

The Prairie Astronomer

Atlas Site Vandalism!

by Del Motycka

If you have been to the Atlas site recently, you would have seen that the east gate has been vandalized. The bottom weld on the end of the gate was broken, and the sheet metal reinforcement was cut by either shears or a chisel, so it was possible to lift the gate off of the locked chain and gain access. Saturday morning, Rick Johnson advised me that the whole end of the east gate was torn off and gone. This happened between February 6th and February 12th.

I telephoned the manager of the Firth Co-op and discussed this matter with him. He was unaware of the latest damage. He advised me that he had made arrangements for a portable welder to fix the previous damage, but the person had not done the work promptly. Now more extensive repair is required.

We discussed liability due to this situation. We also discussed additional sheriff patrol. He will contact the Gage County Sheriff and request that they investigate every time the gate is open and someone is at the site. Anyone who has a key to use the site should ALWAYS lock the gate after them -- otherwise you may have company. We may need to provide an identification card to members who have a key.

We also discussed erecting a new and stronger gate. If the club is willing to contribute part of the cost, this may help secure the area.

I also mentioned our desire to invite the manager and the co-op board to look through the telescopes when we finish sealing the old access. This created considerable enthusiasm in the manager.

International UV Explorer Marks Decade of Research

*From the Compuserve Space News
and Information Section*

When NASA launched a space-based telescope called the International Ultraviolet Explorer (IUE), it was expected to last only 3 years, perhaps 5 at the most.

On Jan. 26, the IUE will complete a decade of continuous operation during which it was instrumental in some of the most important advances in modern astronomy.

The IUE is credited with the discovery of galactic halos (hot gas which surrounds our galaxy), monitoring volcanic activities on Io (a moon of Jupiter), beaming the first images ever recorded of Halley's comet from space and monitoring, since Feb. 24, 1987, the intense emissions of ultraviolet radiation from Supernova 1987A, an exploding star approximately 163,000 light years from Earth.

Dr. Yoji Kondo, IUE project scientist at NASA's Goddard Space Flight Center

(GSFC), Greenbelt, Md., maintains, "The IUE is one of the most productive telescopes on or off the planet.

"One measure of the productivity of a scientific instrument is the number of papers published in referred journals about work using that instrument," he said. "As the IUE completed its 10th year in orbit, more than 1,400 articles, based on IUE observations, have been published in referred journals. This far exceeds the number of articles based on data from other telescopes in similar journals during the same time period. The papers are based on research of astronomers from around the world who conduct their studies in real-time on both sides of the Atlantic."

The IUE was placed in a geosynchronous orbit over the Atlantic Ocean, enabling operations around the clock. The satellite telescope is controlled from the science operations center at GSFC for 16 hours and in Spain, with the Villafranca Ground Station near Madrid, for 8 hours. IUE staff astronomers at GSFC, under contract by the Computer Sciences Corporation, Beltsville, Md., assist visiting astronomers with their work. The Bendix

The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc., and is free to all club members. Membership status and expiration date is listed on the mailing label. Membership dues are: Junior Members and Newsletter Only Subscribers...\$8/yr; Regular Members...\$22/yr; Family Memberships...\$25/yr; Address all new memberships, renewals, or questions to THE PRAIRIE ASTRONOMY CLUB, INC., P.O. BOX 80553, LINCOLN, NE 68501. For other club information contact one of the following officers: Del Motycka (Pres) 489-2520, Ron Veys (V.Pres) 464-1449, Kim Ellen Owen (Sec) 423-7440, Dan Neville (Tres) 476-7772, Ron Debus (2nd V.Pres) 435-5688. All newsletter comments and articles should be sent to Newsletter Editor JOHN LORTZ, 9255 CADY AVE #14, OMAHA, NE 68134 no later than 7 days before monthly club meetings. Club meetings are held the last Tuesday of each month at Hyde Observatory in Lincoln, NE.

Field Engineering Corporation performs spacecraft maintenance operations 24 hours-a-day from GSFC. The IUE is a joint effort of NASA, the European Space Agency (ESA) and the British Science and Engineering Research Council (SERC). Goddard scientists, engineers and technicians designed, integrated and tested the IUE. An ESA team built the solar array and the ground facilities near Madrid. SERC, in collaboration with University College, London, provided four TV camera detectors for transforming the spectral displays into video signals.

