

The *Prairie* Astronomer

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

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Internet Addresses:

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

JANUARY & FEBRUARY MEETINGS & EVENTS

PAC MEETING

TUESDAY JANUARY 28, 1998, 7:30 PM
at Hyde Memorial Observatory

NSP-5 PLANNING MEETING

THURSDAY FEBRUARY 12, 7:30 PM
at Mahoney State Park lodge

PAC MEETING

TUESDAY FEBRUARY 24, 1998, 7:30 PM
at Hyde Memorial Observatory

January's Program:

Harlan Franey will present the program this month on Celestial Navigation. He will cover the history of early navigation methods which lead up to the use of celestial features to help navigate the earth. Harlan will have on hand the tools used for centuries by navigators including a sextant, nautical almanac and transit and will explain how navigation has evolved in the electronic age by demonstrating the latest navigation device, the Global Positioning System (GPS) receiver.

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

CHANGES TO PUBLIC STAR PARTIES At MAHONEY STATE PARK

By Jim Rippey

1) We can no longer use the Soccer Field for our star parties. Mahoney State Park plans to build a large multi-purpose facility at the soccer field site. Construction is to begin ASAP.

The 1998 star parties will be held at the Driving Range. This facility is west of soccer field. The area between the clubhouse and the tee locations is fairly flat and commands a clear southerly view from east to west. There will be limited space for those who need to drive into the area to set up. There's also an area immediately west of the clubhouse which is close to the west end of the parking lot.

2) At the request of Mahoney officials, the May star party has been moved to Friday the 22nd. This will allow us to entertain the Memorial weekend campers. The new schedule is as follows:

Friday May 22nd

Friday June 26th

Friday August 21st

Friday September 25th

Friday October 23rd

All events begin at sunset. Be sure to add these dates to your calendar and support PAC's & OAS's efforts to bring astronomy to the general public.

GOING THROUGH COMET WITHDRAWALS?

Look for 9th magnitude Comet Temple-Tuttle in early February lying 4.5 degrees SW of M33. It then heads south through Pisces toward perihelion on February 27th, where it will lie 4° north of Saturn. Comet Temple-Tuttle is the parent of the annual Leonid meteor shower.

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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.

PRESIDENT'S REPORT

By: *Dave Knisely*

At the December meeting, I outlined three goals I would like to see our organization work towards during 1998. They are:

1. Observing and Socializing events. This includes improving the quality of meetings, organizing regular star parties, and the selection of a new observing site for the club. An observing site selection committee has been organized with club treasurer Liz Bergstrom as chairperson. If you are interested in helping with site selection, contact Liz. We are also looking into a trip to the Kansas Cosmosphere and Space Center sometime this year. Another focus is on club meetings and the quality of their programs. Last month, I demonstrated how, with a little work, even a dumbbell like me can put on a decent and interesting program. Hopefully, we will be getting a few more members to put on programs for club meetings. If you have an idea for even a short program, please contact 2nd Vice President Erik Hubl (he will thank you profusely!). And remember, after the club meetings, many of us go to the Village Inn on "O" street northwest of St. Elizabeth's Hospital for some additional socializing (and some nice food), so come along if you can.





2. Improving the Club's Relationship with Hyde Memorial Observatory. The biggest way we as a group can recruit club members is via public nights at Hyde. It is also one way to bring the issue of light pollution into the public eye. However, without the staff

to man the facility, we can't do the kind of outreach we need. The club needs to become more involved in assisting with Hyde on a regular basis. To that end, some changes must be made in both how the Observatory views the club, and how the club views Hyde. An atmosphere of mutual respect and cooperation must be maintained between the Observatory Supervisors and the club members. Planning meetings for the future of the observatory are to be held to set the course for Hyde into the next century, and the club needs to be there to help that planning along. Possible future club "recruiting" nights at the observatory may also be in the works, so stay tuned!

3. Continued Support and Assistance with the Nebraska Star Party. We have one of the best all around national star parties in the U.S. NSP puts the club in the national spotlight, and has forged a firm link of true cooperation between our club and the Omaha Astronomical Society. However, NSP still needs as much support from club members as we can provide, so even if you can't attend NSP, you might still consider going to the NSP meetings to provide input or help out a little with a few of the many tasks which need to be done early to pull this event off smoothly. Attending these meetings also may let you meet a few of our friends up the road a bit!

