



# The Prairie Astronomer

The Official Newsletter Of The Prairie Astronomy Club, Inc.

January 2002

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## JANUARY'S PROGRAM:

### January's program is "New Scope Owners Night".

The public is invited to bring their new Christmas present telescopes out, to get some good pointers from club members on getting the most out of their new telescopes.

**PAC-LIST:** If you have an e-mail address and are not on the PAC List, you may subscribe by submitting an e-mail to [list@4w.com](mailto:list@4w.com). Write "Subscribe PAC-List" in the body of the e-mail.

## CLUB EVENTS

### PAC MEETING

Tuesday, January 29, 2002, 7:30 PM  
at Hyde Memorial Observatory

### CLUB STAR PARTY

Friday, February 8, 2002  
Olive Creek S.R.A.

### NSP PLANNING MEETING

Thursday, February 14, 2002  
Mahoney State Park

### UNL STUDENT OBSERVATORY PUBLIC NIGHT

Friday, February 22, 2002, 7-10PM  
UNL Student Observatory

### PAC MEETING

Tuesday, February 26, 2002, 7:30 PM  
at Hyde Memorial Observatory

### Mahoney Star Party Dates

May 17<sup>th</sup>, 5 days after new moon  
June 14<sup>th</sup>, 4 days after new moon  
July 12<sup>th</sup>, 2 days after new moon  
September 27<sup>th</sup>, 2 days before 3rd quarter.

## NEWSLETTER UPDATE

Those who wish to help with publishing and postage costs by receiving only the on-line version of the newsletter should contact Liz Bergstrom or Mark Dahmke and request the logon account and password for access. You may receive both the mailed version and the on-line version if you wish.

### FOR SALE

Meade LX200 8" f/10 in excellent condition. Includes tripod, case, 26mm eyepiece. \$1700. Mark Dahmke 475-3150.

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The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc. Membership expiration date is listed on the mailing label. Membership dues are: Regular \$20/yr, Family \$22/yr. Address all new memberships and renewals to: The Prairie Astronomy Club, Inc., PO Box 5585, Lincoln, NE 68505-0585. For other club information, please contact one of the club officers listed on the last page of this newsletter. Newsletter comments and articles should be submitted to: Mark Dahmke, PO Box 80266, Lincoln, NE 68501 or [mdahmke@4w.com](mailto:mdahmke@4w.com), no less than ten days prior to the club meeting. The Prairie Astronomy Club meets the last Tuesday of each month at Hyde Memorial Observatory in Lincoln, NE.

# Secretary's Report

By: Lee Taylor

Prairie Astronomy Club Meeting Minutes for 12/26/01

President Dave Knisely called the meeting to order. No new guests present.

We had a good show of the Geminid Meteors on the thirteenth, with several reports from members. On the third, the Quadrantids come, but a gibbous moon interferes. Jupiter and Saturn remain great targets, with Jupiter reaching opposition on New Year's night, and occultations of Saturn by the moon on Dec. 28th AND Jan 20-21. Rick Johnson, Dave and Joey Churilla, and Dave Brokofsky were on hand at Hyde for the partial solar eclipse on the 14th with dozens of guests. Also, the UNL student observatory had several dozen visitors for this event.

January events: 4: Quadrantid meteors, 11: Club star party at Olive Creek, 29: Club Meeting New 'Scopes Night Program Chair Brian Sivill asks any club member who can help people get new telescopes set up and working/being used to show up as their help would be greatly appreciated.

As always, Brian asks anyone who has any ideas for programs should contact him and he'll be glad to help make them happen.

Mahoney Star Party dates are: May 17th, June 14th, July 12th, and September 27th.

Hyde News: According to the Hyde Board, We'll be getting word on Hyde's grant by year-end. No progress on repairs of the 12.5". Discussion was made about making the club 'scope available at Hyde. A new dew cap is on order for the C-14, a much sturdier one than the most recent. Thanks to Dave Knisely for the new dew cap.