These organizations select observers and programs through annual proposal competitions. In January 1987, the total number of U.S. guest proposals for the 10th year of operation reached 320, the highest number for any year. Over the years, the total number of IUE guest observers at GSFC came to more than 800 different astronomers, while the number for the control center in Spain totaled more than 750.

"These figures indicate that a very substantial number of the world's astronomers have used the IUE for their work at one time or another," said Kondo.

Goddard engineers, astronomers and analysts encountered a serious problem with IUE when one of its remaining three gyros failed and the spacecraft lost its

pointing capability in 1985. Of the IUE's original six gyros (three had previously failed in 1979, 1982, and 1983), the 1985 gyro failure left only two working gyros.

Spacecraft traditionally need a minimum of three gyros to determine the spacecraft roll, pitch and yaw reference to point at targets and maintain stabilization during observations. The problem of maintaining three-axis stabilization with only two gyros is considered nearly impossible to achieve.

A plan was devised and implemented by Goddard's guidance and control team, led by GSFC engineer Henry Hoffman, that substituted one axis of the IUE's sun sensor for the lost gyro, thus maintaining three-axis control on only two gyros. Not only did using the sun sensor stabilize the ailing spacecraft, but pointing accuracies and stability remained virtually unchanged.

"The IUE has an entirely new set of control laws which bear no resemblance to what was there before," explained Hoffman.

"We have a one-gyro system sitting in our hip pocket," he added. This software has been fully checked out on the ground and will be uplinked to the IUE if and when one of the remaining two gyros fails. The one gyro system uses the second axis of the sun sensor in lieu of one of the remaining two gyros.

"We have a concept and plans for develop-

ing a zero-gyro system," Hoffman claimed. "Two reference axes will be derived from the sun sensor, and the third reference by carefully managing the speed of the spacecraft's reaction wheels." The zero-gyro concept is being studied and appears feasible at this time.

There are many ground-based telescopes much larger and more powerful than the IUE but being space-borne vastly improves the acquired images due to the absence of clouds or atmosphere that obscure vision.

Notes From The 2nd V.P.

by Ron Debus

I've been busy since last meeting. First I turned in the order for shirts and jackets. As of today (2/16/88) there has been no phone call from David Dier with whom I turned in the order. I sure hope we can have our new outfits for the next meeting.

Next, on February 6th I followed up on a flier received at our last meeting from a place called Home Gallery. They wanted a telescope display for their hobby show. Out of a dozen or so clubs in Lincoln, only three showed up... model airplanes, model cars, and the PAC. So the show was kind of a fizzle. But the displays that were there were good, even though the crowd was SMALL. As I took some literature back to Hyde Obser-

vatory that Saturday night, it was about 9:10pm and I found a couple of frozen PAC volunteers. I think the temperature was only 0 degrees!

The following weekend, February 13th, I set my telescope up with the rest of the scopes at Hyde Observatory. With the other telescopes pointed at Jupiter, Venus, and the Orion nebula, I turned my scope to the northern deep sky. We saw the Andromeda Galaxy, the double cluster in Persius, and with the help of Steve Bornemeier we hit galaxies M81 and M82. We also stopped by the Pleiades and the open cluster M35. Other PAC members at Hyde that night were Ellen Owen and her family, Russ Copple, and telescope operator Harlan Franey. The crowd was big, the weather was nice, and we all had a nice evening.

All of the above also brought me two more commitments for PAC meeting programs. Now my year-long schedule is almost full! Thanks for listening.



Observing Chairman's Report

by *Dave Knisely*

THE NEXT SCHEDULED STAR PARTIES ARE MARCH 11TH AND MARCH 18TH AT THE ATLAS SITE. Late winter skies will give the patient observer a taste of spring by offering a number of fairly bright galaxies. In Sextans is a fairly bright object, NGC 3115, also known as the "Spindle Nebula". It can be found just over three degrees east and a half north of Gamma, appearing as a faint fuzzy oval of light in a 60mm refractor. Larger instruments will show the brighter nuclear region and the pointed ends that give this galaxy its name.

