

# DENVER OBSERVER

Newsletter of the Denver Astronomical Society

*One Mile Nearer the Stars*



The Sombrero Galaxy (M104) in Virgo.  
Image: © Kiowa Observatory, 2001

## A Galactic Hat Dance

Galaxies, galaxies, and more galaxies. Finally, it's springtime in the Rockies and observers are treated to a host of observing challenges in the form of other worlds. It takes practice to be a good galaxy observer—even when they're nice and bright, discerning detail from spiral arms, dust lanes, and companion galaxies can test the limits of our skills.

Some people have more difficulty than others seeing these often faint spheres and ribbons of light. But no galaxy observer has stared at one, transfixed, through the eyepiece without wondering . . . is anyone out there looking back?

# April Showers Bring . . . Lyrids

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## A P R I L S K I E S 2 0 0 1

**M**ars approaches its closest opposition in 13 years and just about doubles in brightness by the month's end. After being the star performers for the last many months, **Jupiter** and **Saturn** are preparing to exit the evening skies. They'll set lower each evening, taking with them the entourage that made their performance so spectacular. **Venus** brightens to almost its most brilliant by the end of April and rises only 45-90 minutes ahead of the sun. On April 6, **Mercury** is only 10° south of Venus and is so low in the sky it's difficult for us to see. Nevertheless, it shines at a bright  $-0.6$  magnitude. A near moonless treat this month showers us with **Lyrid** meteors beginning around the 20th.

1 .....	First quarter moon
	Change clocks forward one hour
8 .....	Full moon
15 .....	Last quarter moon
22 .....	Lyrid Meteor Shower peaks
23 .....	New moon
28 .....	Astronomy Day in the U.S.



**Left: Triple Conjunction of the moon, Venus, and Jupiter.**  
Image: ©Ron Pearson, 2001



The Spring Banquet brought D.A.S. members and their spouses together for a terrific meal at Dardano's Restaurant. John Bally gave an outstanding presentation that all attendees were able to enjoy. Photo: David Shouldice

## PRESIDENT'S CORNER

The open house at Kiowa Observatory was a smash hit. Terry and Ellen Chatterton, Jon Goldberg, and Steve Solon hosted a great night. Though it was cold, we had the warmth of their hospitality combined with coffee, hot chocolate,

and snacks. Many thanks to those who made the open house so wonderful for all attending.

I also wish to thank the outgoing E-board, the Dark Sky Committee, the Public Night crew, the Open House participants, the newsletter editor, the webmaster, and all those for their great efforts at making this organization what it is today. I didn't thank members by name because I did not want to leave anyone out. I encourage members to become active in the various activities that interest them.

If you'd like to participate in any of the public events or wish more information about club activities, have suggestions, ideas, or questions, please contact either myself or any board member. Clear and steady skies to you all—  
*Larry Brooks*



## D.A.S. Schedule

### APRIL

- 6 E-Board meeting, 8 P.M.
- 20 - 21 Sterling Star Party (See March Observer)
- 20 - 22 Dark Sky Site Weekend
- 27 General Meeting at Olin Hall, D.U. 7:30 P.M.—  
*Speaker: Colo. Meteorite Society (Think you have a meteorite? Bring it and they will identify it for you.)*
- 28 Open House

### MAY

- 4 E-Board meeting, 8 P.M.
- 18 - 19 Dark Sky Site Weekend
- 25 General Meeting at Olin Hall, D.U. 7:30 P.M.—  
*Speaker: To be announced.*
- 26 Open House

*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:**

Larry Brooks (303) 986-5255

Email: [LBrooks100@aol.com](mailto:LBrooks100@aol.com)

### **Vice President:**

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Jack Eastman

## Executive Board Members

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Jack Eastman David Shouldice

Joe Gafford Steve Solon

Greg Marino Dan Wray

George Jones, Past President

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(303) 986-5255

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StarFire Creations Unlimited

