The Prairie Astronomer

The Official Newsletter Of The Prairie Astronomy Club, Inc.

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MEETINGS & EVENTS

PAC MEETING
TUESDAY, OCTOBER 26, 1999, 7:30 PM
at Hyde Memorial Observatory

MAHONEY STAR PARTY
NO MORE THIS YEAR

CLUB STAR PARTY
FRIDAY, NOVEMBER 5, 1999
OAS Observing Site
(see map on back page)

NSP 7 PLANNING MEETING
THURSDAY, NOVEMBER 11,1999
Mahoney State Park

HYDE VOLUNTEER MEETING
SUNDAY, NOVEMBER 14, 1999, 7:30 P.M.
At Hyde Memorial Observatory

LEONIDS METEOR SHOWER PEAK
WEDNESDAY AND THURSDAY, NOVEMBER 17 AND 18
Preferably in a dark sky near you!

PAC MEETING
TUESDAY, NOVEMBER 30, 1999, 7:30 PM
at Hyde Memorial Observatory

OCTOBER'S PROGRAM:

Dr. Vanessa Gorman

UNL historian **Dr. Vanessa Gorman**, who also works with the Classics Department, is provisionally scheduled to give a presentation on the autumn constellations, focusing on the classic Greek "Perseus Cycle."

ELECTION OF PAC OFFICERS

Current Nominations are:
President: Dave Knisely
Vice President: Doug Bell
2nd Vice President/Program Chair: Mark Fairchild
Secretary: Willa Penney
Treasurer: Liz Bergstrom

PAC-LIST: Mark Dahmke maintains an e-mail list server for PAC. 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. Write "Subscribe PAC-List" in the body of the e-mail.

NEWSLETTER INPUT: If you have an article or articles, pictures, recent viewing session stories, or anything else you would like to put in the newsletter, please be sure to forward them to the Editor. Also, if you have ANY suggestions on how to make The Prairie Astronomer a better newsletter for you, please do not hesitate to bring your ideas to the Editor.

CONTENTS:

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: **Jeff King, 4018 South 83rd Street, Lincoln, NE 68506-5973 or jeffrey892@aol.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: Willa Penney

President Dave Knisely opened the meeting. He reported that solar activity has settled down recently but should begin to pick up again. Comet Lee is at its closet approach to earth. Jupiter and Saturn continue to be good viewing.

Saturday, September 18, Erik Hubl and Dave presented a "Star Walk" to about 50 people at the Homestead National Monument in Beatrice.

Doug Bell, the 2000 NSP Chairman, announced that the first planning meeting will be October 14 at Mahoney State Park lodge. Anyone is welcome to attend.

October 8 is the OAS/PAC banquet and star party; registrations include 7 from OAS, with a total of 47. Larry Hancock reported that dinner will be at 7:30 with Martin Gaskell's program on Mars at 8:30. We will be in the Helen Sapp Riverview Lodge, by the Journal Star tower.

The UNL Behlen observatory will be open on October 15 from 7:00 - 10:00.

The Leonid Meteor Shower is predicted to be at peak at 7:50 p.m. Lincoln time on November 17. However, it could be 16-24 hours either before or after. Dave said that it could be a "storm" this year with as many as 1,000 per hour.

Mrs. John Lawler presented a Telrad to the club.

Jeff King thanked everyone for submitting articles for the newsletter. Erik Hubl's report on the August 13 "sonic boom" is on the PAC website; he was interviewed on local TV news and received additional reports as a result. One of those reports was of a pickup window being shattered. Erik has been contacted by Rex Graham from Astronomy magazine about an excerpt being put on their web page with links to the PAC website. Erik reported that he found a mention on Norad's website to an expected "demise" of part of a Pegasus rocket on August 13.

Bob Leavitt showed a picture of the proposed club banner; it will be 6' x 2' and will cost $50.

Mark Fairchild, in addition to being Hyde Volunteer Coordinator, is also a Hyde Supervisor. The next Volunteer Night will be Sunday, October 10. Mark asked for volunteers to help with the Hyde youth group. He proposed that they meet the 2nd Sunday of each month, just prior to the monthly volunteer meeting.

Nominations were taken for officers for PAC for 2000:

President - Dave Knisely
Vice President - Doug Bell
2nd Vice President/Program Chairman - Mark Fairchild
Secretary - Willa Penney
Treasurer - Liz Bergstrom

Officers will be voted on at our November meeting. Meeting was adjourned to our program; Dave Hamilton presented a very interesting program on variable star observing.