Hopefully, we can work towards these goals (as well as others) to keep our club active and vital in the new year.

The PRAIRIE ASTRONOMY CLUB CALENDAR for FEBRUARY 1998

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 Moon Occults Saturn 3 PM CST	2 Mercury Passes 2° South of Neptune	3 1ST QUARTER MOON 	4	5 Moon passes 0.2° north of Aldebaran 12 noon CST	6	7 Mercury Passes 1.4° South of Uranus
8 Mercury Passes 1.3 degrees From Uranus	9	10 Galileo Europa 13 flyby	11 FULL MOON 	12 NSP-5 Planning Mtg. 7:30 PM at Mahoney State Park Lodge	13	14 Asteroid 1116 Catriona occults Beta Aurigae Fritz Zwicky's 100th birthday
15 Voyager I Overtakes Pioneer 10 (farthest man-made object)	16 50th anniversary of Kuiper's discovery of Uranus' moon Miranda	17	18	19 3RD QUARTER  Copernicus' 525th birthday	20 q A Orionis in the Trapezium in the Orion nebula is in eclipse. Minimum at 20:43 CST.	21 Algol in eclipse (late evening on 20th & early AM on 21st)
22 Mercury 1.0° from Jupiter Asteroid 153 Hilda Occults PPM717088	23 Algol in eclipse (mid-evening)	24 PAC MEETING 7:30 PM Hyde Obs. 30th anniversary of discovery of 1st pulsar	25	26 NEW MOON  Solar Eclipse Visible from S. America & Caribbean	27 Comet Temple-Tuttle at perihelion	28

SOME AVAILABLE LIGHT POLLUTION AND NARROW-BAND FILTERS

By: *Dave Knisely*

Reprinted from the web site of *The Prairie Astronomy Club*

There are a number of different filters available on the market today, with most coming in one of three classes: 1. Broad-Band "light pollution" filters, 2. Narrow-Band "nebular" filters, and 3: Line filters.

In the Broad band range are the Lumicon Deep-Sky, and the Orion SkyGlow. They enhance many deep-sky objects by blocking out the common Mercury vapor and some other emission lines which contribute to light pollution, while letting through a broad range of wavelengths. While these broadband filters do help increase the contrast of some objects somewhat, their overall effect is not terribly striking. A similar effect can sometimes be achieved by increasing the magnification slightly, since the light pollution effect is then diluted. The Lumicon Deep-Sky does help enhance the visibility of things like the Merope Nebula, the Trifid, and M42, but not much of an effect is noted with galaxies and star clusters. I have noted that using the filter on M33 and NGC 253 in my 10" when skyglow is higher than usual will help boost the visibility of the detail, but the effect is only moderate. Since some light is blocked by the Deep-Sky filter, there will actually be a light loss, and some objects may even look fainter with the filter than without. The Deep-Sky also works as a passable blue filter for observing Jupiter. Thus, the broad band filter, while somewhat useful, is not the most effective filter intended for deep-sky use.

In the narrow-band "nebular" filter range, the best filters seem to be the Orion Ultrablock, and the Lumicon UHC. These filters allow only the emission lines of Hydrogen (H-alpha and H-beta) and the bright Oxygen III lines (plus wavelengths between H-beta and the OIII lines), to get through. Their effect can be quite striking, with many faint nebular objects becoming easy to see (without the filter, some may not be visible at all!) Even the more prominent nebulae which are visible without filters gain considerable detail and contrast with the narrow band filters. Both the UHC and Ultrablock will, for example, often show the Rosette Nebula TO THE NAKED EYE when you look through them. Even under a really dark sky, the contrast and detail improvement are impressive, and most observers continue to use their nebular filters at such dark-sky sites. One neat trick for finding tiny planetary nebulae is to "blink" the objects by holding the filter

between the eyepiece and the eye. The stars in the field will dim somewhat, but the planetary nebula will remain undimmed, thus standing out from the background stars. In comparison, both the UHC and Ultrablock have very similar characteristics, but some people have reported a slight edge in performance with the Ultrablock. At times the Ultrablock has also been somewhat less expensive than the UHC. Both will perform very well, and should be used at moderate to low powers for best results. However, these "nebular" filters do not usually work very well on star clusters, reflection nebulae, or galaxies.