(303) 948-5825

**The Observer is available in color**

**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.*

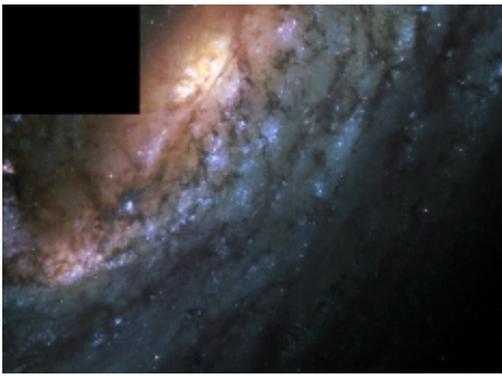
# www.denverastro.org

## The Astronomical League and You

In the previous two installments of “The Astronomical League and You,” I’ve tried to make you aware of the fact that as a member of the Denver Astronomical Society you are also a member of the Astronomical League; the world’s largest amateur astronomical federation. Last month I introduced you to the League’s most popular observing program, “The Messier Club” and how you may earn your club certificate and pin.

This month I’d like to feature the principal source of information about the Astronomical League—its web page. There is no doubt that, in today’s “on-line” world, websites have become the World-Wide source of information. When it comes to a total compendium of information about the Astronomical League, the place you want to go is [www.astroleague.org](http://www.astroleague.org). Exploring this web page you will find information about the League’s organizational structure, its many services like the A.L. Book Service, the League Store, and of course, complete details on its 15 observing programs and awards.

Some of the information found on the website can also be found in the League’s quarterly publication, *The Reflector*, however printed publications cannot carry the detailed information that can be stored on a website. If you really want to understand the Astronomical League, check out [www.astroleague.org](http://www.astroleague.org).—*Jerry M. Sherlin, ALCOR*



**HST Zooms in on the Bar of a Favorite Spring Galaxy.** An international team of astronomers used Hubble to study how the galaxy’s bar feeds material to the center in order to form new stars. It’s believed that NGC 2903 in Leo bears a close resemblance to our own Milky Way Galaxy. See original image at: <http://sci.esa.int/hubble/news/index.cfm?oid=26173> (Image: ESA & NASA)

*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 ([chcarlo@du.edu](mailto:chcarlo@du.edu)). See the back page of this newsletter for more information.*

**Thor’s Helmet (NGC 2359) in Canis Major will set around midnight this month.** Image: © Steve Bell



### Note from the editor:

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 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](mailto: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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# observers deck



## The Perfect Telescope

Build this scope in time for  
star party season  
by David Trott

*This article is adapted from the article on Dave Trott's website (<http://hometown.aol.com/davetrott/page1.htm>). Please refer to it for more information, photos, and blueprints. All photos and article © David Trott.*

This six-inch Dobsonian reflector is “the perfect telescope” in many ways. It's inexpensive, reasonably portable, and is a good performer on planets, the moon, and deep sky objects, but best of all—it's simple. The total out-of-pocket expense could be as little as \$200 if you watch your pennies. At most it might cost twice that. You can buy the optics new for about \$150, which is the heftiest single expense.

This scope has some nice features, many of which are not found on more expensive commercial scopes.

First, the design puts the eyepiece at nearly eye level. In most cases you do not have to kneel on the ground to use it.

Secondly, the cage assembly allows you to twist the scope around for either right-handed or left-handed viewing—move the scope up and down for perfect balance without counterweights (no matter what kind of finder or eyepiece you use) and adjust the scope to make it easier for kids to look through. The cage also serves as an “exoskeleton” to keep the tube rigid thereby keeping the telescope well collimated and aligned. It uses standard 1.25-inch eyepieces so you can upgrade to higher quality eyepieces anytime you want. Nearly all the parts for this telescope come from your hardware store, and you can make it and

Two Days Before Full (January 7, 2001).