The Universe is but the Thing of things,
The things but balls all going round in rings.
Some of them mighty huge, some mighty tiny,
All of them radiant and mighty shiny.

from *Accidentally on Purpose*
Robert Frost, 1960

Deep Sky Observing

By Dave Knisely

DATE: October 6th, 1999, 0330 to 0700 hrs UTC.
LOCATION: Olive Creek State Recreation Area, Nebr. 40.580N, 96.848W
INSTRUMENT: 10 inch f/5.6 Newtonian, 47x, 59x, 101x, 141x, 220x,
CONDITIONS: Clear, Temp. 50 deg. F., wind calm.
UNAIDED EYE LIMITING MAGNITUDE: +6.5
SEEING: 1" arc (variable).

OBSERVATIONS: After opening Hyde Observatory for an hour or so for a group of about 30 Girl Scouts and 6 or 7 harried parents, a friend of mine, John Lammers, and I went out for some more serious observing southwest of Lincoln, Nebraska from our dark sky site at Olive Creek Lake. We started with a little sight-seeing, allowing my friend to see how my 14mm Meade Ultrawide, which I have nicknamed "The Glass Hand Grenade", worked on deep-sky. I put M31 in the ten inch at low power to give him an idea of the field. The dark lane and diffuse patchy detail along the southwestern spiral arm were both fairly easy, but when I put in the Glass Hand Grenade, the dark lane became much more obvious, showing little irregularities along it as it passed the bright nuclear core. The 14mm gave just enough power to cut down on the weak skyglow, without significantly reducing the visible field of view (about 49 arc minutes at 101x verses 64 arc minutes at 47x in my 30mm Ultrascopic). The view of M33 was also impressive, but with its diffuseness, John liked the 59x of my 24mm Koenig better on this object. The 14mm Ultrawide worked much better on NGC 891, as John immediately noticed its dark lane along much of its length. The Double Cluster also faired well with the 14mm, but again, John liked just a tad lower power to get more of the surrounding region in. We then got down to a little more serious observing. I resumed my hunt for the Herschel II objects remaining (I am down to 47 left after tonight, but most of the remainder sit in the spring sky). Most were not terribly notable. The highly tilted spiral NGC 7541 was a small but not terribly faint narrow streak with a brighter middle. 141x revealed a small brighter core with a possible star-like nucleus, as well as a slight brigtening west of the core. Next to it was the somewhat smaller and fainter galaxy NGC 7537, which didn't show much detail other than shape.

I took a somewhat lengthy look at the Pegasus 1 galaxy group centered on NGC 7619. Three of these galaxies are on the Herschel II list, but none were terribly difficult and I had previously logged many of them a few weeks earlier. According to my quick Megastar plot, I should have seen about 12 galaxies in the field of my 14mm. The brightest galaxy is the Elliptical NGC 7619, which, along with its immediate neighbor NGC 7626, were the only two objects which were very obvious at low power. With the Glass Handgrenade in, I easily noted a number of other small faint galaxies in the field, but to see all of those noted on my Megastar plot, I had to go to 141x to get the scale up. Both NGC 7619 and 7626 were not terribly large, but were quite easy. Each showed star-like nucleii in brighter cores surrounded by a nearly circular diffuse outer haze, although NGC 7626's core seemed a bit sharper.

Off the southwest edge of NGC 7619 was the diminutive but still fairly easy NGC 7617, appearing as a very tiny oval puff. Some distance to the north, I noted the small faint oval form of NGC 7623. Suprisingly, it was much easier to see than the edge-on spiral NGC 7631 which sits to the east of the two bright core ellipticals. Megastar lists both at 13.9, but I would have to say that NGC 7623 was a tad brighter than that and NGC 7631 was somewhat fainter. NGC 7631 was a tiny elongated streak which pointed towards a very faint star. I glimsed a very small galaxy southeast of NGC 7626 which was not on my original plot, but which I later identified as MAC 2321-0810A.

