

The Prairie Astronomer

The Official Newsletter Of The Prairie Astronomy Club, Inc.
March 1998

Volume 39 Issue #3

Internet Addresses:

PAC Web Page: <http://www.4w.com/pac/>
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NSP Web Page: <http://www.4w.com/nsp/>
NSP E-Mail: nsp@4w.com
OAS Web Page: <http://www.top.net/cdcheney>

March's Program:

Joe Babcock will give a program titled, "A Brief History of Astronomy: Ptolemy to Herschel". For over a thousand years the thinkers of ancient Greece were the authorities on astronomy and cosmology. This finally changed in the early 17th century but the beliefs of these early astronomers were influential in how the Renaissance thinkers approached their investigations. I hope to fill in some background on how and why the investigations progressed, in the manner and order they were.

In April: Dr. Peter Morin will speak on the art of creating Sundials.

If you would like to present a program at the monthly PAC Meeting, call Erik Hubl at 488-1698 or email at ehubl@ci.lincoln.ne.us

Only 3½ months until NSP !!!

You won't want to miss the 5th Annual Nebraska Star Party

At Merritt Reservoir, July 18-25, 1998.

For more information, or to register, call the

NSP Hotline: (402) 466-4170

See page 12 for the latest NSP update



MEETINGS

& EVENTS

PAC MEETING

TUESDAY MARCH 31, 1998, 7:30 PM

at Hyde Memorial Observatory

NSP-5 PLANNING MEETING

THURSDAY APRIL 9, 7:30 PM

at Mahoney State Park Lodge

PAC STAR PARTY

FRIDAY APRIL 24, 1998

at Wagon Train Lake

PAC MEETING

TUESDAY APRIL 28, 1998, 7:30 PM

at Hyde Memorial Observatory

ASTRONOMY DAY

SATURDAY MAY 2, 1998

At Morrill Hall

In this issue of The Prairie Astronomer:



Astronomy Crossword Puzzle Contest

Win a \$50 gift certificate to Orion !!

See Pages 4 & 5

PAC-LIST: Mark Dahmke maintains an e-mail list 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.

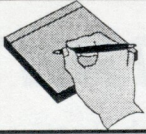
CONTENTS:

WOW !!!

I found out I could mail up to 6 double-sided pages for 32¢, so this newsletter is bigger than ever before. To think... I was trying to keep it down to 4 sheets in the past. Hope you all enjoy the longer newsletter. Lots of room for all of your submissions now (hint,.. hint)!

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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, renewals, or questions to: The Prairie Astronomy Club, Inc., PO Box 80553, Lincoln, NE 68501. For other club information, contact one of the following: Dave Knisely -President (402) 223-3968, Doug Bell - V.P. (402) 489-8197, Liz Bergstrom - Treasurer (402) 464-2038. All newsletter comments and articles should be sent to: Dave Scherping, 640 S. 30th St., Lincoln, NE 68510 (402) 477-2596 or e-mail dscherp1@aol.com ten days prior to the club meeting. Club meetings are held the last Tuesday of each month at Hyde Memorial Observatory in Lincoln, NE.



SECRETARY'S REPORT

Minutes of the February 24, 1998 PAC Meeting

By Dave Scherping

PAC President, Dave Knisely, opened the meeting at 7:30 pm and began by having guests introduce themselves. There were 9 visitors, including: **Don Taylor**, astronomy professor at UNL and guest speaker at the February PAC meeting, **Brian Weber** and **Matthew LeFeber**, who are active volunteers at Hyde Observatory, **Bill Evans**, who came with Bob Leavitt, and 5 students from UNL: **Jen Webster**, **Toni Kroll**, **Tina Lund**, **Tom Bills**, and ????. A total of 43 people attended the meeting.

Dave mentioned the upcoming PAC events, including the next local star party, March 20th at Wagon Train Lake, and Astronomy Day, which will be held May 2nd at Morrill Hall on the UNL campus. Dave asked once again for a volunteer to coordinate Astronomy Day.

The trip to the Cosmosphere, near Hutchinson, KS will be held sometime this year. Doug Bell talked with Louis Dorland about a joint trip with the Omaha Astronomical Society. Louis said that Bill O'Donnell will be the OAS coordinator. No preferred date was mentioned. The plan is to leave Lincoln early on a Saturday morning, visit the Cosmosphere that day, observe at Lake Afton that night, stay over night and maybe visit the Cosmosphere again on Sunday.

Liz Bergstrom gave a report from the site committee. They have two potential sites to investigate, one is near Wilber and the other is near Sterling. Liz brought fliers to hand out and post on bulletin boards.

Liz Bergstrom gave the Treasurer's Report. The annual audit was conducted by Liz Bergstrom and Rick Johnson. Doug Bell is looking into what tax forms are required for this year. Liz mentioned that she would like everyone who is subscribed to Sky & Telescope or Astronomy to let her know so she can add it to her database. She plans to notify people when their subscriptions need to be renewed. Liz brought a list of about 30 members whose dues have not been paid. Dave Scherping will write to each of these members.

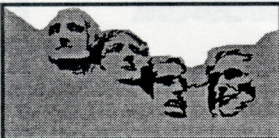
Dave Hamilton gave a report on the Nebraska Star Party. T-shirt designs are being finalized. This year's t-shirt was designed by Mark Dahmke and was inspired by his good friend Vincent Van Gogh. Check it out at <http://www.4w.com/nsp/t-shirts/design6.jpg> and on page 10 of this newsletter. The road to the observing site will be closed each night during NSP to reduce headlight annoyance. Registrations are coming in. Info packets are being mailed to those who register. Keynote speaker will be Tippy D'Auria, co-founder of the Winter Star Party and Tectron. Other speakers will include Louis Dorland, Dave Knisely, and Gary Fugman. A beginner's school is being coordinated by Brenda Culbertson.

Bryan Schaaf brought the remaining PAC library books to the meeting. He was unsure who the new librarian is. Whoever it is, please let me know so that I can publish it in the newsletter.