In the "line" filter category, the Lumicon Oxygen III (OIII) filter is the real standout. It allows only the narrow pair of emission lines of Oxygen to get to the eye, and for many planetary and diffuse emission nebulae, the boost in visibility has to be seen to be believed! The Veil and North American Nebulae look like photographs in a 10" with the OIII filter, and many of the "green box" emission nebulae in SKY ATLAS 2000.0 jump out at you. You may even see some nebulae which are not shown on many atlases. Planetary nebulae become easy, and the "blinking" technique becomes vastly more effective, as the stars nearly vanish, leaving the planetary nebula standing out like a sore thumb. However, since the bandwidth of the OIII filter is so narrow, it may hurt some objects slightly, like the nebulae around Gamma Cygni. This filter also hurts the view of clusters and galaxies even more than the narrow band filters do.

One line filter of note is Lumicon's H-Beta filter. As the name indicates, the filter only lets through the H-Beta emission line of Hydrogen, and is mainly useful on a limited number of objects, like the Horsehead Nebula, the California Nebula, the Cocoon Nebula, and M43. On an 8" to 10" scope, the Horsehead Nebula goes from invisibility to visibility, as does the California Nebula. However, these objects remain fairly faint (especially the Horsehead), and unless you REALLY like looking at them, you can probably forget about buying the H-Beta!

For recommendations, I like the Orion Ultrablock and the Lumicon OIII, but remember to use them with an eye that is properly dark adapted. Filters won't make the objects brighter, but they will make many of them a lot easier to see. Have fun!

"ASK THE ASTRONOMER"

By: *Dr. Sten Odenwald*

Reprinted with permission from web site, <http://www2.ari.net/home/odenwald/qadr/qanda.html>

Q: What happens when two black holes collide?

A: When they are far apart, they interact just like any other bodies acting under weak gravitational fields. For black holes with about the mass of the sun, their sizes are about 2 kilometers in diameter. When they get within a few hundred miles, their shapes begin to deform, meaning their Event Horizons are distorted from a spherical shape (if they are non-rotating black holes). As they get closer together, they are under enormous acceleration and since all accelerating bodies emit gravitational radiation, the combined black hole system begins to shed some of its energy. Since energy and mass are equivalent, this also means that the sum of the effective masses of the black holes during the collision is steadily decreasing compared to the sum of their masses when they were far apart. Within a few minutes, the black hole Event horizons begin to interpenetrate. If you were watching this all happen, you would see the black holes merge together to become a new black hole. The mass of this new hole would be a little less than the sum of the black hole masses before the encounter because of the loss of mass due to gravitational radiation. According to supercomputer calculations, the new mass is something like 10 percent less than the original sum of the masses. This means that, in terms of the surface area of the new black hole, it would not be exactly the sum of the surface areas of the two black holes, but would instead be slightly smaller.

- Also See Page 6 -

SKY HIGHLIGHTS FOR 1998

By: Dr. Martin Gaskell

During January -- the famous giant variable star Mira Ceti is predicted to be near maximum brightness around January 10th. Watch it fade during January and February.

January 19 - 29 -- best times to see zodiacal light after sunset. Go to a dark place to the west of Lincoln with no artificial sky glow on the western horizon as twilight is ending.

Tuesday January 20th -- close conjunction between Mars and Jupiter after sunset. Watch them close in the night before and move apart the day after. They get closer than the apparent diameter of the moon.

Wednesday/Thursday January 28/29th -- eclipse of Algol. Faintest after midnight.

Saturday/Sunday January 31st/February 1 -- eclipse of Algol.

Tuesday February 3rd -- Algol in eclipse after sunset.

February 16 - February 28 -- best time to see zodiacal light after sunset (see January).

Friday February 20th -- η A Orionis in the Trapezium in the Orion nebula is in eclipse. This is the westernmost of the four stars. Minimum at 20:43 CST. Minimum for 2 1/2 hrs centered on that time. Whole eclipse lasts about 16 hours.

Friday/Saturday February 20/21 -- Algol in eclipse (late evening)

Monday February 23 -- Algol in eclipse (mid-evening)

Thursday February 26th -- eclipse of the sun. Not visible from Nebraska, except the very extreme SE corner. To see the partial phase you will need to go into eastern Kansas or into Missouri or (better) even further south and east.

