

The Prairie Astronomer

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

Volume 39 Issue #6

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MEETINGS & EVENTS

PAC MEETING

TUESDAY JUNE 30, 1998, 7:30 PM
at Hyde Memorial Observatory

MAHONEY STAR PARTY

FRIDAY JUNE 26, 1998
at Mahoney State Park - Driving Range

NSP PLANNING MEETING

THURSDAY JUNE 9, 1998, 7:30 PM
at Mahoney State Park Lodge

NEBRASKA STAR PARTY

JULY 18 - 25, 1998
at Merritt Reservoir

PAC MEETING

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

PAC-LIST: Mark Dahmke maintains an e-mail list server for PAC. If you have an e-mail address and are not on the PAC List, you may subscribe by submitting an e-mail to list@4w.com. Write "Subscribe PAC-List" in the body of the e-mail.

June's Program:

The Astronomical League sponsors nine different observing awards through which members can earn certificates and pins. Club member Ron Veys has earned four of these and is working on the rest. At the June meeting Ron will explain the requirements for each of these awards and give some tips he found useful in completing his observing programs. He'll display his awards and provide handouts you can take home to begin your own observing programs. He has found that working on an award gives your observing direction and purpose and is a great incentive to get out there and "just do it!"

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

Last Call for NSP !!!

You won't want to miss the 5th Annual Nebraska Star Party
At Merritt Reservoir, July 18-25, 1998.



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I still need somebody to write these monthly columns for The Prairie Astronomer:

"OBSERVERS' REPORT"
"PAC ASTRONOMY CLASS"
(see previous issues for examples)

Other ideas are welcome, as are your freelance articles. It's your newsletter... I need your help and input to make it a success. See below for details on submitting. - Dave

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.



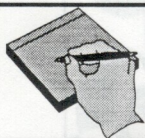
PRESIDENT'S REPORT

By: Dave Knisely

Now that we are into the summer observing season, we need to focus more on one of the goals I set at the beginning of my term, namely, a club observing site. While there are a fair number of places both public and private, which can be used, it would be best if we always had a place where club members were observing consistently. We had this with the Atlas site, but development near that site and the potential for light pollution made it less than satisfactory. At present, club members observe at two major observing locations: Wagontrain Lake, and the Beaver Crossing recreation area. There has also been observing activity at places like Hickory Ridge Wildlife refuge near Crab Orchard, and Rockford Lake east of Beatrice. We need to define what we want for a quality place where we can get together on a regular basis for observing activities. To that end we need to answer the following questions:

1. How far away from Lincoln do we go? From a light-pollution standpoint, it appears that 15 to 20 miles from the center of town is the minimum range, but what about the maximum? Hickory Ridge and Rockford both have very dark skies but are over 40 miles out, so it makes for a long drive for a single night's worth of observing. The closer in a site is, the easier (and probably more used) it will be.
2. Which direction do we go? To the northeast is Omaha, and Lincoln appears to be growing in both east and north, so the northern and northeastern quadrants seem to be off limits. Probably the best directions are southeast, south, and southwest.
3. Do we lease, buy, or just borrow (from a consenting landowner), land for a permanent site? This can have an important financial impact on our club.

I think that the site committee (headed by Liz Bergstrom) has several ideas but again, it could benefit from your input. We need to get the club into both observing and social "cloudy-night" get-togethers, like maybe cookouts at some observing site, even when observing doesn't look too likely. Perhaps all of the star parties (except those in inclement weather or during the winter) need to be also designated as star party get-togethers in general. We also need to set up a "calling-tree" system or use the PAC-list for those who want to go out at times other than regular star party dates. It could also help those of our younger members who need rides to our observing sessions. In any event, we need to get your ideas and opinions, do come to the next club meeting or contact Liz. This club needs to meet the needs of its members, and this is one way it can. See you at the next meeting.



SECRETARY'S REPORT

Minutes of the May 26, 1998 PAC Meeting

By Dave Scherping

Dave Knisely opened the meeting at 7:30 PM, by first welcoming and introducing our visitors.

The next topic was a review of Astronomy Day, which was held Saturday May 2, 1998 at Morrill Hall on the UNL campus. Turnout was very low and there was much discussion about what to do different next year. Some suggested we cancel it, some suggested move it to someplace else, and others felt it needed more publicity.

Liz Bergstrom presented the Treasurer's report and gave an update on the search for a new observing site.

President Knisely reminded everyone about the upcoming Mahoney Star Parties, the next of which is scheduled for June 26th. The May 22nd star party was clouded out. Dave urged everyone to come out and have a great time observing with the Omaha Astronomical Society and sharing astronomy with the general public.