Program:

Don Taylor, astronomy professor at UNL gave a wonderful presentation on the discovery of the Crab Nebula (M1) in the visual spectrum. Don was part of a three-man team, which also included Michael Disney and John Cocke, that were the first to detect M1 in the visual spectrum in 1968. Their work was conducted at Steward Observatory on Kitt Peak using equipment that Dr. Taylor had developed. Don gave a brief history of the crab pulsar and the major theories and discoveries leading up to their discovery. He then described the equipment he developed and how it worked. During the discovery, an audio tape was accidentally recorded and Don shared the unedited version of that tape with us.

Dr Taylor will be retiring at the end of this semester and will be moving back to Arizona. He will be greatly missed in both the professional and amateur astronomy community in Lincoln.



PRESIDENT'S REPORT

By: Dave Knisely

We have a NEW ASTRONOMY DAY CHAIRMAN! He is **Brian Weber**, one of our newer members, who has taken up the job of helping organize this year's event. In case any of you have been sleeping under a rock, Astronomy Day will be held on May 2nd in the lobby of Mueller Planetarium, and we will again need the help of members to showcase to the general public what our hobby is all about. Brian will be calling on you to help provide telescopes, computers, posters, demonstrations, and warm bodies to help us with our display this year. If you are interested in helping, show up at a meeting and sign up. You can also contact him via e-mail at Tthtalorion@aol.com. Jack Dunn is co-chair, so you can also contact him at the planetarium if you want to help. Jack is also working on getting a "major" speaker for this year's event (probably on the night before our display), which should help attract more public attention. That Friday evening, the student observatory at UNL may be open, and of course, Hyde Observatory will be open Saturday night as well, so that weekend looks like a good one for amateur astronomy.

In other news, the observing site committee is now looking at several good locations for a club observing area. At present, the star parties are still being held on the south side of Wagontrain Lake near the east edge of the dam. If you are interested in helping with the site selection process, contact site chairperson Liz Bergstrom. One other area of note is Hyde Observatory. One way we can help others become aware of things like light pollution and amateur astronomy is through the public nights at Hyde. You too can become involved by volunteering to help with things like running the telescopes and crowd control on Saturday evenings. If you are interested in helping, contact Ann Kelly (435-5033), or one of our other supervisors, and we will get you on the list.

The proposed trip to the Kansas Cosmosphere and Space Center in Hutchinson is getting a lot of interest from both our club and from the Omaha Astronomical Society. It now looks like the trip will be a joint activity. A date has not yet been set, but sometime this spring is a likely time for it. See you at the meeting!

ONE-MILE-WIDE ASTEROID TO PASS CLOSE TO THE EARTH IN 2028

Produced at the Harvard-Smithsonian Center for Astrophysics (CfA), Cambridge, Massachusetts, U.S.A.

Recent orbit computations on an asteroid discovered last December indicated that it was virtually certain that it would pass within the moon's distance of the earth a little more than 30 years from now. Refined computations, based on prediscovery images from 1990, show that the miss distance is now a rather comfortable 600 thousand miles.

The asteroid, known as 1997 XF11, was discovered by Jim Scotti in the course of the Spacewatch program at the University of Arizona. This program utilizes modern electronic technology on a 36-inch telescope at Kitt Peak that was built 77 years ago.

After the discovery observations on December 6, observations made by two Japanese amateur astronomers during the following two weeks showed that the minimum distance between the orbits of 1997 XF11 and the earth was very small. Given also that the object was quite large as earth-approaching asteroids go, perhaps one mile across, it was added to the list of "potentially hazardous asteroids" (PHAs) that need to be monitored, lest they are destined to come dangerously close to the earth over the course of the next several centuries. There are currently 108 PHAs.

As astronomers continued to gather data on 1997 XF11, it slowly began to become apparent that there would be a particularly close approach to the earth in October 2028. A computation from observations spanning 60 days suggested that the miss distance would be 500 thousand miles. This distance may seem large in human terms, but it was less than had previously been predicted in advance for any other known asteroid during the foreseeable future.

Observations made on March 3 and 4 by Peter Shelus with a 30-inch telescope at the McDonald Observatory in western Texas extended the observed arc of 1997 XF11 to 88 days. This time, the orbit computation indicated a miss distance of only 30 thousand miles from the center of the earth; the earth's radius is about 4 thousand miles. The time of encounter would be around 1:30 p.m. Eastern Daylight Time on Thursday, October 26, 2028.

There was still some uncertainty to the computation. On the one hand, it was possible that 1997 XF11 would come scarcely closer than the moon. On the other hand, the object could come significantly closer than 30 thousand miles. Further observations were necessary in order to refine the figures. It was also possible that prediscovery observations of 1997 XF11 could be located on archival photographs. Particularly favorable opportunities for recording the object would have occurred in 1990, 1983, 1976, 1971 and 1957. Ephemerides for these times are available, as is a current ephemeris.

Prediscovery images of 1997 XF11 were located by Ken Lawrence (JPL) on films taken at Palomar in 1990 during the Planet-Crossing Asteroid Survey by Eleanor Helin, Lawrence and Brian Roman using the 0.46-m Schmidt. The observations, on 1990 Mar. 22 and 23, were consistent with each other and allowed a much improved orbit to be derived for 1997 XF11. These latest computations show that the nominal miss distance will be 600 thousand miles on 2028 Oct. 26 around 2:30 a.m. Eastern Daylight Time. Although the chances for an actual collision with the earth in 2028 can now be discounted, the orbit of 1997 XF11 will continue to come close to the orbit of the earth for the foreseeable future. Further future notable close approaches to the earth will occur in 2002 (5.9 million miles), 2078 (7.5 million miles), 2090 (4.2 million miles) and 2095 (1.3 million miles).

The predicted 2028 approach distance of 600 thousand miles will be the closest predicted for any PHA up to that time. In 2086 the substantially smaller asteroid (2340) Hathor will come to a distance of 550 thousand miles from the earth.

A list of the closest known minor-planet approaches to the earth is available, as is a list of closest known approaches by comets. Also available is a list of predicted approaches to the earth within the next 33 years.