Thursday February 26th -- Algol coming out of eclipse at sunset.

March 8 - March 30 -- best time to see Mercury in the evening sky.

Thursday March 12 -- Penumbral lunar eclipse. Moon begins to dim at 20:15 CST. Maximum shading is at 22:20 CST. Eclipse finishes at 26 minutes past midnight.

Sunday March 15 -- Algol in eclipse (late evening).

Wednesday March 18 -- Algol in eclipse (after sunset).

Friday March 20 -- Vernal equinox at 13:55 CST.

Sunday April 5 -- Daylight savings time starts. Put clock forward one hour ("spring forward").

Tuesday/Wednesday April 21/22 -- Lyrid meteors (peak is before dawn). Best seen from a dark place.

Thursday April 23 -- close conjunction of the moon, Venus and Jupiter in the pre-dawn sky. One of the most compact and stunning conjunctions in recent years.

Wednesday May 6 -- Eta Aquarid meteor shower. Visible the hour or two before dawn twilight. Best seen from a dark place.

Sunday June 21 -- Summer solstice (9:03 CDT)

June 27 - July 19 -- best time to see Mercury after sunset.

Friday August 7 -- Penumbral lunar eclipse. Barely noticeable. Shading begins at 20:32 CDT. Maximum shading at 21:25 CDT. Eclipse ends at 22:18.

Tuesday/Wednesday August 11/12 -- Perseid meteors peak. Visible all night. The shower can be seen several days before or after this. High rates. Best seen from a dark place. Moonlight interferes this year.

Saturday/Sunday September 5/6 -- Penumbral eclipse of the moon before dawn. Shading starts at 4:14 CDT. Maximum shading is after the moon has set and the sun has risen.

September 19 - October 3 -- Best time to see zodiacal light before dawn twilight. Go to the south and east of Lincoln well away from the city with no man-made skyglow on the eastern horizon.

Wednesday September 23 -- Autumnal equinox at 12:02 CDT.

Thursday October 8th -- Draconid ("Giacobinid") meteors. This could be a good year for them. They are best seen in the early evening.

October 19 - November 1 -- Best time to see zodiacal light before dawn twilight (see September).

Wednesday October 21 -- Orionid meteor shower. Best after 10 p.m. Visible for several days before and after this date.

Sunday October 25 -- Clocks change. Put back one hour ("fall back")

Tuesday November 17 -- LEONID METEOR STORM??!! Visible in the early morning hours. Maximum rates expected before dawn twilight. Best seen from a dark place.

December 10 - 27 (approx.) -- best time to see Mercury in the morning sky.

Sunday/Monday December 13/14 -- Geminid meteor shower. Maximum is at midnight. A very good shower -- perhaps the best of 1998. Visible even in the city, but best seen from a dark place. Can also be seen a couple of days on either side of this time.

Monday December 21 -- Winter solstice (19:56 CST)

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PLANETARY ALIGNMENTS IN 2000

By John Mosley - Griffith Observatory

Reprinted with permission from <http://www.griffithobs.org/skyalignments.html>

The news is out! There will be a series of planetary alignments in the year 2000. Will the earth tilt over? No. Will tidal forces trigger earthquakes? No. Will the polar ice caps melt? No. Will you even be able to see the alignments? Not really. But a lot of people want to know what is going on, so the Griffith Observatory has established this page with all the details and links.

Here is a narrative description of what will happen astronomically in 2000. [Illustrations are grouped on a separate page.]

The year begins with the planets dispersed over 160° of sky and all but Mercury visible. Venus is prominent in the morning sky while Mars, Jupiter and Saturn are in the evening sky. Mercury moves to the evening sky and becomes visible early in February. All planets are then moving eastward (none are in retrograde) and their spread is decreasing. On February 28 their span has decreased to 90°. A few days later Mercury swings back to the morning sky.