Those of you who like planetary nebulae should look about two degrees south of Mu Hydrae for NGC 3242. Sometimes referred to as the "eye" nebula, this bright planetary can be seen in a three inch as a fuzzy blue star. A six or eight inch reflector will show the disk and some hints of detail in the shells of nebulosity. A ten inch will make it look much like its photographs.

In Cancer are two nice open clusters, M44 and M67. M44 is faintly visible to the naked eye roughly between and slightly west of Gamma and Delta Cancri. It is best seen in binoculars or rich field telescopes and has many bright stars. M67 is located about two degrees west of Alpha and is smaller and fainter than M44. It can be glimpsed as a fuzzy patch in 10x50 binoculars with instruments four inches and larger showing the large number of stars in this fine object.

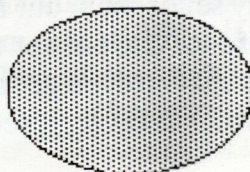
In western Leo is a fine spiral galaxy, NGC 2903, located about a degree and a half south of Lambda Leonis. Small telescopes show it as a

faint diffuse oval patch with a brighter core. An eight inch on a good night will show much mottling across the face of the galaxy, while a ten inch will vaguely show the tight spiral structure.

Another bright galaxy is the edge-on spiral NGC 2683, located five degrees west and a degree south of Alpha Lyncis. It should be visible in a four inch as a fairly narrow ray of light. Large instruments show some hints of dark detail on the ends but otherwise add little to the view of this object.

One of the brightest galaxies in the northern sky can be found in the rather bland constellation of Camelopardalis. About a degree west of the faint star 51 is NGC 2403, a mottled spiral that should be easy in 10x50 binoculars. It is fairly large with a low surface brightness, so small instrument users will find this galaxy difficult. An eight inch will show some hints of patchy detail as well as the brighter nuclear region, but the spiral structure is difficult to see even in large instruments.

In Ursa Major is perhaps the best pair of bright galaxies in the entire sky, M81 and M82. Both are visible in 10x50 binoculars if you look about two degrees east and a bit south of the faint star 24 Ursa Majoris. M81 shows up as a fairly bright oval of light with an extensive outer halo when viewed in small instruments. The spiral arms are narrow, faint, and very difficult to see unless you use an eight or ten inch and look way out towards the edge of the galaxy. M82 shows up as a fuzzy cigar about 3/4 degrees north of M81 in a 60mm refractor, but shows much dark detail in telescopes six inches or larger.



From The Editors Desk

by John Lortz

Hi! Ok, so you haven't seen me in awhile. I'm still around, but classes and late nights at work are keeping me here in Omaha, although I'd rather be in Lincoln at club meetings. Hopefully, I'll soon get somewhere near caught-up with life's little nuances, and I'll be at a meeting.

There were a couple of things that I needed to pass along to all of you. First of all, because of laser-printer scheduling and the such, I have to make the last day you can submit articles for the newsletter a bit earlier. From this month on, please have your articles to me by Wednesday before the next meeting (on Tuesday). That gives me enough time to get things put together and out the door to you. I hope this doesn't cause any problems.

Second, I received a very nice letter from Carroll Moore concerning the help we're giving new telescope owners at the meeting. Carroll gets quite a few calls from new telescope owners who ask for assistance in operating their new devices. Carroll usually sends them out to PAC meetings where we can answer their questions, and maybe even get a new club member or two. However, it seems that a

few people who have visited our meetings are slightly put off by negative comments toward the telescopes they have purchased or been given as gifts.

It might be wise on our part to encourage our visitors to work with what they have rather than criticize. Ok, so Tasco is not high up on the list of fine telescopes, but they CAN be used, and it might be better if we just help the people along with what they have. Then later down the line when they have more experience, we can suggest they move up the ladder or even build a scope of their own. Anyway, I hope all those who are helping out with telescope owners questions will keep the non-critical attitude in mind. Who knows, it might get us a few extra members.