NSP planning meetings are on the 2nd Thursday of each month now through NSP 9(NINE already?) at 7:30 PM at Mahoney State Park. For more info, or if you'd like to help, contact Dave Knisely.

Treasurers Report: We still have annuals that need to be paid for; those that ordered them need to pay for them. Be sure to get your payment to Liz if you have one on order. On the bright side, there are no late dues for December! Also, the new electronic version of the newsletter has saved us \$3.40 last month. We'd appreciate more people taking the electronic option, as the goal is to save the club as much on postage, etc. as possible. To have the mailed version stopped, contact an officer or Mark Dahmke and start enjoying the online version :).

Mark Dahmke gave another great demonstration of the nifty new items on the newsletter on the PAC site. His goal is to make the online version a much more active and timely document than the mailed newsletter currently allows. (Now, if the secretary can just be timely in getting his report in. ;))

Adjourn to Larry Stepp's annual program on telescope projects past, present and FUTURE!

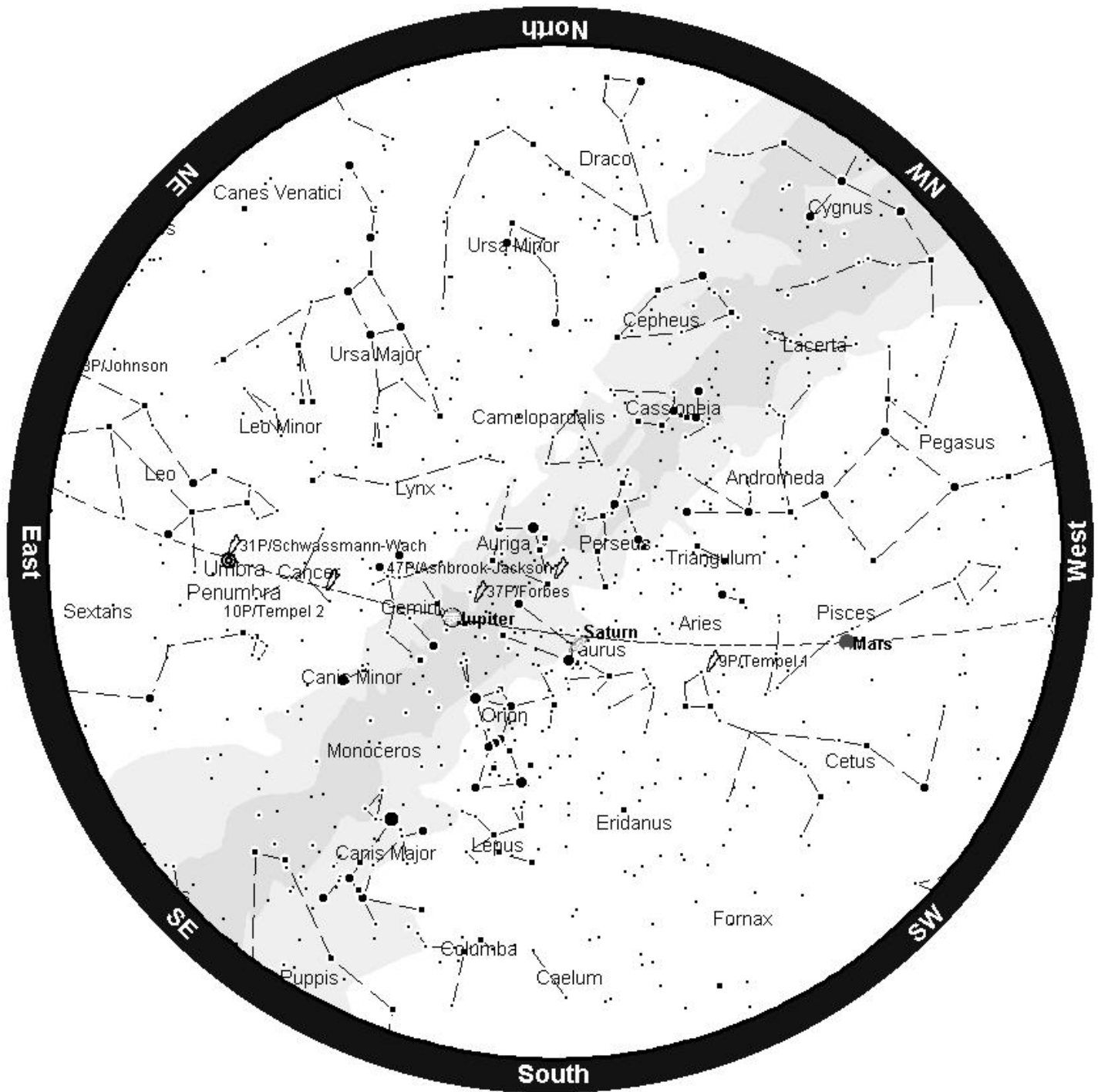
Respectfully submitted by:

Lee Taylor

## Hyde February Schedule

<u>December</u>	<u>Team Leader</u>	<u>Telescope Operators</u>		<u>Supervisor</u>
2/2/02	Bill Wells	Jeff Campbell	Bob Leavitt	
2/9/02	Jeff King	Steve Lloyd	Joey Churilla	Dave C
2/16/02	Dave Churilla	Joey Churilla	AJ Benker	
2/23/02	Brian Sivill	Dan Delzell	Jared Delzell	Rick J

## February Star Chart



## **RECENT OBSERVATIONS by David Knisely**

DATE: December 18th, 2001, 0700 to 0836 hrs UTC.

LOCATION: Rockford Lake, Nebr. 40.227N, 96.580W, 1400 ft (427m) elevation.

INSTRUMENTS: 10 inch f/5.6 Newtonian: 59x, 70x, 101x, 178x, 288x

CONDITIONS: Mostly Clear, Temp. 25 deg. F. (-4 C.) Wind Calm.

UNAIDED EYE LIMITING MAGNITUDE: 6.6

SEEING: 1.3 to 2 arc seconds (Antonaidi III to IV).

OBSERVATIONS: It was fairly cold when I got home from work at 11:15 p.m. and I was still fighting off my cold, so I thought I would get the scope into the garage and start the fan on the mirror to cool things down while I got caught up with some e-mail and USENET postings. What was to have been less than an hour's work ended up being close to two hours (including some time working on a balky minivan door lock) so I didn't get out to my observing site on the hill above Rockford Lake until after 12:45 a.m. (0645 UTC). I had intended to do only two things: look at a couple of double stars which Sissy Haas had mentioned in Sky and Tel, and take another look at the faint reflection nebula Ced 62 in Orion. One look in the scope, however, showed that seeing was lousy. With Cetus well into the western sky, I didn't have a lot of hope about the double Gamma Ceti. True enough, when I put the scope on the star at 178x, the star images were small fuzzy balls, shimmering at the edges a bit. However, I could just begin to see the faint companion to Gamma, so all was not lost. At 288x, things were somewhat fuzzy, but I could see the companion a bit better. Sissy described the strongly unequal pair (magnitudes 3.6 and 7.3: separation 2.8 arc seconds) as a yellowish primary and a faint "olive" companion, but to my eyes, the primary appeared to be a dazzling almost pure white (spectral class A2). The companion was so much fainter and was blurring at times into the fuzz of the primary that I could not see much color to it at all, although it could have been slightly bluish or just a neutral grey (spectral class F5). In any case, Sissy's description was enough different from what I saw that I had to check things again to be certain of which star I was on. Sure enough, the Telrad showed the scope was smack-dab on Gamma. The ten seemed to be nice and chilled, but the out of focus star images showed a fast almost linear flow across the disks, which I often seen when high altitude winds are the culprit. I put on my variable aperture off-axis mask and stopped the scope down to 94mm. BINGO! The faint companion was seen clearly sitting almost on top of the primary's first diffraction ring. I would have to give neither of these two stars any significant color hue, so I guess I will have to differ from Sissy on this one.