The first conjunction of many occurs when Venus passes Mercury on March 15, and the two inner planets are 2.1° apart at their closest at 22:44 UT. (Times here are of closest approach, not conjunction in Right Ascension or ecliptic longitude, and are computed by the Voyager II program for the Macintosh. Times are accurate to within a few minutes.) At the same time Saturn, Jupiter, and Mars span 20° in the evening sky. These three outer planets continue to converge (Mars is overtaking Jupiter which in turn is overtaking Saturn), and on April 6 Mars passes Jupiter (they are 1.0° apart at 6:24 UT) with Saturn 6° to the east. This conjunction happens while Mars and Jupiter are 30° from the sun and it is easily visible. The prettiest evening sight of the suite of planetary groupings comes at about 7 p.m. local time on Saturday night, April 6, for middle latitudes in the United States, when the thin crescent moon is near Saturn and the moon and four planets fit within a circle about 9° in diameter. Daylight Saving Time begins the following morning in the United States.

A week later Mars is roughly midway between Jupiter and Saturn and the three planets fit within a circle 5° in diameter. Mars is closest to Saturn (2.2°) at 14:24 UT on April 15. Mars then leaves Saturn and Jupiter behind and the three planets slowly become strung out in line.

Meanwhile, Mercury and Venus have been approaching superior conjunction and their separation with the sun (and with the other planets) has been decreasing. On April 20 the five planets (and sun) span 39°, with Venus and Mercury in the morning sky and Mars, Jupiter, and Saturn in the evening. Weather permitting, the five planets should be visible, although not simultaneously, to people with binoculars and clear eastern and western horizons.

On April 28 at 14:56 UT Mercury passes 0.3° from Venus, but the two are less than 12° from the sun. The five planets and sun now span 30°.

The moon joins the five planets a few days later, and it remains between Venus, which is the westernmost planet, and Mars, which is the easternmost, from 9:37 UT on May 3 until 8:08 UT on May 5 as measured in ecliptic longitude. The moon is new at 4:12 UT on May 4.

Because Venus is moving eastward faster than Mars, the grouping of the five planets plus moon and sun continues to compress during the time it takes the moon to move eastward and reach the longitude of Mars. All seven classical solar system bodies span their smallest geocentric arc in ecliptic longitude -- 25° 53' -- at 8:08 UT on May 5. This moment is the culmination of the celestial massings. The sun is near the center of the massing, so all that will be visible will be Mars and the crescent moon, both 16° east of the sun in the evening sky, and perhaps Venus, 10° west of the sun in the morning sky.

This is as seen from the earth. As seen from the sun, the five planets, which in order from left to right are Mars, Saturn, Jupiter, Mercury, and Venus, span 50°. The earth is in the opposite direction. As seen from far above the sun they do indeed look aligned--as they actually are.

After passing Mars at 8:08 UT on the 5th, the moon leaves the sun and planets behind, but the five planets continue to converge (and to become even less-easily visible). In sequence, Jupiter is in superior conjunction, Mercury passes Jupiter, Mercury is in superior conjunction, Saturn is in superior conjunction, and Venus passes Jupiter. This last conjunction, which takes place at 10:30 UT on May 17, determines the smallest geocentric spread in longitude of the five classical planets (and the sun, but not the moon), which span 19° 25'. The moon is in a kind of alignment by being 170° opposite the sun and 21 hours before full. This is a second instant for astrologers and psychics to focus on. All planets are too close to the sun to be seen--but we can demonstrate what is happening in our planetarium theaters! After this moment, Jupiter's slower eastward motion causes it to lag behind the others and the planets begin to spread out.

A notable feature of the May 17 minimum span is that Venus and Jupiter are separated by only 42 arcseconds! Venus almost occults Jupiter. It would be a wonderful sight were they not less than 7° from the sun. This close conjunction has already been compared to the 2 B.C. conjunction of the same planets that is often identified as the Christmas Star in the book of Matthew.

Conjunctions continue as Mercury passes Mars with a minimum true angular separation of 1.1° at 9:04 on May 19 (as determined by Voyager II). They are 12° from the sun and possibly visible. Jupiter passes 1.1° from Saturn at 13:20 on May 27. Venus is in superior conjunction with the sun on June 11 (and literally behind it), by which time both Jupiter and Saturn have become visible in the morning sky, where they rise 2° apart. Venus passes 0.2° from Mars at 17:04 on June 21 (both are far too close to the sun to see).

Another interesting massing (and a last chance for astrologers whose earlier predictions of disaster were not fulfilled) comes on July 1 and 2 when, for 11 hours, the moon, sun, Mercury, Venus, and Mars fit within a circle 8° in diameter. The massing will not be visible, of course. Further groupings of lesser interest continue on and on ...