Brian G. Marsden (1998 March 11, updated March 12)

Mars Pathfinder Mission Status - Tuesday, March 10, 1998

From NASA Jet Propulsion Laboratory's web site <http://www.jpl.nasa.gov>

The long goodbye to NASA's Mars Pathfinder lander and the Sojourner rover ended today when the lander failed to respond to the final command to communicate with controllers at NASA's Jet Propulsion Laboratory. The Pathfinder mission, which operated three times longer than its original 30-day planned lifetime on the martian surface, is acknowledged as one of NASA's most successful endeavors as a dramatic example of the space agency's new style of "faster, better, cheaper" planetary exploration.

Today's last-ditch effort to listen for a signal from Pathfinder effectively ends the mission, said project manager Brian Muirhead. No further attempts will be made to communicate with Pathfinder, he added.

Pathfinder flight controllers Ben Toyoshima and Rob Smith at JPL spent nearly four hours today alternately commanding the lander to turn on its transmitter, then listening for a response via NASA's Deep Space Network's 34-meter antenna at Goldstone, California, in the Mojave Desert. One-way radio communications to Mars from Earth take nearly 20 minutes.

The final Pathfinder telecommunications session ended at 1:21 p.m. PST when no transmissions had been detected from Pathfinder.

A description of today's efforts to reestablish contact with Pathfinder can be found at the following URL: <http://mars.jpl.nasa.gov/readme.html>

Galileo Europa Mission Status - March 11, 1998
 From NASA Jet Propulsion Laboratory's web site <http://www.jpl.nasa.gov>

NASA's Galileo spacecraft is once again sending pictures and science information to Earth following a 2-1/2 week-hiatus caused by a period of "solar conjunction." Radio communications were hampered during this period, when the Sun passed between Earth and Galileo.

Now that full communications have been re-established, Galileo is sending to Earth pictures and information stored on its onboard tape recorder during the close Europa flyby this past December. Included are observations of the Pwyll impact crater region, the Conamara Chaos region, and fields and particles information on Europa's interaction with Jupiter's magnetic and electric fields.

This batch of information was actually transmitted once before, but this retransmission of the recorded data allows scientists to fill gaps caused by transmission problems, and to replay particularly interesting observations and additional data.

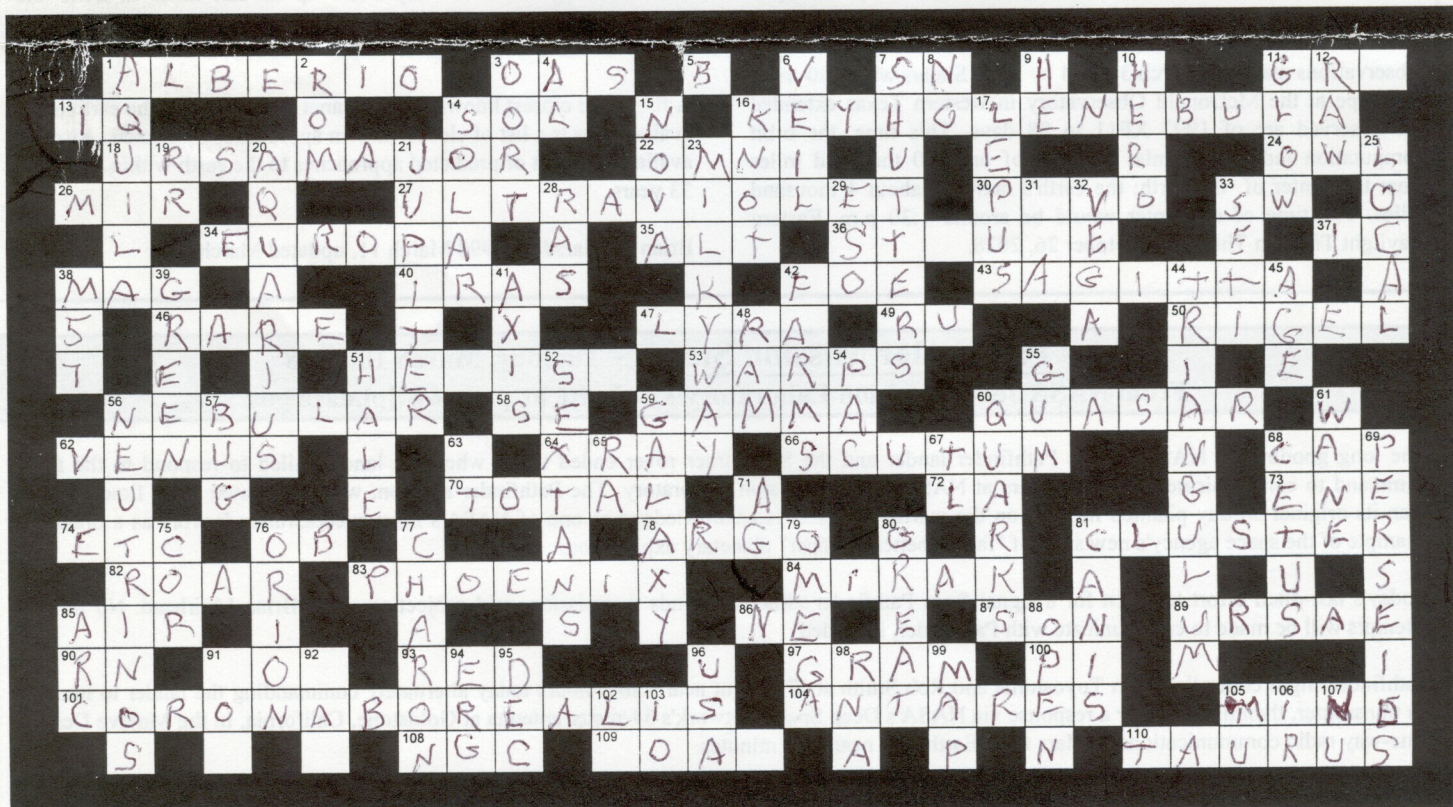
A turn for attitude maintenance was performed successfully on Sat., March 7. On Tues., March 10, the spacecraft's attitude control system was tested. This test was designed to determine how Galileo was affected by intense radiation exposure during the February 10 Europa flyby. Intense radiation in the Jovian system is considered a prime candidate as a cause of recent anomalous behavior by an attitude control system gyroscope. After analyzing results of the test, it was determined that the gyro's performance had degraded further. Although this may affect future pointing accuracy and stability, the Galileo team believes strongly that spacecraft still can collect additional science information during future flybys.