Dave Scherping gave an update on the Nebraska Star Party plans, and reminded everyone to register by June 15th to get the free NSP-5 mug. Dave brought up that PAC has typically made a donation of a door prize to NSP, but that last year we forgot. He then made a motion to have PAC donate \$200 worth of kids' door prizes to NSP. Erik Hubl seconded the motion and the vote was carried. Thanks PAC for your generosity.

The meeting closed somewhere around 8:00 PM and was turned over to Program Coordinator, Erik Hubl who introduced this month's speaker, the creator of the "Astro-Man" cartoons, Dave Scherping. While Dave was getting set up, Del Motycka gave a nice short presentation to the beginners on how to get started in astronomy. He showed several useful books and planetariums and left them on the back table for everyone to see after the program. Dave presented four years of "Astro-Man", showing several cartoons that were never published, several "underground" cartoons that could never be published, and sharing the stories that inspired some of the best Astro-Man cartoons.

Physicists Propose New Cosmic Ray Theory

By The Associated Press

SAN DIEGO - Cosmic rays, mysterious high-energy particles that constantly zip through planets and even people, are born in the shock waves of exploding stars and sent racing outward at near the speed of light, according to a new theory.

Physicists say the theory solves a puzzle of how cosmic rays can make some heavy elements, including boron, a chemical used in ordinary household soap. "If you've ever used borax you have washed your hands in old broken up cosmic rays," Richard Lingenfelter of the University of California, San Diego, said Thursday. "The boron comes from cosmic ray interactions."

The new theory by Lingenfelter, Reuven Ramaty of the Goddard Space Flight Center in Maryland and Benzion Kozlovsky of Tel Aviv University in Israel was presented at the national meeting of the American Astronomical Society. Cosmic rays have puzzled astrophysicists for almost a century. It was known they bathed the universe, speeding with no apparent harm through planets, objects, people. "A dozen pass through this piece of paper every second," Lingenfelter said at a news conference. "More than 10 billion go through your body in a lifetime."

The rays are nuclei of atoms and their passage is not noticeable, although some studies have suggested that cosmic rays may break chromosomes and cause mutations. It has been suggested that such mutations over millions of years could be a factor in biological evolution. When primary cosmic rays collide with atoms of the atmosphere, they create what is called "secondary cosmic rays." Only the most energetic of these reach the ground. Primary cosmic rays have been detected using balloons and spacecraft. The rays leave marks in detectors made of plastic layers. The path of cosmic rays is twisted by magnetic fields in the galaxy, making it impossible to pinpoint their origin.

In 1990, it was determined the high speed particles originate from within the Milky Way galaxy, but their exact source was unknown. Experts suggested cosmic rays were created in supernova explosions, but the precise mechanism of how the particles could be accelerated at such high rates of speed was unknown. When a supernova occurs, ionized gas is shot out into space at thousands of miles per second. It creates a powerful shock wave that moves outward at high speeds for thousands of years.

In the new theory, Lingenfelter and his colleagues suggest that this shock wave is the key to cosmic rays. Lingenfelter said he believes heavy elements made by the star and sent speeding outward by its explosion condense into dust grains of graphite and metal oxides. These are shot into the cosmos "like tiny bullets," he said, and are part of an expanding high speed cloud of superheated ionized gas called plasma.

The gas slows, but the grains race through the plasma. Atoms are ripped from the grains and become electrically charged. These are then accelerated to near the speed of light by the shock wave, becoming the cosmic rays, the theory states.

Cosmic rays containing the nuclei of oxygen and carbon collide with interstellar matter. The collision produces beryllium, an element that uniquely is made only by cosmic rays. Later interactions create boron. Most other heavy elements are created in the nuclear fusion of stars and are spread through the universe when the star explodes.

The presence of beryllium in ancient stars in the galaxy has long puzzled astronomers, but Lingenfelter said the new theory would account for the element's abundance in those stars. Lingenfelter said high speed particles ejected from shock waves have been detected by NASA satellite instruments. Other elements of the theory will be tested by a science satellite called Advanced Composition Explorer, he said.

Distant Star May Be Brightest In Universe

By The Associated Press

NEW YORK - Astronomers have spotted what appears to be the brightest known object in the universe, a distant quasar that looks like an ordinary star through a small telescope. The quasar, in the constellation Lynx near the Big Dipper, is about 11 billion light-years away. It gives off visible light and infrared emissions, and its brightness in terms of total energy output beats the current record by about tenfold. But researchers said it may actually be dimmer than it looks. There's a good chance that a huge galaxy between it and Earth is acting like a lens, concentrating its light and making it look brighter than it truly is.