Also visible was the tiny elongated patch of MCG +1-59-58. Farther to the southwest, UGC 12522 was very difficult, and I am not sure that I wasn't just seeing a faint star, but what was confusing me was another somewhat easier slighly elongated galaxy to its immediate south. Megastar identified it as UGC 12518, which appeared to be elongated North-south. To the northest of these were a nice pair of highly tilted spirals, NGC 7611 and IC 5309. NGC 7611 was about the third or 4th easiest galaxy in the entire group, appearing as a small elongated fuzzy spot, while IC 5309 was somewhat fainter and had to compete with several faint stars next to it. The tiny oval forms of UGC 12510 and NGC 7608 were not terribly bright, but still were not overly hard to see. I also picked up NGC 7615 and 7612, but southeast of NGC 7612 was another tiny small and very faint spot of light. Going back to Megastar revealed that it may have been CGCG 406-69, although again, it might

Continued on Page 4...

have just been a faint star enlarged by bad seeing. All in all, between 13 and 15 galaxies were seen in this interesting field. Looking at their radial velocity data in Megastar, it would appear that most of these objects are indeed part of some physical cluster. Looking a bit farther away with the computer picked up a few more galaxies in the area with similar radial velocities, so this group may be part of an extended cluster. Resuming my Herschel II search, I ran into an old favorite; NGC 7640, a nice big but faint target which I appreciate even more after hunting down all the tiny faint fuzzies on the list. The galaxy was best in either the Glass Handgrenade or with my 10mm Ultrascopic, showing some patchy detail. It has a slightly brighter middle and a possible star-like nucleus, but with all the faint stars in the field, this may be questionable. The outer haze seems patchy, with the brightest patch being an elongated one in the north half of the galaxy. It isn't terribly far from the "Blue Snowball", NGC 7662, so that object got a quick look as well. The last object on my Herschel II list of things to see tonight was the open star cluster NGC 7762, a moderate to large elongated group of faint stars in Cepheus. It has a small central line of 5 or 6 stars, with an arc of stars on the south, which together seem to form a sort of squashed "Z" or "S" shape. The background is fairly rich which made estimates of the total number of stars difficult, but somewhere between 20 and 40 stars were seen.

Having completed my night's "required" observing, I went back to having a little fun with the Glass Hand Grenade. I blew John away by putting the scope on NGC 253 with the 14mm, especially after the "torture" I had put him through with my Herschel II search. The galaxy extends over the entire width of the field of my 10mm Ultrascopic, and just sparkles with light and dark detail.

After this, we paid the usual stops to the Pleiades, seeing the Merope Nebula with ease in the 14mm. We also viewed the California Nebula with my 30mm and the H-beta filter, as John got to see some of the faint filamentary detail this object has. I then hit John with a few nice open clusters. M37 in Auriga was spectacular, and seemed to be a more symmetrical version of M11. A pair of clusters John really liked were M38 and its tiny neighbor NGC 1907, both of which were really fine sights in the 14mm. I could get both easily in my 24mm Koenig, but you could easily view them with the 14mm with just a bit of nudging at the scope. We looked at the irregular cluster NGC 1893 and easily saw the nebulosity around it (IC 410) using the UHC and OIII filters. We finished off with a stunning view of the Orion Nebula in the 14mm equipped with the UHC filter. All in all, it was a good night, and certainly makes up for the bad weather last month.

Clear skies to you.

David Knisely

Water discovered in meteorite *From USA TODAY*

Scientists who cracked open a meteorite that fell to earth last year found tiny pockets of briny water, providing the first close look at water not originating on earth, according to an article in the journal *Science*. While astronomers have long thought that water flowed through asteroids and other bodies formed at the beginning of the solar system, the meteorite's liquid cargo offered the first chance to actually study it in a lab. The meteorite burned through the sky and was spotted by a group of boys in Monahans, Texas, who alerted scientists from NASA's Johnson Space Center in Houston. Chondrite meteorites, such as the one found in Monahans, are thought to comprise some of the most primitive ingredients from the early period of the solar system, and the water in the crystals could date as far back as 4.5 billion years.

Leonids Made Easy

Reprinted from: http://comets.amsmeteors.org/meteors/showers/leonids.html

What are the Leonids?

The Leonids are a meteor shower. They are called the Leonids because they appear to radiate out of the constellation Leo. A Meteor, also known as a "shooting star," is a particle from space. Its typical size ranges from that of a grain of sand to that of a pea. A meteor appears when it enters Earth's atmosphere and burns up high overhead. Meteors can be seen on any night, but Earth enters clouds of particles several times each year and the result is a meteor shower.

What Do the Leonids Look Like?

All meteors appear as brief streaks of light moving a short distance across the sky. Some meteors move slow and some move fast. This "streak" is called the train and is basically a trail of glowing dust left in the wake of the meteor.

The Leonids are fast meteors and they leave lots of trains. They enter Earth's atmosphere traveling at speeds of over 158,000 miles per hour (mph). For comparison an Indy race car can reach a top speed of about 250 mph, the fastest jet has a top speed of 2190 mph, and an orbiting spacecraft has an average speed of 20,000 mph.