Later this week, the spacecraft will perform a flight path adjustment to ensure that it is aimed correctly for its next encounter with Europa, scheduled for March 29.

Astronomy Crossword Puzzle Contest

Complete the crossword puzzle below and submit your answers to Dave Scherping no later than the start of the April 28th PAC meeting. Answers may be mailed to 640 S. 30th St, Lincoln, NE 68510. At the end of the April meeting, the winner will be drawn from those who submitted correct answers. If nobody gets all of the answers correct, the person with the most correct answers will win.

Grand Prize: Orion \$50 gift certificate -- To be awarded at the April PAC meeting. (Note: Must be a PAC member to win).



Crossword By: Dave Scherping (created the old-fashioned way... before I found out there were computer programs to do it !)

Clues appear on next page

CROSSWORD CLUES

ACROSS

- 1 Double star at the head of Cygnus (β Cygni)
- 3 The Omaha amateur astronomy club (abbr.).
- 5 _____ and χ Perseii (the Double Cluster).
- 7 Exploding star (abbr.)
- 11 Orbiting Gamma-Ray telescope.
- 13 Measure of intelligence (abbr.)
- 14 Old name for the Sun.
- 16 Common name for NGC3372 in Carina (2 words).
- 18 Constellation featuring M81 & M82 (2 words).
- 22 Prefix meaning "all-".
- 24 M97
- 26 Russian space station (abbr.).
- 27 Band of wavelengths between visible light and x-rays.
- 30 Constellation between Tucana & Ara.
- 33 Direction from Gemini to Orion.
- 34 A moon of Jupiter.
- 35 _____ - Az.
- 36 Astronomer known for his double star work.
- 37 Index Catalog (abbr.)
- 38 Used to designate brightness of Astr. objects (abbr.)
- 40 Orbiting Infrared telescope.
- 42 Light pollution to an astronomer.
- 43 The "arrow" constellation.
- 46 As common as the SL9-Jupiter crash.
- 47 Home of the Ring Nebula.
- 49 Symbol for Ruthenium.
- 50 β Orionis.
- 51 Radio astronomer (discoverer of first pulsar).
- 53 Distortions of space-time caused by massive objects.
- 56 Type of filter often used on deep-sky objects.
- 58 Direction from Taurus to Orion.
- 59 Double star in Andromeda or "rays" of short wavelengths.
- 60 Quasi-Stellar Object.
- 62 Planet enveloped in CO₂.
- 64 Wavelength between ultraviolet & gamma rays.
- 66 A summer constellation or a Milky Way star cloud.
- 68 Polar ice _____ on Mars.
- 70 The ultimate eclipse.
- 72 Metro area where JPL is located.
- 73 Direction opposite WSW.
- 74 "And so on" (abbr.)
- 76 _____ Association. A grouping of young stars.
- 78 The "Ship" comprised of Vela, Puppis, Carina, & Pyxis.
- 81 With 88 Down, an object like the Pleiades or Beehive.
- 82 Sound made by Leo?
- 83 Southern constellation; Bird of fire.
- 84 Star in the bowl of the Big Dipper.
- 85 Earth's atmosphere.
- 86 State where NSP is held (abbr.).
- 87 Relation of John Herschel to William Herschel.
- 89 _____ Majoris.
- 90 Symbol for Radon.
- 91 The "Furnace" constellation (abbr.)
- 93 Color of the Betelgeuse and Antares.
- 97 Unit of mass.
- 100 " π "
- 101 The "Northern Crown" constellation.
- 104 The brightest star in Scorpius (α Scorpii).
- 105 "A terrible thing to waste".
- 108 Catalog containing the Herschel list (abbr.)
- 109 US optical observatories.
- 110 Constellation containing M1.

DOWN

- 1 The "Eagle" constellation.
- 2 Non-writable memory.
- 3 "Cloud" from where comets come.
- 4 Organization of amateur astronomers (abbr.)
- 5 Symbol for the most plentiful element in the universe.
- 6 NGC6960, 6992, 2995 (supernova remnant).
- 7 Camera parts.
- 8 Symbol for Nobelium.
- 9 Symbol for the 2nd most plentiful element in the universe.
- 10 Perseus after beheading Medusa.
- 11 To give off light.
- 12 Unprocessed NASA images or data.
- 14 Pertaining to the Sun.
- 15 Phenomenon of some binary star systems; A PBS series.
- 16 A dense region in a spiral arm.
- 17 The "Rabbit" constellation.
- 19 _____ Lyrae (variable star)
- 20 The "Water Bearer" constellation.
- 21 Target of Shoemaker-Levy 9.
- 23 Easiest galaxy to see from earth (2 words).
- 25 Group including The Milky Way, M31, M33, etc.
- 28 Royal Astronomical Society (abbr.).
- 29 Organization with observatories at La Silla & Paranal (VLT) in Chile.
- 31 A woman's name that has nothing to do with astronomy.
- 32 Westernmost star in the Summer Triangle.
- 33 Project looking for aliens (abbr.)
- 38 The Ring Nebula (yes, numbers are allowed).
- 39 _____ Flash. Phenomenon at sunset.
- 41 Line connecting Earth's poles.
- 42 Often good places to observe from.
- 44 Home of M33.
- 45 This is large for red giants and small for the Trapezium.
- 48 Animal depicted by Aries.
- 51 Co-discoverer of the great comet of 1997.
- 52 Home of the "Spindle Galaxy" (NGC3115).
- 54 Founders of the "Nebraska Star Party".
- 55 _____ Nebula, SN remnant associated with Vela Pulsar.
- 56 Massless elementary particles with no charge & $\frac{1}{2}$ spin.
- 57 The "Virus" Nebula? (NGC6302)
- 59 Spiral, elliptical, or irregular.
- 60 Constituents of Hadrons (available in 6 "flavors").
- 61 Something for the moon to do after it is full.
- 63 Common name for NGC457.
- 65 East-West celestial coordinate (abbr.)
- 67 Symbol for Thallium.
- 68 The "Whale" constellation.
- 69 A popular August astronomical event.
- 71 Symbol for Silver.
- 75 _____ Caroli, in Canes Venatici.
- 76 The "Hunter" constellation.
- 77 Pluto's companion (not Mickey Mouse).
- 79 _____ Nebula (also known as the "Swan").
- 80 The _____ Rift of the Milky Way.
- 81 Orion's dog's first name.
- 85 Field Of View.
- 88 See 81 Across.
- 91 Field of view (abbr.).
- 92 360 degrees divided by 2π .
- 94 CGS unit of work (10^{-7} Joule).
- 95 North-South celestial coordinate (abbr.)
- 96 Letters seen on Saturn V rocket.
- 98 Translates DNA's genetic information into proteins.
- 99 A page out of Sky Atlas 2000 or Uranometria.
- 102 Natural logarithm (abbr.)
- 103 A moon of Jupiter.
- 105 " μ "
- 106 Thermal radiation region of the spectrum (abbr.).
- 107 " ν "