My next stop was Zeta Orionis, so I too off the aperture mask but left my 5-8mm Speers-Waler in and moved the scope. I had bumped my 8x50 finder slightly out of alignment, so when I looked in at 178x, I was a bit startled to find something other than a bright double in the field. Faint highly irregular clouds of light were filling the field, which I immediately recognized as the "Flame" Nebula NGC 2024. The 27.5 arc minute field of the Speer-Waler and the extra power combined to produce a fairly pleasing view of dark lanes and diffuse patches of faint nebulosity, so I will have to remember this combination when I look at this object next time. After a quick twist of an adjustment screw on the finder, I went back to observing Zeta. It is a brilliant and very nice pair (mags 1.9 and 4.0, sep. 2.3 arc seconds), both of which are arc-light white and not too close to make them terribly difficult to separate. Seeing up in this area seemed quite a bit better than earlier, so I dropped the power and put in the H-beta filter to try for the Horsehead. Even at 59x, with Zeta out of the field, the dim band of nebulosity was quite visible, with the dark "notch" of the Horsehead showing fairly well with averted vision. The best view came at 70x with the H-beta filter, where the "snout" began to show up. 101x and 178x were just a little too much for this dim object, although I could still see it at 101x.

I moved down to M42 for a quick look, and was also startled at how much fine detail was visible at moderate and high power. I could have studied it for much of the night at 178x, as I could see a hint of reddish hues even without a filter. The core region around the Trapezium was bluish-green and filled with light and dark structure, although I only got occasional glimpses of the E and F components of the Trap. M43 was particularly impressive, as the usual diffuse "comma" shape was overlaid with an almost spiraling arc structure. The H-beta filter is fairly effective on this object, although filters weren't really required for viewing some of the fine light and dark detail. Its a pity that M43 is a bit overshadowed by its big neighbor, as otherwise, it might get noticed and examined more closely by more observers.

I decided at least one more diversion was in order, so I went further south to the small planetary IC 418 (a.k.a. "The Pink Planetary"). Despite its fairly small size (12" arc), I picked it up with little trouble at 59x. Unlike earlier sightings of it, this evening it appeared more bluish-green than pink especially in its core region. As I was examining it more closely, the very edges suddenly seemed to "flash" red! I pushed the power to 70x and the faint red "edge" phenomena seemed to be there again. It was vastly redder than I had ever seen it. At 101x, the red was not nearly as obvious, although the main outer "ring" seemed pinkish at times. 178x showed a bluish oval core with its prominent central star and fainter outer ring, but no more fiery red outer edge. Maybe the "flashing" of color was more related to seeing variations, but it was nice to see something new in an old favorite!

I was really getting cold, as I hadn't dressed warmly enough for an extended stay, so I went back up north to pick up my other "required" target Ced 62. I had first run across this object by accident in early October of 1985 when I was trying to

locate Halley's Comet. The comet was in roughly the same area of the sky, but I had noted this little "green box" on my trusty dog-eared copy of Skalnate-Pleso Atlas of the Heavens (Becvar), so I went after it with my 8 inch and found it a good deal easier to see than the stupid comet! I had not seen Ced 62 in years, so I thought it was time to revisit it with the ten inch. After a minute or two, I had gone through Sky Atlas 2000 and Uranometria, but for some reason, the stars didn't seem to match what I saw in the scope. I found something small, fuzzy, and a bit elongated, but it didn't seem to be quite in the right place. Well, I finally broke down and fired up the laptop and MEGASTAR, to find that the view now \*exactly\* matched what was shown on the screen (so much for atlases). Ced 62 is a small faint diffuse patch elongated roughly north-south, centered on a 12th or 13th magnitude star. Low power makes it look a bit like a rather tilted faint spiral galaxy with a brighter star at the core. 101x and 178x showed the northern half to be somewhat brighter than the southern half, and with averted vision, the northern portion looked almost fan-like, as if the whole nebula is bipolar. The areas just east and west of the central star looked a bit darker, which reinforced this "bipolar" feel of the nebula. Filters didn't seem to help it much, so it must be a reflection nebula, or maybe the jets from a forming solar system. It might be nice to get the HST to image this one.

