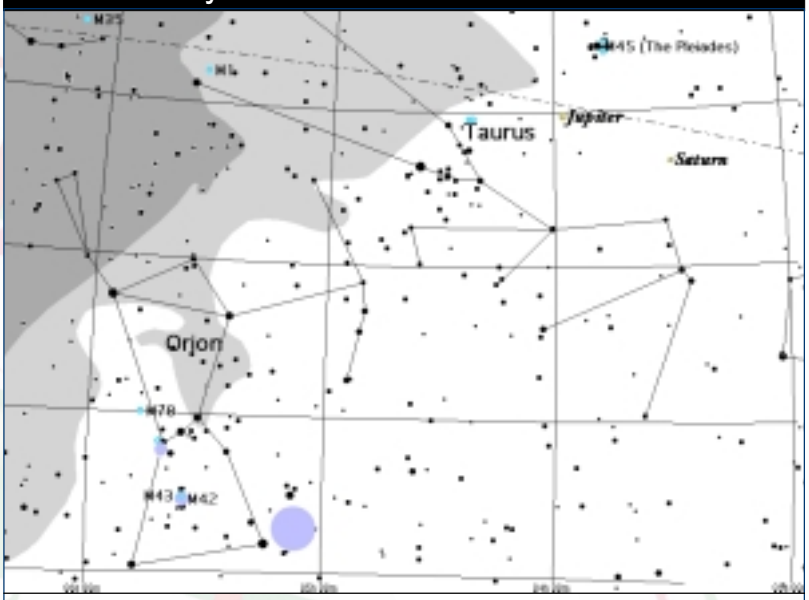


Io and Jupiter
On Oct. 1, 2000, Cassini arrived at Jupiter for a five-month layover on its way to Saturn. Check out the updates at http://ciclops.lpl.arizona.edu/ciclops/.
Image: Cassini Mission Team

Sky & Telescope ***sends only one notice before subscriptions end. The D.A.S. 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 D.A.S. Treasurer, Chuck Carlson (chcarlso@du.edu). See the back page of this newsletter for more information.***

M 42 (The Great Orion Nebula).
Image: © Kiowa Observatory, 2001

January 2001 Star Chart



Star chart from TheSky, Software Bisque (www.bisque.com)

This month's chart showcases Orion and Taurus as well as the bull's interlopers, Saturn and Jupiter. A dazzling sight around midnight with the addition of Sirius below Orion, has this portion of the night sky glittering like a celestial tapestry — a sight worthy of photos, particularly if one were to be creative with foregrounds.

Note from the editor:

Newsletter contributions (ccd and film images, 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.

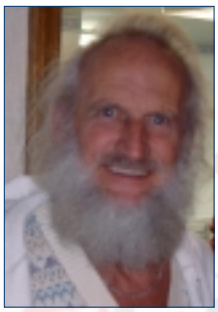
CCD: Uploaded to the listserve upload area (resolution as high as possible, please).

Text: Articles should be no more than 250 words, please. Paste into an email and email 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*
12086 W. Cross Ave., #203
Littleton, CO 80127

observers deck



Here Comes The Sun

Methods for observing our great ball of fire

by F. Jack Eastman

The following article completes a two-part series begun in the December, 2000 Observer.

WARNING!! Use adequate eye protection when looking at the sun. This means using certified solar filters or shade 14 welders glass in front of the unaided eye, and NEVER place a welder's glass or filter of any other kind behind your eyepiece. The little filters sold with cheap telescopes should never be within throwing distance of a telescope. The projection method is recommended, because one can obtain a fairly large image that can be measured with a ruler. This is much cheaper than a filar micrometer* at the telescope!

Make Your Own Measurements

Sunspot Positions: The positions of sunspots on the solar disk can be made by projecting the sun's image onto the traditional Stonyhurst disks, which show solar latitude and east-west position. With the disk properly oriented in respect to the north point of the image, the measured positions of spots can be converted to solar longitude with the help of the Astronomical Almanac. I believe sets of Stonyhurst disks are available from the AAVSO solar division. Page 82 of Norton's 2000 shows the orientation of the sun's north pole and position of the center of the solar disk through the year, although not as detailed as the Stonyhurst disks. Letting the image drift without your drive, will establish the east-west line. The direction the image is moving is west. Moving the telescope south in declination, the north point will lead. The number of reflections will determine if the image is correct or if it's a mirror image.

Sunspot areas: To get the observed area of the spot or group, measure the solar image diameter, D. Measure the maximum and minimum size of the spot, more or less at right angles to each other, call these A and B. The spot area relative to the disk is: AB/D^2 .