Besides being fast, the Leonids usually contain a large number of very bright meteors. The trains of these bright meteors can last from several seconds to several minutes.

Where Do the Leonids Come From?

Most if not all meteor showers are produced by comets. In the case of the Leonids the parent comet is named Tempel-Tuttle and it makes an appearance in our skies every 33 years. Comets are composed of ice and dust. Every time a comet approaches the sun the ice melts and dust is released. Eventually the dust spreads completely around a comet's orbit, but most of the dust stays close to the comet. When Earth passes through the dense cloud of dust the result is a spectacular meteor shower or a meteor storm. Meteor storms produce several thousand meteors per hour.

When Do the Leonids Occur?

Every November 17 Earth crosses the orbit of comet Tempel-Tuttle and the Leonids become visible. An observer with clear, dark skies can see 10 or 15 Leonid meteors every hour on that morning. Unless an observer is living at a very high northern latitude (generally within the Arctic Circle), the Leonids are only visible during the morning hours.

Since Tempel-Tuttle passed closest to the sun in February of 1998, the years 1998 and 1999 should produce very strong displays. Astronomers predict in 1998 that the meteor shower will be strongest during the morning hours for observers in Asia, while in 1999 it will be best seen by observers in Asia and Europe. During the mornings of November 17 and 18 of both years observers anywhere in the Northern Hemisphere should see larger than normal displays. Start watching sometime after about 10:00 p.m. local time, which is your time. As the evening progresses toward morning, meteor rates should generally increase. Keep watching until morning twilight begins. (However, keep in mind that certain meteor "experts" predict the peak to be around 10:08 p.m. central time on the 17th).

How Do You Observe the Leonids?

The point from where the Leonid meteors appear to radiate is located within the constellation Leo and is referred to as the radiant. The radiant is located in the western portion of that constellation in what is commonly referred to as the "sickle" or "backwards question mark." The radiant location with respect to the horizon is shown below.

(Image produced by the Author using Starry Night 2.0 and Adobe Photoshop 5.0. It represents the view from mid-northern latitudes at about 3:00 a.m. local time.)

To best observe the Leonids wear appropriate clothing for the weather. Lay outside in a reclining lawn chair with your feet pointing towards the east (the general direction of the radiant). Do not look directly at the radiant, but at the area above and around it. The Leonids can be observed into morning twilight. Other minor meteor showers will be going on at the time and stray meteors, more commonly called sporadics, will frequently be seen that do not belong to a meteor shower. When you see a meteor mentally trace it backwards and if you arrive at the "sickle" of Leo it is probably a Leonid.

ABC's of Astronomy

A is for Astronomy, the science of far out
B is for Big Bang, how the cosmos came about
C is for Chandrasekhar, who knew things compact
D is for Dark Matter, whose existence is a fact
E is for Eddington, and matters radiative
F is for Faraday, and wave planes rotative
G is for Galaxies, which fly between voids
H is for Hubble, who knew disks from ellipsoids
I is for Ionization, revealing energy states
J is for Julian Day, for periodic dates
K is for Kepler, and his revolution
L is for Local Group, a galaxian profusion
M is for Molecular Cloud, a protostellar batter
N is for Neutron Star, the densest of matter
O is for Oort Cloud, that beyond Pluto lies
P is for Photon, the coveted prize
Q is for Quasar, the most energetic
R is for Redshift, revealing the kinetic
S is for Supernova, nucleosynthesis site
T is for Telescope, gatherer of light
U is for Ultraviolet, seen only from space
V is for Virial Theorem, an equilibrium case
W is for Wolf-Rayet Star, massive and bright
X is for X-ray, where hot things emit light
Y is the fraction of helium by amassed
Z is for Zenith, the highest and last.

Leonid Predictions for 1999

Since the 19th-century discovery that the Leonids were a recurrent meteor shower capable of producing storms of meteors, astronomers have not been particularly successful at predicting the strong displays. After tremendous displays in 1833 and 1866, predictions for 1899 and 1933 failed to pan out. Another prediction for 1966 indicated a display was possible, but nothing prepared observers in the western United States for one of the greatest meteor displays in history.