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PLANETARY ALIGNMENTS IN 2000

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Every astrologer and psychic will put his own spin on these alignments. They occur over so a wide a span of time that there should be opportunities to link at least a few natural and political disasters to planetary positions.

Alignments Summary

Planets	date	UT time	true separation
Venus-Mercury	March 15	22:44	2.1°
Mars-Jupiter	April 6	6:24	1.0°
Mars-Saturn	April 15	14:24	2.2°
Mercury-Venus	April 28	14:56	0.3°
Mercury-Jupiter	May 8	18:08	0.8°
Venus-Jupiter	May 17	10:30	0.01°
Mercury-Mars	May 19	9:04	1.1°
Jupiter-Saturn	May 27	13:20	1.1°
Venus-Mars	June 21	17:04	0.2°

minimum span in longitude of sun, moon, and five planets
May 5, 8:08 UT 25° 53'

minimum span in longitude of five planets (plus sun)
May 17, 10:30 UT 19° 25'

When Did This Last Happen?

The short answer to the question, "when was the last time the five planets plus sun and moon were this close," is 1962 -- when there was a solar eclipse at the same time!

minimum separation of 5 planets + moon

event	date	separation
last	February 5, 1962	15.8°
present	May 17, 2000	19.5°
next	September 8, 2040	8.3°

minimum separation of 5 planets + moon + sun

event	date	separation
last	February 5, 1962	15.8°
present	May 5, 2000	25.9°
next	March 20, 2675	22.6°

Editor's Note: List of suggested references that appeared on the web site are not included here due to limited space. Please refer to <http://www.griffithobs.org/skyalignments.html>

SKY HIGHLIGHTS FOR 1998

-continued from page 4 -

LINCOLN SUNRISE AND SUNSET TIMES (1998) AND EFFECTIVE CLEAR NIGHT TEMPERATURES

Date	Rise	Set	Clear night eff. Temp
Jan 1	7:51CST	5:10 CST	
15	7:49	5:24	-8
Feb 1	7:37	5:44	
15	7:32	6:01	0
Mar 1	7:01	6:18	
15	6:39	6:33	12
20	6:31	6:39	
Apr 1	6:11	6:51	
15	6:48CDT	8:06 CDT	25
May 1	6:26	8:23	
15	6:10	8:37	37
Jun 1	5:58	8:52	
15	5:55	9:00	52
21	5:55	9:02	
Jul 1	5:59	9:02	
15	6:08	8:57	60
Aug 1	6:23	8:43	
15	6:36	8:25	58
Sep 1	6:53	8:00	
15	7:07	7:36	44
23	7:15	7:23	
Oct 1	7:23	7:09	
15	7:38	6:47	29
Nov 1	6:57CST	5:23 CST	
15	7:14	5:09	14
Dec 1	7:31	5:00	
15	7:44	5:00	0
21	7:48	5:02	
31	7:51	5:09	-5

Note: Clear night temperatures are typical effective low temperatures on clear nights with a wind-chill factor for a gentle 5 mph breeze included. They are meant as an approximate guide. A 10 mph breeze will give effective winter temperatures about 10 degrees cooler still. Record low temperatures almost always occur on clear nights and they are a generally about 10 degrees cooler than the effective clear night temperatures given above. Early evening temperatures will be a little warmer than those given in the table.

If you keep a detailed observing log check my predicted temperatures out and tell me how close they come!

More "ASK THE ASTRONOMER"

By: Dr. Sten Odenwald

Q: How many astronomers are there ?

A: The American Astronomical Society has about 6500 members as of 1995, and world wide there are probably more than 15,000. The 1994 issue of the Astronomy and Astrophysics Abstracts lists over 15,000 authors for papers published during the 10 month period from January to October in the American and international astronomy journals. If you figure that probably 1/4 of these are graduate students and not matured astronomers with PhDs, then you get about 12,000 actively publishing astronomers during this 10 month period, and something like 12,000 X 12/10 = 14,000 active astronomers world wide that publish each year or so. This is not a very large group compared to the over 100,000+ physicists worldwide and many times that number of scientists in biological + physical sciences which I imagine number close to 1 million.