The Flame Nebula (NGC 2024) in Orion.
Image: ©Joe Gafford, 2001

The Double Cluster in Perseus (NGC 869 and NGC 884).
Image: ©Dr. Roger Clark, 2001

Partial Lunar Eclipse, March 23, 1997.
Image: ©Bill Ormsby, 2001

The D.A. S. Listserve (For Members Only)

The D.A.S. Listserve is available to club members with an Internet connection. It's operated by the E-board and can be accessed from a link provided at the D.A.S. website. Members are encouraged to join up and share anecdotes, observing and imaging tips, or whatever moves you astronomically. *Be sure to check the website for profiles of upcoming speakers.*

Upcoming Chats (8 P.M.):

January 10	**Tim Puckett** *(Hunting supernovae and observing comets)*
January 17	**Dr. Rocky Kolb, Fermilab** *(The Big Bang)*
January 31	**Jason Ware** *(Deep-sky film astrophotography)*

Tentative, check website for update.

Multiply by 100 to get the percentage area obscured. It has been my experience that spots covering ~0.1 percent of the disk are easy to see without magnification, using a #14 welder's glass. If it seems too bright, tilting the glass to increase its effective thickness will help somewhat.

Spot areas are usually given in millionths of the disk (hemisphere?) so multiply your measurement by one million to get millionths.

So far so good — you now have the relative area of the spot to the disk, but the spot, being on the surface of a sphere, is foreshortened and looks smaller than it really is. To correct for this, measure the distance from the sun's limb to the spot. Subtract this from the image RADIUS R, and call that L. Calculate the angle between the spot and the line through the sun's surface to your eye, as seen from the center of the sun, θ. (A bit toasty in there, but it'll only take a second). Sinθ=L/R. Divide the area measured above, by cosθ, and that should be the real area of the spot.

There is some confusion in my mind, whether the spot areas are reported relative to the disk area or the hemisphere area (twice the disk area). Page 82 of Norton's 2000 says millionths of the visible disk, but our banquet speaker last March indicated it was the hemisphere. The relative area obtained above needs to be divided again by 2 to get it relative to the hemisphere.

That monster sunspot around September 20, 2000 came out, uncorrected, at 0.233% of the disk, twice the 0.1% limit. It was easy to see without the telescope. Going further, θ=47.3 and cosθ=0.678. The area, relative to the disk, corrected for foreshortening is 3438 millionths of the disk, and 1719 millionths of the hemisphere.

The measurements above were taken from the Sept. 20, 2000 Mt. Wilson drawing off my computer screen. No frost or mosquito bites with this technique.

***Definition of Filar Micrometer:** This is essentially an eyepiece with a pair of parallel hairs, one of which can be moved by a precision screw. These instruments were used for measuring the separations of double stars, and can be used to measure planetary features, including sunspots. The one I use with the 12-cm. is made for a microscope by Bausch & Lomb, and contains a 12X (~20mm) eyepiece. It has a scale, with a line every mm, and a movable line, controlled by a 1-mm pitch screw with a head divided into 100 parts, so each setting of the movable line can be read to 10um. Integral mm can be read off the scale, and fractions with the movable line. 10um/1800mm X 206264.81 = 1.146 arc seconds/division on my 12-cm. On the 51-cm (20") (F=7800mm), this scale is 0.264"/division. This can be increased with a Barlow lens, but one must be careful to calibrate the new EFL carefully.

Finally, a couple of relevant websites:

- http://www.astro.ucla.edu/~obs/cur_drw.html: This is the daily drawing/magnetic measurement made at the 150-foot telescope at Mt. Wilson.
- http://sec.noaa.gov/rt_plots/: This one gets the X-ray, proton fluxes, and magnetometer data from the GOES 8 and 10 weather satellites in real time and allows the user to call up past data. Check the stuff from July 15 -19 or so.

I hope all this helps make your solar observing safe and more enjoyable. I wish all of you clear, dry skies.

Warming Hut Rules:

The following rules for the new warming hut are temporary. The E-board will determine a final set of rules at its next meeting. Your input is needed and appreciated. Thank you. — Larry Brooks

- When not in use, the building should be left unlocked and the window shades kept in the "up" position. If someone wants to break in, they will see that it's empty.
- Nothing can be stored in the building. If you leave crumbs or spill food, clean up after yourself immediately in order to keep mice out of the building.
- Be sure to close the door tightly so that it can't be blown open.
- When you are the last person to leave the building, turn off the lights, even if there are others still at the site.
- Please do not bring any contributions to the building until you clear it with the E-board — this will help prevent duplication. For your information, we cannot have upholstered furniture in the building because mice like to nest in it. At this point, we do not want items like coffeepots because there is no water to wash them. Contributions not approved will be thrown out.
- This is not an overnight camping site. You may take short naps, but it's not designed for overnight use.

Classes

University of Denver

Astronomy Classes:
All levels of instruction are available at Chamberlin and Mt. Evans Observatories. Contact Dr. Bob Stencel (303) 871-2135, *rstencel@du.edu*, www.du.edu~rstencel, and/or the D.U. Registrar's Office at (303) 871-2284.

Chamberlin Observatory

Mirror-Grinding Classes:
December 9 and 23 - 10:30 A.M.
Please call Terry Chatterton for details at (303) 621-2442.

The new warming hut is unloaded at the Deer Trail Dark Sky Site. Image: © Larry Brooks, 2001

Directions to the D.S.S.