Beginning in the 1980s investigations of the orbit of the Leonid parent comet revealed the effects of Jupiter's gravity. Suddenly, some of the failures of the past were revealed. The reason for the lack of strong displays in 1899 and 1933 were possibly due to the fact that Jupiter had tugged on the comet following the 1865 return and made it so that Earth did not pass particularly close to the Leonid stream orbit in 1899 and 1933. In addition, changes in the orbit as it approached the sun for the 1965 return caused Earth to once again approach close to the stream orbit, thus apparently explaining the intense Leonid display of 1966.

Several astronomers posted predictions for the Leonid returns of the late 1990s, with 1998 and 1999 believed to be the optimum years. Donald K. Yeomans (Jet Propulsion Laboratory), a person who has extensively studied the orbital motion of the Leonid parent comet, predicted maximum would occur on November 17, 1998, at 19:43 UT, with hourly rates of 200 to 5000. Peter Brown, a leading researcher into the mechanics of meteor streams, generally agreed with the time, but gave a more optimistic estimate of hourly rates between 1000 and 9000. But the display of 1998 surprised everyone. Instead of a possible meteor storm, observers were treated to a display of about 250 per hour. To make matters worse, the display peaked about 16 hours earlier than predicted.

The interesting quirk of the 1998 display inspired several astronomers to approach the analysis of the Leonid stream in a different way. Leading the pack was David J. Asher (Armagh Observatory, United Kingdom) and Robert H. McNaught (Australia). Asher constructed a model of the Leonid stream which contained a number of filaments or trails. Each trail was produced by a different appearance of the parent comet. Asher and McNaught began comparing the model with previous appearances of the Leonids. Using computers to determine the evolution of each trail, they noted that the model came close to predicting the hourly rates of each display and indicated an accuracy of 10 minutes or better in predicting the time of maximum. Perhaps the biggest boost for their model came when it predicted a strong outburst for 1869 that should have been visible over western Asia, the Middle East, and eastern Europe. Upon searching they found an account of Leonid observations made on the island of Mauritius in the Indian Ocean. The indicated peak differed from the predicted value of Asher and McNaught by only 5 minutes!

Asher and McNaught have used their model to predict the circumstances of Leonid displays for the period of 1999 to 2002. The following details are indicated:

Time (UT)	Estimated ZHR	Visible from
1999, November 18, 2:08	1500	Europe, Middle East, Africa
2000, November 18, 3:44	100-5000?	Europe, Africa
2000, November 18, 7:51	100-5000	E. U.S.A., E. Canada, Atlantic
2001, November 18, 10:01	2500?	Americas
2001, November 18, 18:19	10000-35000	E. Asia, W. Pacific, Australia
2002, November 19, 10:36	25000	Americas

Another prolific investigator of the Leonids has been Joe Rao, a frequent writer for *Sky and Telescope*. He essentially has two predictions for the 1999 display, but believes only one will prove correct. It all depends on how previous Leonid displays are interpreted. His earliest prediction is November 18 at 2:08 UT and he derived it by extrapolating the circumstances of the 1866 and 1966 displays. This is essentially an independent confirmation of the Asher and McNaught prediction. His later prediction is November 18 at 4:17 UT and he derived it by extrapolating the instances of the Leonid maximum in 1996, 1997, and 1998 up to 1999. Rao firmly believes 1999 will be the best year for the Leonids this time around and said rates could be as high as 20,000 per hour. Recently Rao commented, "I honestly believe that those who are predicting "only" 1000-1500 for this year are playing it cautiously . . . however . . . based on my study of the orbital integrations of past storms, dating back to 1833, I believe that 1999 will fall roughly in-between the cases of 1866 and 1966 in terms of activity."

From these two careful studies, it would seem the likely time of the upcoming Leonid maximum will be around 2:08 UT on November 18. This is equivalent to 10:08 a.m. on November 18 in China and western Australia, 5:08 a.m. on November 18 in Moscow, 2:08 a.m. on November 18 in England, 9:08 p.m. on November 17 for the east coast of the United States, and 6:08 p.m. on November 17 for the west coast of the United States. (That's 10:08 p.m. for those of us in Nebraska).

Downsizing The Solar System

Bob Riddle, Director
KCMSD Planetarium
Kansas City, MO

(WASHINGTON D.C.)

The US Congress today, in an effort to rectify the current stalemate with the President over the continuing resolution has made a dramatic announcement. In an effort to reduce the NASA budget, a resolution was passed today to downsize the solar system. According to an unnamed congressional staffer, House Republicans felt there has been "too much redundancy in the solar system" and that streamlining the 4.5 billion year old planetary system is long overdue. Such action would give NASA fewer places to go and this would allow the agency to carry out its space exploration goals within the funding profile that the House proposed earlier this summer.