I was getting even colder, but I couldn't resist a quick look at the nearby nebula NGC 2174. It was surprisingly good tonight even without a filter, as it almost looked like a small version of the Rosette with the "hole" filled in! The UHC and OIII filters brought out quite a bit of contrast, showing circling arcs of nebulosity and small patches of dark detail. This one should get a lot more attention when observing articles are published about the winter sky. It was quite plainly visible even in my 8x50 finder.

With teeth firmly in the "chatter" mode, I decided to work maybe just one more galaxy (and ended up finding three). An old favorite, the "Spindle" Galaxy NGC 3115 in Sextans was well up, so I went after it. Its a nice small but fairly high surface brightness object, showing an elongated almost spindle-like form with a tiny stellar nucleus. It kind of reminds me of M104 without the dark lane! 178x really showed the brighter core and star-like nucleus well, along with a faint diffuse but very prominent linear spine running all the way from one end of the galaxy through the nucleus and on to the other end. This central spine reminds me a bit of the inner tail spines I have seen in some comets, and was so incredibly obvious that I wonder why I hadn't noticed it before.

Since MEGASTAR was still running and showed a couple of galaxies to the north of NGC 3115, I decided that one last search was probably possible. I found NGC 3110, but only after increasing the power to 101x. It is fairly small and rather faint, appearing as a small football (US) shaped fuzzy patch with irregular ends. It was next to a line of very faint stars, but the other galaxy (MCG-1-26-13) was not immediately visible. Megastar listed NGC 3115 as magnitude 13.5 and the other galaxy as 12.7, but all I could see at the plotted location of the other galaxy was what looked like a very faint star. Going to 178x and 288x revealed that the "star" was indeed the MCG galaxy itself, which now appeared as a very tiny almost lens-shaped patch. Who said high power isn't useful for finding galaxies?!

## Hubble Captures Opaque Globules in Space

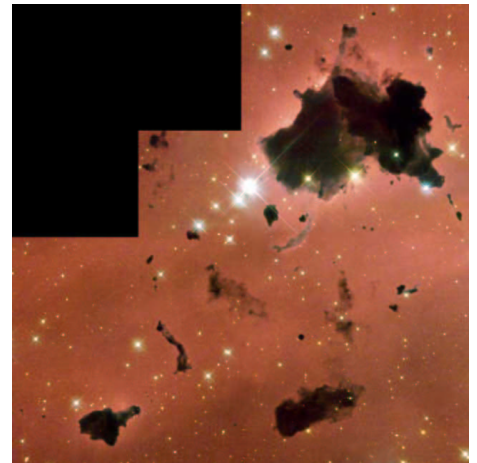
Source: JPL News Release, January 3, 2002

Strangely glowing, floating dark clouds are silhouetted against nearby bright stars in a busy star-forming region viewed by NASA's Hubble Space Telescope.

The image showing dense, opaque dust clouds - known as globules - in the star-forming region IC 2944 is available online at <http://heritage.stsci.edu> or <http://opposite.stsci.edu/pubinfo/pr/2002/01> or <http://www.jpl.nasa.gov/images/wfpc> . It was taken by Hubble's Wide Field and Planetary Camera 2, designed and built by NASA's Jet Propulsion Laboratory, Pasadena, Calif.

Little is known about the origin and nature of these globules in IC 2944, which were first found by astronomer A.D. Thackeray in 1950. Globules are generally associated with large hydrogen-emitting star-formation regions, which give off the glowing light of hydrogen gas.