The D.A.S. Deer Trail Dark Sky 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 D.S.S. 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 D.S.S. 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.

Dark Sky Site Guidelines

The Dark Sky Site is for the use of D.A.S. members and their guests. If you are neither, please contact an officer of the D.A.S. for a "guest pass." Please remember that white 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 all dome and trunk lights in your car (or cover with layered red tape or duct tape)
- ★ Use only dull RED FLASHLIGHTS.
- ★ If you leave before everyone else, ask for assistance in getting out of the site without headlights.
- ★ NO OPEN FIRES. NEVER.
- ★ If you're the last person to leave, close the gate.

Other suggestions:

- ★ Wear warm clothing.
- ★ Bring your own toilet paper in case that in the porta-pottie has run out.

how to get there

The Urban Observer

Welcome to the new millennium! It is also the beginning of the new century and decade, for those who reckon calendars beginning with the year One. Here's hoping for the best possible world and sky in these new days to come. When resources permit, incremental improvements at Chamberlin Observatory will be sought to benefit both D.A.S. and University of Denver programs in outreach and educational research in astronomy.

Opportunities: Congrats to those who have a new telescope. To you and those with seasoned equipment, consider expanding your observing program to include reporting results. One important area involves VARIABLE STARS. All you need is a 6-inch or larger scope, your eyes, and a finder chart available from the American Asssociation of Variable Star Observers (www.aavso.org). Another interesting opportunity has been recently announced by the Hands-On Universe collaboration, headquartered at the Lawrence Berkeley Lab (www.hou.lbl.gov). Their aim is to establish a global network of remotely accessible telescopes, and they are looking for individuals to help high school science teachers work with students on using these facilities. This seems like a good way for D.A.S. members to support science teaching in our regional high schools.

Light Pollution Notes: NOW is the time to get acquainted with your State legislative representatives. Following the defeat of the "Smart Growth" amendment (24), various growth proposals are being developed and you can help inject the concept of SMART LIGHTING into the discussion. As astronomers, we are especially sensitive to the degradation of even remote observing sites in Colorado, and there is an opportunity to say with your mouth what your eyes want to see – dark skies! What have other states done? For examples, visit the IDA website (www.darksky.org). We're also looking for people to help measure sky brightness with star counts in regions

Image: © Patti Kurtz, 2001

What is it about kitchens that seem to beckon party-goers? The kitchen area at the holiday potluck was certainly the usual gathering-place, but we didn't see these guys cooking up anything but trouble. From left to right: Ron Pearson, David Shouldice, Raleigh Souther, Jack Eastman, Dan Wray, and Larry Brooks.

defined by the International Meteor Organization (www.du.edu/~hharland).

MARS happenings: Lots of great summer star parties are being planned in collaboration with the Astronomical League; for details see the Mountain Astronomical Research Section website (http://hometown.aol.com/gkramer259/documents/index.htm). — Dr. Bob Stencel, email: *rstencel@du.edu,* University of Denver Astronomy (www.du.edu/~rstencel/Chamberlin)

Regional newsletters are welcome to reprint any useful portion of this article.

For Sale

Telescopes

★ **Meade 7" APO Refractor,** 1996 model with all standard accessories; Mount upgraded to 750 with current 1697 Computer firmware. Asking $6,800.

- Heavy duty tripod
- Eyepieces: Meade Super Wide angle 40mm, TeleVue 27mm Panoptic, TeleVue 12mm Nagler 4, TeleVue 7mm Nagler, TeleVue 2X Big Barlow, TeleVue 2" to 1.25" Brass Equalizer
- Thousand Oaks Solar Filter
- ND-5 Meade 7" Type 2 Full Aperture
- Extra 25-lb. counterweight
- DC Power adaptor

Contact: Sam Andrews (303) 688-4429, email: sandrews@lasertech.com

★ **Meade 6" ED 152 Refractor** with computer drive any heavy mount, 2" & 1.25" Barlows, 2" & 1.25" eyepieces, filters, camera adapter, extras. Located in Longmont. $6500. **Respond to jmwsmw@msn.com** Provides exceptional viewing for the planets and moon.

Binoculars

★ **10x50 Nobles,** a great twilight instrument! Fully multi-coated (roof prisms are phase-coated) for good resolution. Waterproof, nitrogen-purged, fogproof, rubber-armored with twist-up eyecups, and good enough eye relief to use with glasses. FOV is 263' at 1000 yards. $385, includes shipping. Paid-up DAS members: $360. **Email: Pat Ryan at neptune9@thesimpsons.com.**

About the Denver Astronomical Society

The D. A. S. is a group of amateur and professional astronomers that share a mutual interest in the heavens. The D.A.S. 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 D.A.S. 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 D.A.S. 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 ☐ **Renewal** ☐

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 ☐ No ☐

Do you want the above information excluded from the yearly roster? Yes ☐ No ☐

Please Circle All That Apply:

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:

D.A.S. Treasurer, Chuck Carlson; 1521 So. Vine St.; Denver, CO 80210

Denver Astronomical Society

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

join us