One final thing... I want to personally thank 2nd V.P. Ron Debus for doing all the leg-work in getting the club members new T-shirts, shirts, and jackets. I know Ron had to run all over town to get the samples to the club meetings and to then place the order. You may want to give him a nice pat on the back next time you see him!

Photographic Polar Alignment

by Gregg Beach

For the next few months we're going to stray a little and delve into the realm of the experienced astrophotographer.

The one, often elusive requirement for any astrophotographer and telescope owner is proper polar alignment. This allows long-exposure photographs to be taken in order to build-up on film that dim star light that has travelled so far. It also allows the observer to see faint details in planets, comets, galaxies, etc., without strain and to prevent constant searching for a runaway galaxy!

This is accomplished by aligning the POLAR AXIS of the telescope (which is quite often just a camera platform) to the POLAR AXIS of the Earth. Easy to explain and understand but often difficult to perform under even the best of conditions. Most telescope owners know of at least one method of polar alignment at the beginning of each observing session. I present here another, little known method. I chanced upon it several years ago when I received my copy of TELESCOPE MAKING MAGAZINE #22 in the mail (pages 20-25).

This case study will focus on an amateur astronomer who has taken many astrophotos with portable equipment. He/she has decided it is now time to set up a more permanent facility. He will then be able to spend all his energies in selecting and photographing a target rather than worrying about polar alignment (misalignment) and constant guiding.

We will not discuss observatory types, telescope

types, mount types, pier etc. We are only concerned with aligning the polar axis of the telescope to the NORTH CELESTIAL POLE (NCP) as best and as accurate as is possible by the individual.

PPA will work equally as well with a fork mount or german equatorial mount. Atmospheric refraction will not be taken into account. The altitude of POLARIS is relatively high for most of North America that the error caused by it will be less than the accuracy we are striving for here.

Not all amateur astronomers/astrophotographers will go through this phase. Perhaps only a minor few will or even should! I present it here for your information. File it away for now, someday you may need it.

LET'S TAKE A CLOSER LOOK AT PPA
Photographic Polar Alignment can be a long process. It won't be completed in one night. There is no need to rush into it, in fact it could take days, weeks, months, or a year or more! Your telescope won't be out of commission for this length of time. Your camera will still be of use. You may just have to guide a little more often and maybe be satisfied with tiny trails on your film. Each step you take will get you a little closer to the NCP. As a brief overview let's take a look at the steps required:

- o You take a series of triple exposures (ie: three photos on one frame of film) of the polar region.
- o In-between each exposure you rotate the polar axis 30 degrees in Right Ascension (RA).
- o Make an 8x10 print of the resulting negative or slide.
- o From this print you will determine:
 - A) The exact location of the NCP.
 - B) The axis of rotation of your telescope's

polar axis.

C) The error in ALTITUDE and AZIMUTH of the polar axis.

D) The amount of movement required (mechanically) to move a little closer to the NCP. ie: How much of the sky and in which direction does this screw turn the axis.?

o Repeat the above steps.

Sound like an involved process? YES! I do not recommend PPA for the beginner. For everyone interested in the best accuracy as is possible within "normal" means, I highly recommend consideration of this method.

HISTORY

I have photographically polar aligned three telescopes based on PPA:

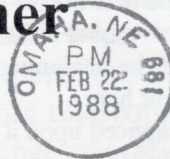
- 1) A Perkin's Elmer 8" f/5 astro camera mounted in a massive fork mount with a 48" sector RA drive.
- 2) A 17.5" f/4.5 newtonian on a german equatorial mount. (see SKY & TELESCOPE, May '87, pg 554)
- 3) I assisted on a Meade 2080 8" f/10 in the standard fork mount. The azimuth adjustment was modified and patterned after a Meade 8" LX3.

What kind of accuracy can you expect from PPA? After just three PPA photos the Perkin's Elmer is 28 arc seconds (0.0075 degrees) east of the NCP and 46 arc seconds (0.013 degrees) below the NCP.

That's the beauty of this method! You know EXACTLY where your telescope's polar axis is in relation to the NCP. No second guessing. *CONTINUED NEXT MONTH...*

The Prairie Astronomer

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Next PAC Meeting
February 23rd