The largest globule in this image consists of two separate clouds that gently overlap along our line of sight. Each cloud is nearly 1.4 light-years along its longest dimension. Collectively, they contain enough material to equal more than 15 times the mass of our Sun. The surrounding hydrogen-rich region, IC 2944, is filled with gas and dust illuminated and heated by a loose cluster of stars that are much hotter and more massive than our Sun. IC 2944 is relatively close by, only 5,900 light-years away in the constellation Centaurus.



Using the remarkable resolution of Hubble, astronomers can for the first time study the intricate structure of these globules. They appear to be heavily fractured, as if major forces were tearing them apart. When radio astronomers observed the faint hiss of molecules within the globules, they realized that the globules are actually in constant, churning motion, moving supersonically among each other. This may be caused by powerful ultraviolet radiation from the luminous, massive stars, which heat up hydrogen gas in the region. The gas expands and streams against the globules, leading to their destruction. Despite their serene appearance, the globules may actually be likened to clumps of butter put into a red-hot pan.

The globules are most likely dense clumps of gas and dust that existed before the hot, massive stars were born. But once the stars began to irradiate and destroy their surroundings, the clumps became visible when their less dense surroundings were eroded away. This exposed them to the full brunt of the ultraviolet radiation and the expanding hydrogen-rich region. The new images catch a glimpse of the process of destruction.

The hydrogen-emission image that clearly shows the outline of the dark globules was taken with Hubble's camera in February 1999 by Bo Reipurth, University of Hawaii, Honolulu, and collaborators. Additional broadband images that helped to establish the true color of the stars in the field were taken by the Hubble Heritage Team in February 2001. The composite result is a four-color image.

Image Credit: NASA and The Hubble Heritage Team (STScI/AURA) Acknowledgment: Bo Reipurth (University of Hawaii)

### **Astronomers Discover Edge-On Protoplanetary Disk in Quadruple Star System**

Astronomers using the recently commissioned Gemini North telescope in Hawaii have discovered a protoplanetary disk orbiting one of the stars in a newborn quadruple star system. The dusty disk, about three times the size of Pluto's orbit around the Sun, appears nearly edge-on when viewed from Earth.

Only about 10 edge-on disks like this disk have been discovered to date. Out of these 10, two are in binary star systems, and this new object is the first one discovered in a quadruple star system. The new observations used a technique known as adaptive optics, which partially corrects for the blurring effects of the Earth's atmosphere in images of astronomical sources.

"This is a remarkable demonstration that adaptive optics can help the largest ground-based telescopes reach their full potential," said Ray Jayawardhana, a Miller Research Fellow at the University of California, Berkeley. "We now have a powerful tool to probe the evolution of protoplanetary disks and to look for newborn Jupiter-like planets."

"The new 8- to 10-meter telescopes really need adaptive optics to achieve the highest possible resolution," said the other leader of the team, Kevin Luhman of the Harvard-Smithsonian Center for Astrophysics. "Adaptive optics has come of age, and has allowed us to image a protoplanetary disk in a quadruple star system for the first time."

Adaptive optics works by flexing a thin mirror many times a second into just the right shape to cancel out the effects of roiling air above the telescope. The technique has become regularly available to astronomers only in the last few years. When used on large telescopes, it allows astronomers to obtain images that are as sharp and sensitive as those from space-based observatories such as the Hubble Space Telescope.

Jayawardhana, Luhman and colleagues combined the University of Hawaii's Hokupa'a adaptive optics system with the 8-meter Gemini North telescope to obtain high-resolution infrared images of a wide binary star system. This binary system is only about two million years old, and is part of a small cluster of stars known as MBM 12, located 900 light-years from Earth.

In the new high-resolution images, one of the stars is revealed to be a pair of two closely orbiting stars. What's more, astronomers saw an additional, much fainter and fuzzier object nearby, with two elongated lobes that are separated by a dark lane. This morphology is the distinct signature of a protoplanetary disk that is being viewed edge-on and is blocking the light from the star at its center. The star's light reflecting off the top and bottom surfaces of the disk produces faint nebulosities on either side of the dark lane.