Observing Tips

- Do you wish your eyepieces were parfocal so you would only need to fine-tune the focus when you change eyepieces? If you have a few eyepieces that focus within $\frac{1}{2}$ " or less from each other, you can make them parfocal. Determine which eyepiece requires the most in-travel and focus that eyepiece on a star. Now switch eyepieces, and without readjusting the focuser, focus the eyepiece by sliding it out slightly in the draw tube. With a pencil, mark the barrel where it meets the focuser. Remove the eyepiece & wrap scotch tape around the barrel above the mark. Now, when that eyepiece is inserted into the focuser up to the tape, it will be parfocal with the first. This works best with $1\frac{1}{4}$ eyepieces. Just make sure you have enough of the eyepiece barrel in the focuser to keep it straight & secure. – submitted by Dave Scherping
- Do you want to prevent your secondary from coming loose and falling onto the primary mirror of your Newtonian scope? Dumb question! Remove your secondary mirror and attach a piece of string to the back of it using silicone RTV (tie a few knots in the end of the string first to give it something to adhere to). Let it dry and replace the secondary. Tie the other end of the string to the spider. Now if the secondary mirror comes out of its holder, the string will save it and the primary mirror. – submitted by Dave Scherping
- Are you constantly battling the wind and the dew when you're trying to write down your observations? If you're not trying to draw the object, you might want to record your observations with a small pocket tape recorder. Then transfer your observations to your log at a later time. This is a great way to work on the Messier award or Herschel award. - submitted by Dave Scherping

Got an observing tip you'd like to share in *The Prairie Astronomer*? Call Dave Scherping at 477-2596 or e-mail dscherp1@aol.com

Observer's Report

By: Dave Scherping

Supernovae

SUPERNOVA 1998S IN NGC 3877

Zhou Wan, Beijing Astronomical Observatory, found this SN (mag 15.2) on Mar. 3 as part of the BAO Supernova Survey. A confirming CCD observation made by the Lick Supernova Survey indicates the SN had brightened to mag 13.5 on Mar. 4.3 UT. SN 1998S is located at R.A.=11h46m06s, Decl.=+47°29'.0, which is 16" west and 46" south of the nucleus of NGC 3877. It is probably a type-II supernova.

SUPERNOVA 1998T IN IC 694

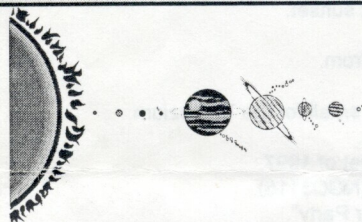
Also discovered by Zhou Wan (mag 15.4) on Mar. 3. This object was confirmed by the Lick Supernova Survey at mag 14.5 on Mar. 4.3, with the corresponding position given as R.A. = 11h28m32s, Decl. = +58°33'.7. SN 1998T and is of type Ib. It appears in a dust lane, in close proximity to a knot, of the irregular host galaxy which has no apparent nucleus.

SUPERNOVA 1998V IN NGC 6627

Discovered by Mark Armstrong, Rolvenden, on a CCD image obtained on Mar. 10 in the course of the U.K. Nova/Supernova Patrol. An image obtained on Mar. 13 yields mag 15.1 and the following position: R.A. = 18h22m37s.40, Decl. = +15°42'07".7 which is about 30" northwest of the center of NGC6627.

Occultation

Don't forget the lunar grazing occultation of the 5.9 magnitude star 18 Leo at 9:23 PM CDT on April 6th. See page 9 for more info on grazing occultations.



The Planets in March

- Mercury:** At inferior conjunction on April 6th. May be glimpsed with difficulty in the morning in late April. Not easily visible until August.
- Venus:** Visible in the morning low in the east-southeast, rising 1.5 hours before the sun. Close to Jupiter & Moon on 23rd
- Mars:** Not visible until late July..
- Jupiter:** Look for Jupiter in the eastern morning twilight in late April. Close to Venus & Moon on 23rd.
- Saturn:** Not visible in April.
- Uranus:** In Capricornus in the early morning sky.
- Neptune:** In Capricornus in the early morning sky.
- Pluto:** In Ophiuchus in the morning sky.

Meteors

The Lyrid meteor shower will peak April 22nd with a ZHR of 15 per hour. Add to that the 10 or so sporadic meteor per hour and you can expect to see upwards of 25 meteors per hour near the peak.

If anyone has the desire to write this column on a monthly basis, please contact Dave Scherping at 477-2596. Thanks.