Image: © David Shouldice, 2001



## Warming Hut Rules

- 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.
- The Warming Hut 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, [rstencil@du.edu](mailto:rstencil@du.edu), [www.du.edu/~rstencil](http://www.du.edu/~rstencil), and/or the D.U. Registrar's Office at (303) 871-2284.

## Spring and Summer Star Parties

STERLING STAR PARTY:

April 20-21 North Sterling State Reservoir (see March Observer).

ROCKY MOUNTAIN STAR STARE 2001:

June 21-24 Pike National Forest, near Tarryall, CO

WEEKEND UNDER THE STARS:

Aug. 16-18 Foxpark, WY

GRAND MESA:

Aug. 24-26 Check the MARS region websites for details: [www.astroleague.org/all/regional/mars.html](http://www.astroleague.org/all/regional/mars.html).

observers deck

maintain it with simple hand tools. The only parts you have to get from a special supplier are the primary and secondary mirror. Even the eyepiece and finder optics come from your local discount store!!

The focuser and finder scope are made from plumbing fixtures. This scope is user-friendly and does not involve complicated computers to operate. It puts you in direct contact with the stars rather than forcing you to interact with a hand-held "interface." This means you have to know a little about the sky to operate this telescope, doesn't it? Don't worry, it's not that hard and it's far more rewarding to locate things in the sky using your own on-board brain.

While you can buy a scope much like this for \$400 or \$500, you *can* build this telescope yourself. Before you decide to take this on, you might do some reading. I am working on a web-book that will help and there are many other web pages to check out. I recommend the books *Build Your Own Telescope* by Richard Berry and *Making and Enjoying Telescopes* by Miller and Wilson. If you are interested in building any kind of telescope, check out my website. Even if you don't build this particular telescope you might find some helpful and money-saving ideas there.



### The Focuser

The focuser is a simple helical focuser. It works well and is inexpensive to build. All you need are some plumbing fittings (above image): The PVC fittings are designed to screw together. Make sure they do so freely without binding. The smaller, inner fitting must be large enough to accommodate the 1.25-inch brass drain extension. Use some masking tape to fit the 1.25-inch snugly inside it. Cut the PVC fittings so that the the only remaining part of the inner section

is its threads. The larger fitting must be cut so that the smaller fitting will go into it from the direction opposite that intended by its design. Mount the assembly on a curved piece of hardwood with a nice big hole in the middle. See the website for a picture clarifying these instructions. The 1.25-inch ID section of the brass tube must be accessible from the outside since that is the standard size for good eyepieces. You might want to cut a couple of slits in it as shown so that it will grip an eyepiece.



### The Secondary Mirror Mount

The secondary mirror mount (above image) is unusual. Many scopes use a fairly complicated device called a spider, with four vanes that attach to the tube in four places and support a special device called a secondary mirror holder. This is a fine system, but it's complicated to build and expensive to buy (about \$50). The system I used is not new. I copied it from some very old books and updated it slightly. It is simple, robust and effective. It is a bit more difficult to adjust, but once properly adjusted should hold the adjustment indefinitely. Telescope-maker purists will object to the thick 1/4-inch single support bolt. But it doesn't introduce very much diffraction and is a useful compromise for a first telescope. The thickness of the bolt makes it very strong and steady; no vibrations in this secondary! I recommend a slightly oversized secondary mirror for this telescope. Use a 1.5-inch secondary if this is your first telescope. The extra large secondary mirror will allow for less-than-perfect construction.