"Look, we have three terrestrial planets" said Congressman Rip U. Apart (R, Del.), "and only one of them really works! So why not get rid of the other two and clean up the neighborhood?" Most subcommittee members felt that while downsizing was definitely in the cards, eliminating both Mars and Venus was going too far. "We have too many international commitments to Mars." said Rush N. Hater (R, Calif.). "So I think we should keep Mars and dump Venus. Its too hot to live on, and liberal Democrats keep using it as an example of what global warming can do. So from a political and practical point of view, Venus has got to go."

Also at risk is the planet Mercury which lacks support because of its small size and poor visibility from Earth. "Who needs it?" asked Congressman Newt Onian (R, N.C.). "Have you ever seen it? I haven't. So what good is it? We just don't need useless planets. And speaking of useless planets, what about the asteroids? If you've seen one, you've seen them all. So I say we ought to get rid of the little boogers once and for all."

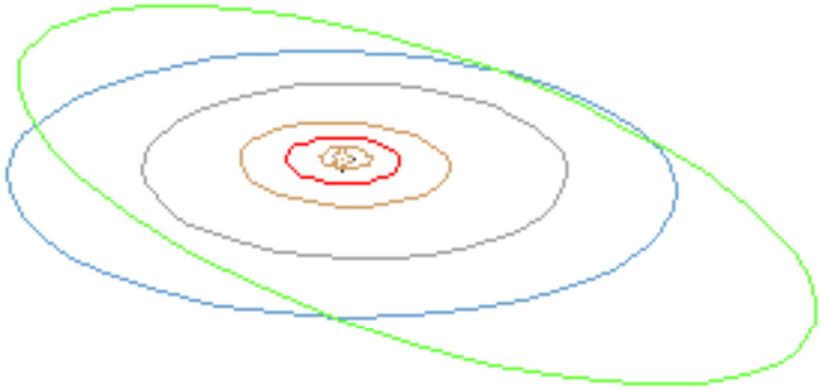
However, the downsizing recommendations do not stop with the terrestrial planets. The resolution also calls for a reduction in the number of gas giants which contain most of the planetary mass in the solar system. Most subcommittee members favor retaining Jupiter and Saturn, and eliminating Uranus and Neptune. "Jupiter employs the most molecules, and Saturn has those pretty little rings everyone likes." said Rep. Con Mann (R, Fla.). "On the other hand, Uranus is a bore and its rings are dirty. And Neptune, for God's sake, is just too far away. So be gone with those ugly bruisers."

But the influential Wright I.M. Fornow from South Carolina has publicly announced he will fight to eliminate Saturn. Fornow is especially miffed by NASA's success thus far in keeping Cassini, the next mission to Saturn, alive which he feels is waste of taxpayers money. "If there ain't no Saturn, then there ain't no Cassini" he exclaimed. The congressman also expressed concern about sending back-to-back spacecraft bearing Italian surnames to the outer planets (The Galileo spacecraft arrives at Jupiter this December).

The subcommittee was unanimous in its views towards Pluto which they deemed a moral misfit. "Now here's a planet we can definitely do without." continued Fornow. "A few years ago, it was farthest from the sun. Now its not. Its just too confusing. And now they tell me its really two planets instead of one. What the hell is going on here?"

The resolution must now be presented to the entire House, where it is expected to pass easily since only a minority of Representatives have constituents on the affected planets. NASA Administratorss have vowed to resist any further reductions to the solar system, saying that "NASA has expended considerable effort to make the planets cheaper, faster, and better. Much of this work would be wasted if the solar system were downsized."

Critics say, however, that reducing the number of planets will not produce the expected savings to taxpayers. Textbooks, they note, would have to be revised to reflect the new arrangement, and facilities would need to be constructed to remove the planets themselves. The resolution is also likely to draw strong opposition from religious fundamentalists who have long opposed the elimination of any of the biblical planets. Thus, the matter is still far from resolved.



[Announcement by Timothy Gaskell[1]*.]*

Part II: Preparing and Starting.

Martin Gaskell

This is the second article in a series describing the "Telescope Making Marathon" held at our house back in July where we helped Kelly Crowley make a 6-inch Newtonian. The background to the project was described last month.