The term "Big Bang" started as a putdown. In the 1940's, there were many competing theories about the nature of universe. British astrophysicist Fred Hoyle coined the term "Big Bang" as a snide putdown of his competitors, only to have the term find its way into the general consciousness as the description of the correct theory. - from "1001 Things Everyone Should Know About Science" by James Trefil



The terminology used to describe key positions of the planets can be confusing to beginning and advanced astronomers alike. The first thing to understand is that there is somewhat different terminology for the inner planets and the outer planets, with four key positions for each as described below and shown in the diagram. First, some general definitions:

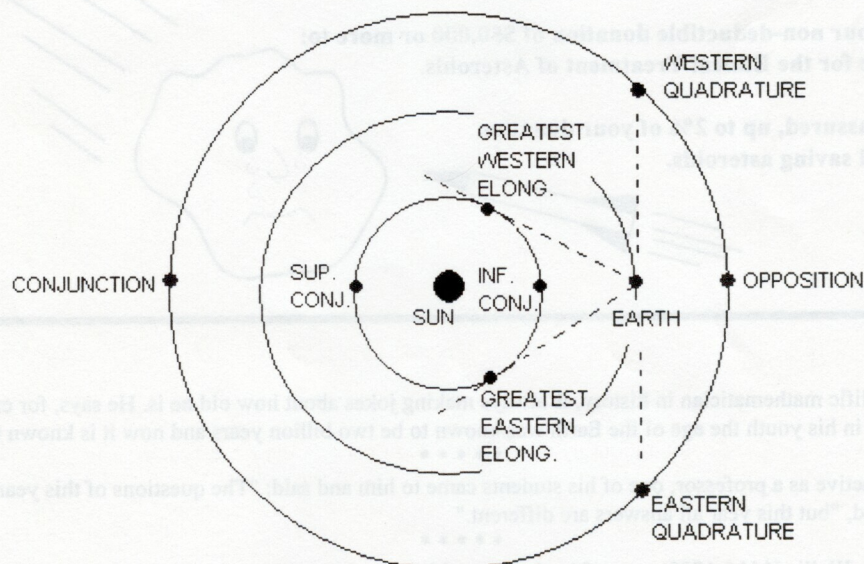
Elongation:	The visual angle, as seen from Earth, between the planet and the Sun.
Conjunction:	When elongation = 0° .
Opposition:	When elongation = 180° .
Quadrature:	When elongation = 90° .

- For the inner planets (Mercury, Venus):

- Superior Conjunction: When the inner planet is on the opposite side of the Sun as the Earth and elongation = 0° (behind the Sun as seen from earth).
- Inferior Conjunction: When the inner planet is on the same side of the Sun as the Earth and elongation = 0° (in front of the Sun as seen from Earth).
- Greatest Western Elongation: When the inner planet is in the west (evening sky) and its visual angle from the Sun, as seen from Earth, is the greatest.
- Greatest Eastern Elongation: When the inner planet is in the East (morning sky) and its visual angle from the Sun, as seen from Earth, is the greatest.

- For the outer planets (Mars, Jupiter, Saturn, Uranus, Neptune, Pluto):

- Opposition: When the outer planet is on the same side of the Sun as Earth and elongation = 180° (opposite the Sun as seen from Earth).
- Conjunction: When the outer planet is on the opposite side of the Sun as the Earth and elongation = 0° (behind the Sun as seen from Earth).
- Western Quadrature: When the outer planet is in the west (evening sky) and Elongation = 90° .
- Eastern Quadrature: When the outer planet is in the east (morning sky) and the visual angle, as seen from Earth, between the planet and the Sun is 90° . Elongation = 90° .



Each month, I will be covering a different topic. If you have a topic you'd like included, let me know – Dave S.
If anyone has the desire to write this column on a monthly basis, please contact Dave Scherping at 477-2596. Thanks.

QUOTES

"The reason why the water in wells becomes colder in summer is that the earth is then rarefied by the heat, and releases into the air all the heat-particles it happens to have. So, the more the earth is drained of heat, the colder becomes the moisture that is concealed in the ground. On the other hand, when all the earth condenses and contracts and congeals with the cold, then, of course, as it contracts, it squeezes out into the wells whatever heat it holds."

- Lucretius (99 BC-55 BC) b. Rome

"The opposite of a correct statement is a false statement. But the opposite of a profound truth may well be another profound truth."

- Niels Bohr

"The hardest thing in the world to understand is the income tax."

- Albert Einstein

Mathematical Proof Of The Month

Theorem: $3=4$

Proof:

Suppose: $a + b = c$

This can also be written as:

$$4a - 3a + 4b - 3b = 4c - 3c$$

After reorganizing:

$$4a + 4b - 4c = 3a + 3b - 3c$$

Take the constants out of the brackets:

$$4 * (a+b-c) = 3 * (a+b-c)$$

Remove the same term left and right:

$$4 = 3$$

Taken from:

http://www.xs4all.nl/~jcdverha/scijokes/1_1.html

Michael_Ketzlick@h2.maus.de (Michael Ketzlick)

* * * *

ASTRO MAN

By Dave Scherping

PETA

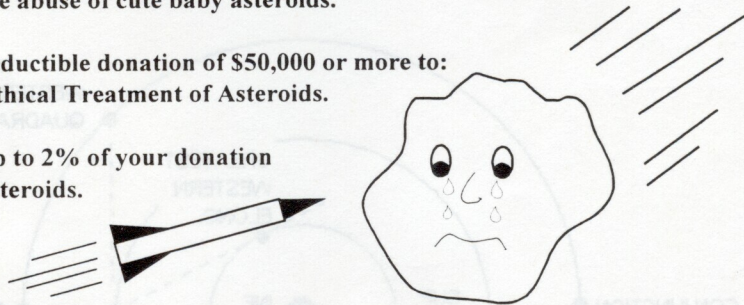
PEOPLE FOR THE ETHICAL TREATMENT OF ASTEROIDS

Even before the recent announcement of Asteroid 1997 XF11, barbaric scientists from around the globe have been formulating diabolic schemes to use inhumane methods such as nuclear weapons to destroy or divert poor, helpless, innocent minor planets, should they wander too close to Earth.

This must be stopped! After all, asteroids are people too.
So what if they're heading toward Earth, can't we just be nice to them?
Help us put an end to the abuse of cute baby asteroids.

Please send your non-deductible donation of \$50,000 or more to:
PETA: People for the Ethical Treatment of Asteroids.

You can rest assured, up to 2% of your donation
will go toward saving asteroids.