"What we're looking at is an example of a dusty disk that will probably evolve into a young planetary system over the next several million years," explains Jayawardhana, lead author of a paper describing these results submitted to the *Astrophysical Journal*. "It's the combination of adaptive optics and a large telescope like Gemini that made this discovery possible. Thanks to these sharp images, now we can study the earliest stages of planet formation in remarkable detail."

"We would never have found this object with normal ground-based imaging. To find something this faint next to a bright star and to resolve its structure, adaptive optics on a big telescope like Gemini was essential," concurs Luhman.

Normally, stars with protoplanetary disks are viewed from an angle so that we see the star easily but we see little or nothing of the disk, which is much fainter. Here, we happen to be looking from an angle where the disk blocks the star and makes its presence known." By analyzing the infrared images of the edge-on disk and the quadruple star system, the research team can learn about both the physical properties of disks from which planets form, and the way in which stars are born in multiple star systems.

## THE PRAIRIE ASTRONOMY CLUB CALENDAR

February 2002						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1  Sun: 07:36 - 17:44	2  Sun: 07:35 - 17:45 Hyde Observatory open to the public 7-10 p.m.
3  Sun: 07:34 - 17:46	4  Sun: 07:33 - 17:47	5  Sun: 07:32 - 17:49	6  Sun: 07:31 - 17:50	7  Sun: 07:30 - 17:51	8  Sun: 07:29 - 17:52 Club Star Party	9  Sun: 07:28 - 17:53 Hyde Observatory open to the public 7-10 p.m.
10  Sun: 07:26 - 17:55	11  Sun: 07:25 - 17:56	12  Sun: 07:24 - 17:57	13  Sun: 07:23 - 17:58	14  Sun: 07:21 - 17:58 NSP Meeting, Mahoney, 7:30	15  Sun: 07:20 - 18:00	16  Sun: 07:19 - 18:01 Hyde Observatory open to the public 7-10 p.m.
17  Sun: 07:17 - 18:02	18  Sun: 07:16 - 18:03	19  Sun: 07:15 - 18:04	20  Sun: 07:13 - 18:06	21  Sun: 07:12 - 18:07	22  Sun: 07:11 - 18:08 UNL Student Observatory Open House	23  Sun: 07:09 - 18:09 Hyde Observatory open to the public 7-10 p.m.
24  Sun: 07:08 - 18:10	25  Sun: 07:06 - 18:11	26  Sun: 07:05 - 18:13 PAC Meeting 7:30pm Hyde Observatory	27  Sun: 07:03 - 18:14	28  Sun: 07:02 - 18:15		

**Directions to Olive Creek  
Observing Site**

Shorter:

Take Hwy 77 South out of Lincoln until you get to the Crete corner (junction Hwy 77 and Hwy 33). Go West on Hwy 33 (toward Crete) until you get to SW 72 St. Turn Left (South) on SW 72 St. and go about 5 miles until you get to SW Panama Rd. Turn right (West) until you get to SW 100 St. (SW 100 St does NOT go through to Hwy 33). Turn Left (South) on SW 100 St and go about 1 to 1 1/2 miles until you see the sign and entrance to Olive Creek (this is the West side of the Park). It's on your left (East) side of the road.

More Black Top:

Take Hwy 77 South out of Lincoln until you get to the Crete corner (junction Hwy 77 and Hwy 33). Go West on Hwy 33 (toward Crete) until you get to about SW 114 St. - the first intersection after SW 100 St. (forgot to look at this street sign, sorry - you'll see a sign for Olive Creek though at this road- but don't count on anymore signs after that, I didn't see any). Turn Left (South) on SW 114 St and go about 5 miles or so until you get to SW Panama Rd (you'll see a church and small school on your right). Turn Left (East) and go about a mile to SW 100 St, then turn Right (South) and go 1 to 1 1/2 miles until you see the Olive Creek entrance and sign (on your left hand side of the road).

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**The Prairie Astronomer  
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First Class Mail

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**Next PAC Meeting  
January 29, 2001  
7:30 PM  
Hyde Observatory**