Preparations

Bringing off a project like making a telescope in one day requires preparation and planning. A number of things we needed were made in advance (I hope this isn't regarded as cheating!). Gary Avery, a friend from church who has been thinking about building his own telescope, made us a wooden grinding stand a few years ago (Gary came by during the marathon to see what we were up to). Gary used wood left over from when he built his house. Bill Wells also brought his old barrel grinding stand round and an unfinished 8-inch mirror in case we got bored and needed another mirror to work on (we didn't get bored as it turned out!).

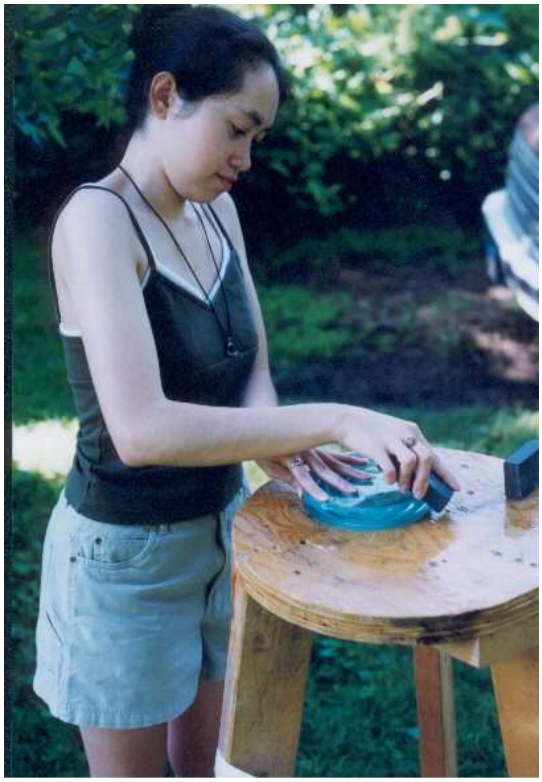
Two other things Kelly and I made in advance were a simple Foucault/Ronchi tester, and the pitch lap on plywood polishing tool. In these newsletter articles I'm going to describe things in order of use so I'll describe the polishing tool and tester in detail in future articles. The only point I'll make now is that these are things that can be made in advance. In fact, if you're thinking of making your own telescope mirror and you already have any sort of Newtonian already, no matter how small, I'd suggest making yourself a tester as the first step in mirror making and trying it out on the mirror you already have. If you're making a telescope mirror on your own and not trying to do it in one day, then you'd probably make the polishing tool right before you need it.

One of the unique features of our telescope making marathon was that we not only made the mirror in one day but we also aluminized it. I had been taught how to aluminize back when I was a graduate student at Lick Observatory, but I hadn't done it since then and John Eurek and Brandon Thaden who were getting the aluminization system running were also new to this so we practiced aluminizing a few times in the weeks before the marathon.

I think the main shortcoming in preparations was not drawing up detailed plans in advance for the woodworking. Instead I had three telescopes on hand for people to examine and copy. In retrospect it would have been more efficient to have had detailed plans. Oh well, I'll do that the next time we have a telescope making marathon (and people are already asking me when the next one is going to be and can they come!).

We're off!

Our plan was to start on the glass and 9:00 a.m. on the Saturday morning. The first person to show up was Liz Klimek. Since Liz was also the last person to do polishing at the end of the



day and was there for "first-light" after the aluminization, she deserves some sort of prize for endurance!

Liz Klimek beveling an edge.

The first thing you have to do with glass disks is to bevel the edges. You bevel by rubbing a grindstone along the edge.

Here is what the bevel should look like and what happens if the bevel wears down while you're grinding (which it did with the tool at one point):

[1] "You can't help respecting anyone who can spell TELESCOPE, even if he doesn't spell it right . . . but you knew it wasn't a microscope" (with apologies to A. A. Milne!)

Kevin Dowd and Martin Gaskell showing that bevelling goes faster in tandem!

Rough Grinding

With the beveling taken care of, it was time to get down to the hard work of hogging out the mirror.

Spooning on the Carborundum powder.

The mirror becomes concave by being abraded in the center and the tool becomes convex by being abraded around the edge. So for the most rapid "hogging out" you want to grind with the center of the mirror above the edge of the tool. The best way of doing this is with a long "chordal stroke."

Kelly Crowley demonstrates the correct starting position for the chordal stroke

You push towards and away from you while slowly walking around the grinding stand. You also slowly turn the disk in your hand the same direction you're walking. It's now just a matter of hard work. The harder you work the faster the job gets done. You

grind hard until the crunching of the coarse Carborundum powder has turned into a smoother swishing sound. With a strong person pushing hard and fast this takes less than two minutes. The ground-up Carborundum and glass makes a messy gray sludge:

Then it's time to give the mirror and tool a quick rinse, put some more Carborundum powder on and get back to work.