Paul Erdos, one of the most prolific mathematician in history, is always making jokes about how old he is. He says, for example, that he is two and a half billion years old, because in his youth the age of the Earth was known to be two billion years and now it is known to be 4.5 billion years.

In the period that Einstein was active as a professor, one of his students came to him and said: "The questions of this year's exam are the same as last years!" "True," Einstein said, "but this year all answers are different."

The English mathematician John Wallis (1616-1703) was a friend of Isaac Newton. According to his diary, Newton once bragged to Wallis about his little dog Diamond. "My dog Diamond knows some mathematics. Today he proved two theorems before lunch." "Your dog must be a genius," said Wallis. "Oh I wouldn't go that far," replied Newton. "The first theorem had an error and the second had a pathological exception."

An Introduction To Grazing Occultations

By David Dunham, International Occultation Timing Association
Re-printed with permission from <http://www.sky.net/~robinson/graze.htm>

As the Moon moves through the sky, it passes in front of, or occults, stars in its path. It can be thought of as casting a shadow of each star, where the star is hidden behind the Moon. If the shadow of a particular star falls on the Earth, this star is occulted. As the shadow moves (due to the Moon's motion) across the Earth's surface, a region is defined from which the occultation of the star is visible. At the advancing edge of the shadow, the star is just disappearing at the Moon's edge. For most observers within the region of visibility of the occultation, the event (time from star's disappearance until its reappearance at the opposite edge of the Moon) will last a little more than an hour. North or south of the region of visibility of the occultation, the Moon will be seen to miss the star, passing close to it. Within a mile or two of the northern or southern boundary, or limit, of the region, a grazing occultation can be seen. Here the star will appear to pass along a line just touching (or tangent to) the edge of the Moon, and the star will disappear and reappear among the mountains and valleys along the Moon's edge for a period of a few minutes. Such a grazing occultation is a spectacular sight; at no other time, except perhaps during a solar eclipse, is the Moon's motion more apparent.

A grazing occultation is visible from a zone about usually about two miles wide, depending on the lunar topography, which can be predicted approximately from lunar charts. If several observers with telescopes and timing equipment are positioned at intervals across the zone, they can each time the sequence of disappearances and re-appearances as seen from their location. If the positions of the observing locations are measured, the timings can be reduced afterwards to determine details of the lunar profile, and gives a very accurate fix of the position of the Moon relative to the star. Such observations are useful for refining knowledge of the positions and motions of stars, and can be used to improve parameters such as the tilt of the Earth's equator relative to the ecliptic (the plane of Earth's orbit around the Sun) and even the rotation of the Milky Way galaxy. Improvement of knowledge of the lunar profile for these observations aids the analysis of total solar eclipse timings, which can be used to study climactically important small changes in the diameter of the Sun over periods of many years. Also, the star's disappearances or re-appearances may occur in steps, indicating a previously undiscovered close double star that can not be resolved by direct observations.

The location of the telescope should be described to an accuracy of about ten feet relative to landmarks (road intersections or large buildings) that are shown on the detailed topographic map of the area; the latitudes and longitudes of the observation sites can then be measured from the map by the expedition leader. Timings can be made by calling out the successive events (can use "D" for disappearance or "R" for reappearance; some are more comfortable thinking the star as a light that goes "off" and "on") and also tape recording a radio station. The best is to record the short-wave time signals from station WWV at 5.0, 10.0, or 15.0 megahertz, but many observers do not have short-wave receivers. If the expedition leader makes arrangements for someone (not necessarily in the graze path) to create a master tape by recording WWV and a local AM or FM radio station, observers in the graze zone can record the agreed-upon local station with car or other radios. A strong AM station is generally preferred since they can be received over long distances, but if reception of a particular FM station is known to be reliable throughout the area of observation, an FM station could be used. Camcorders are now almost as common as tape recorders and can be used in this case as tape recorders; the video is not needed. There are ways to hook sensitive video cameras to telescopes and some grazes, generally of relatively bright stars, have been recorded this way, but this is more advanced work. For bright stars, a camcorder can simply be held up to the eyepiece and, with a little adjustment, the graze can be recorded; this has been done successfully with a few previous grazes. Visual timings made to an accuracy of half a second are quite adequate for defining the lunar profile; for a graze, the observer's location is more sensitive than the timings, since observers even 50 feet apart will notice differences in their event timings.

Try to stress to new observers that making the observations is not that difficult. Besides observing the event, all they need is a tape recorder or camcorder to record their call-outs of the events, plus a background time reference, which could be an agreed-upon local AM or FM radio station, if a time-tagged master tape is prepared, as described above. It's more satisfying to even new observers to both observe a graze, and record it for comparison with records at adjacent sites to build up the profile, whose detail and accuracy is proportional to the number of stations recording data. Written by: David W. Dunham, IOTA, 1996 April e-mail: dunham@erols.com

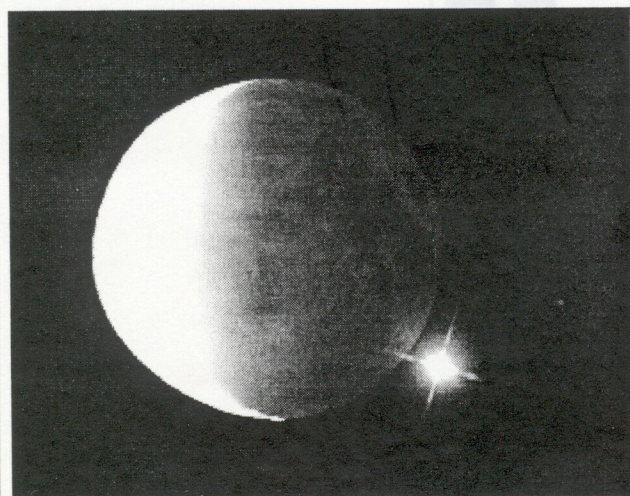


Photo: **VENUS OCCULTATION BY MOON**

By: Bob Sandy, Blue Springs, MO

Date: 26 December, 1978

Time: Within 10.0-min. of Venus' Predicted Reappearance at 5:54 a.m. C.S.T.