Attaching the secondary mirror: Buy a small tube of silicone glue and attach your secondary mirror to a 45° angle piece of steel drilled to accept a 1/4' bolt. (Make this by

bending an ordinary steel cornerbrace to 45°). Attach by placing the secondary face down on several layers of Kleenex and laying a thick bead of silicon glue on the back of the mirror. Be sure to get the placement right, with the proper amount of overhang. (See the diagram in the plans on the website.) Be careful not to touch the front mirror surface. To assure yourself that the mirror will always stay attached, give this assembly the "shake test" after it cures over night. Attach it to a long bolt, place your entire hand and the secondary assembly inside a plastic trash bag and shake the assembly violently. Try not to allow the mirror surface to touch anything during this test. If the mirror comes off now it won't be a major disaster. It would be very unfortunate if that were to happen later after it is installed in the telescope, when the primary mirror is in place.

### Cage Assembly

The cage assembly is actually two separate pieces which are held together by four long pieces of threaded rod. They must be made so that they compress the tube between them. This is what holds them in place. The side bearings are made of four-inch PVC drains. The curved pieces must be covered with felt so they don't scratch the tube. Inexpensive sheets of self adhesive felt are available in the "chair-foot-pad" section of your hardware store.



### The Primary Mirror Cell

The mirror cell (above image) is very simple. It's made of a couple of pieces of plywood. The mirror is held to the top piece by three mirror clips made of angle braces from the hardware store straightened in a vice and re-bent at the proper distance. The

*(Continued on Page 6)*

observers deck



Dan Wray's award-winning 12.5-inch Newtonian with unusual equatorial fork mount is the center of this group's attention at the "Weekend Under the Stars" in Foxpark, Wyoming. The scope breaks down into several sections for easy transport. Image: Unknown photographer.

## The Perfect Telescope

*(Continued from Page 5)*

mirror is held in place with self adhesive felt pads at every contact point. The mirror must be cradled with no excessive pressure. The top piece of plywood has three long bolts protruding from it. These three bolts pass through springs and through the rear, triangular plywood section. Wing nuts pull on these bolts allowing the adjustment of the tilt of the forward plywood disk and thus the mirror. This is necessary for the adjustment of the telescope. See the plans for more detail.

### The Finder

Before you make a decision to build your finder according to my instructions think about this: You can buy a Telrad finder and inexpensive commercial eyepiece for about \$80. This option is much easier than dissecting a cheap pair of binoculars to build your own finder and eyepiece. Though the finder you build will work fine, the Telrad is the best finder for any telescope. It is very simple and easy to use. The build-it-yourself option will cost about \$35, and the Telrad is far superior to the finder you will build. If you still wish to build the finder, refer to the plans.

### Finishing Up

If you are obsessive like me, paint the inside of your tube flat black. The ground

board and the base board must have teflon in contact with Formica or some other brand of plastic laminate. Rough surface Formica works best. Get some teflon pads at the hardware store in the chair-leg section. The ground board is the one closest to the ground. It will have some stubby feet at three points where it contacts the ground.

These directions should give you an idea of what it will take to build this telescope. Full plans are available on my website along with blueprints for the design and a number of pictures for clarity. Again, it's simple enough for just about anyone to build, and best of all, portable enough to take with you wherever your observing heart takes you. Good luck!