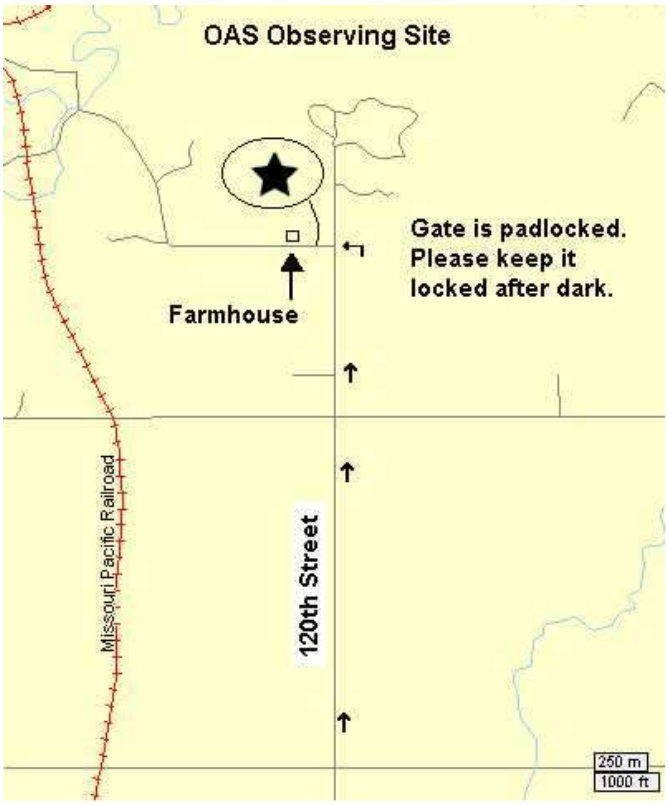
[TO BE CONTINUED . . .LOOK OUT FOR MORE PICTURES NEXT MONTH!]

THE PRAIRIE ASTRONOMY CLUB CALENDAR
For November 1999

Sun	*Mon*	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*
Definition: Telescope: A hole in the space-time continuum, lined with glass, wood, metal, and plastic, into which you pour money.	**1**	**2**	**3**	**4**	**5** **3RD QUARTER**  **OAS Meeting**	**6** **Hyde Observatory open to the public 7-10 PM**
7 **NEW MOON** 	**8**	**9**	**10**	**11** **NSP 7 Planning Meeting, 7:30 @ Mahoney State Park**	**12** **Club Star Party at the OAS Viewing Site**	**13** **Hyde Observatory open to the public 7-10 PM**
14 **Volunteer Practice Night**; 7 p.m. to 10 p.m.	**15**	**16** **1ST QUARTER** 	**17** **Leonids Meteor Shower Peak**	**18** **Leonids Meteor Shower Peak**	**19**	**20** **Hyde Observatory open to the public 7-10 PM**
21	**22**	**23** **FULL MOON** 	**24**	**25** **Thanksgiving Day**	**26**	**27** **Hyde Observatory open to the public 7-10 PM**
28	**29** **3RD QUARTER** 	**30** **PAC Meeting 7:30 PM Hyde Observatory**	**November Volunteer Schedule for Hyde Observatory:** 11/06/1999 Elaine Klaege , Lee Taylor , Jim Woodson , Laura Woodson 11/13/1999 Dave Churilla , Don Gasparetti , Travis Miller , Lee Taylor 11/20/1999 Doug Bedell , Dave Churilla , Joey Churilla , Brendon Goble 11/27/1999 Dave Churilla , Don Gasparetti , Travis Miller , Lee Taylor **Celestial objects for Hyde Public Nights in November are:** Delta Cepheus, h & Chi Persei, M-15, NGC-7662			

Directions to OAS Observing Site

From Lincoln, take Highway 34 East approximately 29 miles to 120th street. Then go North about 2 ½ miles.



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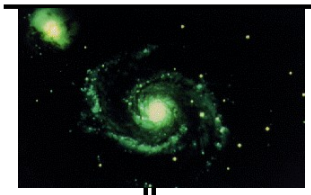

The Prairie Astronomer
c/o The Prairie Astronomy Club, Inc.
P.O. Box 5585
Lincoln, NE 68505-0585

First Class Mail

Next PAC Meeting
October 26, 1999
7:30 PM
Hyde Observatory