NASA NEWS

The following items were reprinted from the JPL web site <http://www.jpl.nasa.gov>

FOR IMMEDIATE RELEASE January 14, 1998

NASA SPONSORS MARS SURVEYOR '98 MISSION LOGO CONTEST

Budding artists and those with a flair for computer graphics have an opportunity to support NASA's next mission to Mars by designing a logo for the Mars Surveyor '98 orbiter and lander mission.

Anyone may enter the contest, said Cathy Davis, logo contest coordinator and a member of the Mars Exploration Program Office At JPL. "We're interested in flashy, eye-catching designs that convey the excitement of this mission to Mars," she said.

Logos, which are multi-colored and typically about the size of a person's palm, can be any shape, such as square, oval or Rectangular, and depict a variety of scenes relevant to the Mars Surveyor '98 mission. "Artists should avoid adding a lot of Small detail to their designs because the detail will be lost in the final format," Davis said. Designs can include images of The orbiter and lander spacecraft, the planet Mars, the southern polar cap region in which the Mars Surveyor '98 lander will land, or the spacecraft's trajectory from Earth to Mars. Designs may also carry the institutional logos of JPL, the NASA "meatball" and Lockheed Martin Astronautics, Denver.

Designs will be judged on style and content, and the winning entry will become the property of JPL for use as the Laboratory Sees fit, Davis said. The Laboratory also reserves the right to modify the winning design for accuracy and compliance with JPL Graphics standards. Entries are due no later than February 4, and should be mailed to Cathy Davis, Jet Propulsion Laboratory, 4800 Oak Grove Drive, Mail Stop T1129, Pasadena, CA 91109. For further information, contact Cathy Davis at 818-354-6111. The winner will be announced on February 6.

"The contest winner will have the prestige of seeing his or her creation on the Mars Surveyor '98 spacecraft, as well as on Mars Surveyor '98 memorabilia, T-shirts, coffee mugs, posters, CD ROMs and other merchandise," Davis added. "These products will be developed for educational and public outreach purposes."

For additional information about the Mars Surveyor '98 mission and logo designs from the last two missions to Mars -- Mars Pathfinder and Mars Global Surveyor -- visit JPL's Mars Missions home page at <http://mars.jpl.nasa.gov>><http://mars.jpl.nasa.gov>.

The Mars Surveyor '98 mission is the next set of spacecraft to be launched to Mars under the auspices of NASA's Mars Surveyor Program. The mission is designed to trace the evolution of Mars' climate and search for water in the Martian soil. The Mars '98 orbiter will be launched Dec. 10, 1998, from Cape Canaveral, FL, and arrive at Mars on Sept. 23, 1999. A companion lander will be launched from Florida on Jan. 3, 1999, and touch down near the south pole of Mars on Dec. 3, 1999.

The spacecraft are in development at Lockheed Martin Astronautics in Denver, which is NASA's industrial partner for the mission. NASA's Jet Propulsion Laboratory, Pasadena, CA, manages the mission for NASA's Office of Space Science, Washington, DC. JPL is a division of the California Institute of Technology, Pasadena, CA.

GALILEO EUROPA MISSION STATUS

January 13, 1998

Members of the Galileo flight team are busy studying data on two incidents of anomalous behavior that have occurred, one during the spacecraft's December 16, 1997 flyby of Europa, and one since. In both cases, the anomalies involved the attitude control subsystem, which controls where the spacecraft and scan platform are pointing. Team members believe the culprit may be one of the spacecraft's two gyroscopes. The gyroscopes are used to point the spacecraft when there is a need for very precise pointing control and knowledge of the spacecraft, usually for remote sensing science observations or orbit trim maneuvers.

Although the anomalies are not considered serious, until the situation was corrected, Galileo's radio antenna was pointing in a direction about 10 degrees from Earth, about eight degrees greater than the normal attitude for ideal transmission of information to Earth. Nonetheless, Galileo was still able to transmit pictures and other information stored on its tape recorder during the Europa flyby, but the data was sent at a lower rate to compensate for the large angle.