## Directions to the Dark Sky Site (D.S.S. )

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

## S & S OPTIKA

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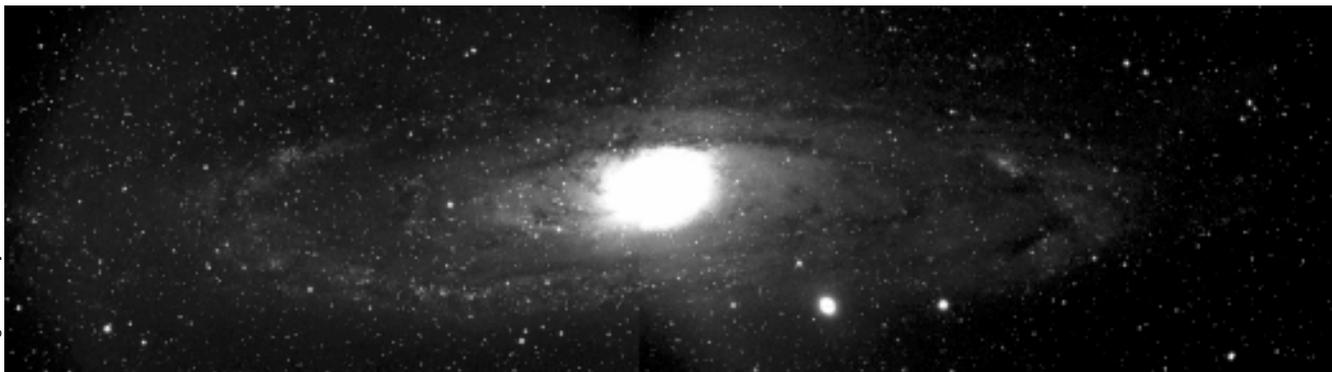
*Hours: Tuesdays, Wednesdays, and Fridays: 10 A.M. - 6 P.M.*

*Thursdays: 10 A.M. - 8 P.M., Saturday: 10 A.M. - 4 P.M.*

*Closed Sundays and Mondays*

*www.sandsoptika.com*

# how to get there



## The Urban Observatory

**MORE DARK SKY NEWS:** Colorado Bill 01-1160 "Outdoor Lighting Standards" passed House 3rd reading (52-9) on Feb.28th and was sent over to the Senate side. This proposal is educating legislative leaders to the issues. Some opposition developed during the debate, about relative cost and effectiveness of full-cutoff lighting. Next stop: Senate Agriculture and Natural Resources, chaired by Sen. Dyer (Durango). Check website [smartlights.tripod.com](http://smartlights.tripod.com) for updates. The IDA ([www.darksky.org](http://www.darksky.org)) identifies light pollution as part of a larger set of issues including light trespass, glare and energy waste. Trespass involves light onto a neighbor's property, that is unwelcome (into a room or yard). Glare is another effect of badly aimed lights, and is especially bad for older persons whose eyes slowly adjust and are blinded. The California energy supply situation highlights the cumulative effect of badly aimed lights: sky glow, with magnitude about the shortfall of megawatts. Not every watt can be captured, but smarter lighting will help. More and more, the manufacturers are waking up to the marketing Opportunities of smarter lighting: check website [www.rabweb.com/friendly/](http://www.rabweb.com/friendly/) for a good example of this!

**STATUS OF DIGITAL SETTING CIRCLES:** Tom Melsheimer and Tom Bisque teamed up to solve the encoder and software incompatibilities affecting the Chamberlin installation, and on Friday March 1st, members of the E-Board were treated to an encoder-assisted viewing session. Everyone seemed pleased with the ability to locate obscure sky objects in record time with the computer assist. A few remaining tweaks are expected to make the system more stable, accurate and generally helpful for DAS public night events and DU classes. At first

**Above: The Andromeda Galaxy (M31) in a spectacular panorama view showing M32 below it and to the right.**

**Right: Jupiter shows off on February 17, 2001** Images: © Ron Pearson, 2001



look, it's remarkable what can be seen despite Denver's bright skies, once you can locate these sky wonders.

**SUMMER STAR PARTIES:** See page 4 for details.—*Dr. Robert Stencel, DU Astronomy, [www.du.edu/~rstencel](http://www.du.edu/~rstencel)*

## 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 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 FIRES. NEVER.
  - ★ 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.

## The D.A.S. Listserve

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.

## (For Members Only)

Upcoming Chats (8 P.M.):

### WEDNESDAYS IN APRIL:

Unorganized chats unless someone has a willing guest "chatter" or suggests one who may be available on short notice. Please notify Patti Kurtz.

o d d s ' n e n d s

## 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*.



## Denver Astronomical Society

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

APPLICATION FOR MEMBERSHIP TO THE DENVER ASTRONOMICAL SOCIETY	
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Renewal	<input type="checkbox"/>
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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	

join us