Venus Magnitude was -4.3

Percent of Moon Sunlit: 14 Waning

Venus-Moon Altitude: 21-degrees

Telescope: 6-inch f/7.5 Newtonian & Film Located at Prime Focus

Film: Fugichrome 100 ASA Slide Film

Exposure: 10-seconds

Also Shown in Picture: 7.0-mag. star Z.C. 2180 (Spectral Class MO), which reappeared at 5:37 a.m. C.S.T.

Star can be seen at 2 O'Clock from Venus.

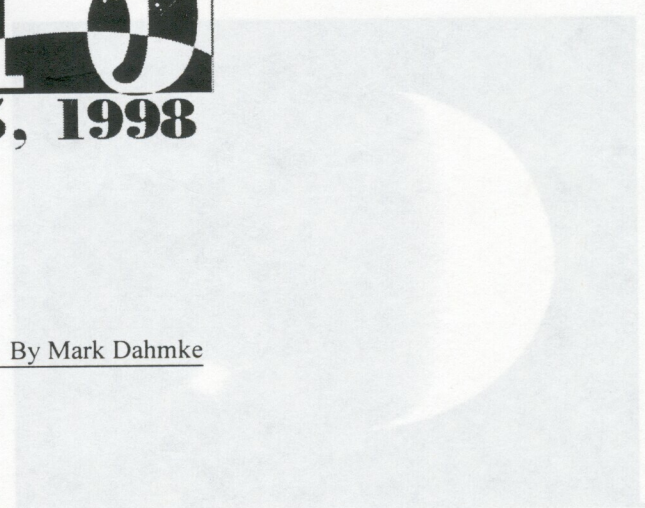
See Bob's web site: <http://www.sky.net/~grazebob/index.html>







NSP-5 T-SHIRT DESIGN By Mark Dahmke (t-shirts will be in color)



NSP-5 MUG DESIGN By Mark Dahmke



The PRAIRIE ASTRONOMY CLUB CALENDAR for APRIL 1998

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
MAHONEY STAR PARTY DATES Friday May 22 nd Friday June 26 th Friday August 21 st Friday September 25 th Friday October 23 rd			1 Aldebaran 0.2° From Moon	2	3 1 ST QUARTER 	4
5 DAYLIGHT SAVINGS TIME BEGINS Set Clock Ahead 1 Hour	6 Grazing Occultation 18 Leo 9:23 pm CDT Mag: 5.9 % Sunlit: 80	7	8	9 NSP-5 Planning Mtg. 7:30 PM at Mahoney State Park Lodge	10	11 FULL MOON 
12 <u>Easter</u>	13	14	15 TAX DAY Conjunction between IRS and your wallet	16 STS-90 Launch (Columbia)	17 Comet Peters-Hartley Closest approach to Earth (1.39 AU)	18
19 3 RD QUARTER 	20 Neptune & Uranus 3° South of Moon	21	22 Peak Of Lyrid Meteors *** Venus 0.3° from Jupiter	23 Venus 0.1° North of Moon *** Jupiter 0.2° South of Moon	24 PAC STAR PARTY *** Moon Occults Mercury	25
26 NEW MOON 	27	28 PAC MEETING 7:30 PM Hyde Obs. *** Aldebaran 0.4° South of Moon	29	30	Don't Forget . . . <u>ASTRONOMY DAY</u> MAY 2 nd Morrill Hall, UNL	

LONG-TERM CALENDAR

MAY '98	Saturday May 2	ASTRONOMY DAY	- Morrill Hall
	Thurs May 14	NSP PLANNING MEETING	- Mahoney State Park Lodge
	Friday May 22	MAHONEY STAR PARTY	- Mahoney State Park
	May 22 - 25	RTMC	- near Big Bear, CA
JUNE '98	Friday June 26	MAHONEY STAR PARTY	- Mahoney State Park
	Thurs June 11	NSP PLANNING MEETING	- Mahoney State Park Lodge
	Thurs June 25	NSP PLANNING MEETING	- Mahoney State Park Lodge
JULY '98	Thurs July 9	NSP PLANNING MEETING	- Mahoney State Park Lodge
	July 18 - 25	NEBRASKA STAR PARTY	- Mahoney State Park
	July 22 - 25	ALCON '98	- French Lick, IN
AUG '98	Friday Aug 21	MAHONEY STAR PARTY	- Mahoney State Park
SEPT '98	Friday Sept 25	MAHONEY STAR PARTY	- Mahoney State Park
OCT '98	Friday Oct 23	MAHONEY STAR PARTY	- Mahoney State Park
	Oct 18 - 25	OKIE-TEX STAR PARTY	- Prude Ranch, Fort Davis, TX

NEBRASKA STAR PARTY

UPDATE

A planning meeting was held March 12th at Mahoney State Park. The T-shirt and cup designs have been finalized (see page 10). Work has begun on the program booklet. We are waiting for a couple of bios and Brenda's schedule to finish the booklets. The next projects will be putting together the registration packets and getting the new signs designed and approved by Game & Parks.

Cabins.... 2 of the 4-bed cabins haven't had the deposits paid, so those cabins are being made available on a first come – first served basis. Please contact Tom Miller at 477-4570 if you are interested.

Reminder.... Please bring any astronomy books you want to donate to the Valentine High School to the next PAC meeting. We have already received quite a few books and want to send them to valentine as soon as possible.

See our web site for more information: <http://www.4w.com/nsp/>
Also, we have a chat area available as well: db.4w.com:8080/~1

Next NSP planning meeting: April 9

FOR SALE:

Sky & Telescope 1989 – 1997 - \$6 per year
Astronomy 1989 – 1997 \$6 per year
Contact Dave Scherping 477-2596

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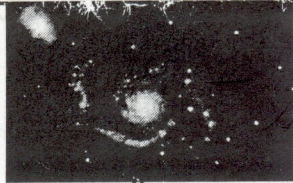
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P.O. Box 80553
Lincoln, NE 68501



Next PAC Meeting
March 31, 1997
7:30 PM
Hyde Observatory

SPRING DALE ARK.

7-17-18-

EARL MOSER 9/98
P O BOX 162
HICKMAN NE 68372-0162