To help correct the spacecraft's attitude and speed up the data transmission, the Galileo team reduced the angle between Earth and the radio antenna by performing a Sun acquisition turn, which turned the spacecraft toward the Sun by using the Sun's Bright light as a guide. This turn, which was performed Sunday night, means that the antenna is now about 3.1 degrees from Earth. The spacecraft is now operating normally, but the cause of the anomalies is still not fully understood, and the team is Continuing its investigation.

This week, Galileo is expected to transmit to Earth high time resolution fields and particles information on the Interaction between Europa and the magnetic and electric field environment of Jupiter. Also on the playback schedule are images of Europa's Conamara Chaos region, an area of bright, icy crust that has broken apart, exposing darker underlying material. There may be some pictures of Europa's regions of mottled or "blotchy" terrain.

Scientists are particularly interested in seeing the pictures taken by Europa during the December 16 encounter, because the flyby was the closest ever to be performed by Galileo, with the spacecraft dipping down to 200 kilometers (124 miles) above the icy moon's surface.

The spacecraft recently began a two-year extended mission, known as the Galileo Europa Mission, which will include a total of eight Europa flybys, four of Callisto, and one or two of Io, as long as the spacecraft remains healthy.

Galileo Trivia

Did You Know...? Galileo was born Feb 15, 1564, the same year as Shakespeare. He died Jan 8, 1642, totally blind, the same year as Michelangelo & Calvin. He studied medicine at the University of Pisa. He named the moons of Jupiter the "Medicean Planets" after the famous Medici family. He was the 1st to study and name the Cycloid. He believed projectiles travel in a parabola. His father, Vincenzo Galilei was a professional musician.



GALILEO
GALILEI

NEBRASKA STAR PARTY UPDATE

By Dave Hamilton

The NSP-5 volunteers have been meeting each month to plan the upcoming 5th Anniversary July 18 -24th. We just finished the information packs and they are ready to mail as your registrations come in. Mark Dahmke has updated the web site, so if you haven't been there in awhile, stop by <http://www.4w.com/nsp/>. This site and the PAC site are provided and maintained at Mark's expense and are some of the finest on the net, take a look!

NPS5 speakers so far for this year are: Tippy D'Auria, founder of WSP, Mike Ford is bringing back StarLab and will speak on beginning CCD and Gary Fugman is presenting his years with AAVSO and how to report variable star data. The big addition this year is the NSP field school. Each day during the week, two classes will be held to give new hobbyists the basics of amateur astronomy.

The next NSP meeting is February 12 at Mahoney State Park. Everyone is invited to help us finalize our tee-shirt and coffee mug designs. The 1999 dates are Aug 7-14.

Additional Star Parties

TSP: April 19-26, Ft. Davis Texas TSP Registrar, 1326 Mistywood Lane, Allen, TX 75002 kastro@aol.com

RTMC: May 22-25, Big Bear, CA, Fox & Stephens, 9045 Haven Ave, Suite 109, Rancho Cucamonga, CA 91730 (909) 948-2205

Astrofest: Sept 11-13, Kankakee, IL contact Astrofest 98, PO Box 596, Tinley Park, IL 60477 (773) 725-5618

Okie-Tex: Oct 18-25, Ft. Davis, TX Kyle Carr, 7000 Pebble Lane, Oklahoma City, OK 73132 (405) 722-1678 seadkins@icon.net

OFFICERS OF THE PRAIRIE ASTRONOMY CLUB

PRESIDENT: Dave Knisely
223-3968
dk84538@ltec.net

VICE PRESIDENT: Doug Bell
(402)489-8197
db16696@ltec.net

**2nd VICE PRESIDENT
(PROGRAM CHAIR):** Erik Hubl
(402) 488-1698
ehubl@netinfo.ci.lincoln.ne.us

SECRETARY: Dave Scherping
(402) 477-2596
dscherp1@aol.com

TREASURER: Liz Bergstrom
(402) 464-2038

Please send all submissions for The Prairie Astronomer to:

Dave Scherping
640 S. 30th St., Lincoln, NE 68510
(402) 477-2596

scherpid@squared.com -or- dscherp1@aol.com



The Prairie Astronomer
c/o The Prairie Astronomy Club, Inc.
P.O. Box 80553
Lincoln, NE 68501



First Class Mail

Next PAC Meeting
January 27, 1997
7:30 PM
Hyde Observatory

MR EARL MOSER
P O BOX 162
HICKMAN NE 68372-0162

1-98