Nobody knows how much of this might be going on. So it's hard to say whether the quasar is truly the brightest known celestial object, but it's certainly among the brightest, said Geraint Lewis of the University of Washington in Seattle and the University of Victoria in British Columbia, Canada. He and colleagues report the finding in an upcoming issue of the *Astrophysics Journal*. Another author, Edward Totten of Keele University in Staffordshire, England, said that even with a lens effect, he believes the quasar is the brightest object.

Quasars are extremely powerful objects in the far corners of the universe. They are thought to be powered by supermassive black holes, which generate huge amounts of energy by sucking up nearby matter. The question of whether there is a lens effect and how strong it is should be solved this year with images from the Hubble Space Telescope.

Largest-Ever Survey Of The Skies To Start

By The Associated Press

SAN DIEGO - The most ambitious mapping of the heavens ever undertaken is about to start from a remote observatory in New Mexico, using the most complex camera ever built.

The \$77 million project, called the Sloan Digital Sky Survey, will probe 40 times farther into the universe than any earlier survey, taking pictures in three dimensions and in five colors, astronomers announced here Monday. When the survey is complete, it will provide an atlas of the skies 100 times clearer than the star charts relied upon for decades and will have pinpointed the location of more than 100 million galaxies. Yet, the survey will produce images that anyone will be able to view on a computer. One day, say the astronomers, schoolchildren will be able to display on their computers the same images experts use to study the heavens.

"This is not just a telescope," said Jim Crocker of Johns Hopkins University, one of nine organizations participating in the project. "This is a science factory." Members of the project team unfurled a 35-foot-long photo swatch of the heavens taken during the project's "first light," the initial pictures taken by a new telescope. The photo contained thousands upon thousands of stellar objects in different colors.

"What you see is 1% of one second of data from this instrument," said Bruce Margon of the University of Washington, the science director of the project. He said that by the time the survey is finished, it will have collected 10 terabytes (10 followed by 13 zeros) of data. The amount of data will equal what is now stored in the Library of Congress. The goal is to completely map, in three dimensions, more than half of the heavens, cataloging 100 million of the brightest galaxies and 100,000 quasars. From its location at Apache Point, N.M., north of White Sands, the telescope cannot see some of the sky over the Southern Hemisphere.

For the galaxy catalog, the telescope will be able to detect objects out to 2 billion light-years. For quasars, the most energetic objects in the universe, the telescope will see out to 10 billion light-years. A light-year is the distance travels in one year, or about 6 trillion miles. "For quasars, we get to the very end (of the universe), as deep as the Hubble" Space Telescope, said Neta Bahcall, a Princeton astronomer and a member of the survey team.

The 2.5-meter telescope is teamed with a digital camera that Mike Turner of Fermilab, one of the sponsoring institutions, called "the most complicated camera ever built." The camera includes 54 light amplifiers and is able to gather more pixels of light than the human eye. In contrast to digital cameras that capture images on tiny chips of silicon, the camera includes a full square foot of silicone. Images, in digital form, flow from the camera into a computer system at the rate of 8.5 million bytes a second, said Constance Rockosi, a University of Chicago graduate student credited with much of the key assembly work on the camera.

The system includes two spectrographs, instruments that break down the wavelengths of light, that will be able to tell the composition of objects, their speed of motion and their distance from Earth. Spectrographs have been used for decades by astronomers, but not like this, said Crocker. "In the first two weeks, we will collect more spectra than all of the other surveys in history," he said.

Margon said the current sky survey by astronomers is a 40-year-old collection of black-and-white photo plates taken at the Palomar Observatory with a conventional astronomy camera. The new survey will go out at least 40 times farther and will be in five colors. "This will be a permanent digital encyclopedia of the sky," he said.

Eventually, the work will be contained on 200 CD ROM computer disks and be available on the Internet. People will be able to slip in a disk or connect to the Web site "www.sdss.org" and see high definition views of the heavens.

"For generations to come, many groups will be able to study galaxies and clusters of galaxies," said Bahcall. "With this data, we'll be able to take a journey through the universe." The first light image of the survey was unveiled at the national meeting of the American Astronomical Society.

NASA's MARS GLOBAL SURVEYOR SPACECRAFT CAPTURES WINTER ON MARS

Taken From The NASA JPL Web Site <http://www.jpl.nasa.gov/releases/98/>

New color images of Mars, as seen by NASA's Mars Global Surveyor spacecraft, are available on the Internet at <http://www.msss.com>. The first image shows a winter morning with upper atmospheric hazes in Tharsis, a volcanic region in Mars' northern hemisphere. The image was taken on June 1, 1998. The second image shows detailed cloud patterns in the Tempe Terra/Kasei Vallis region of the northern hemisphere. These winter cloud patterns were observed on June 4, 1998.

Mars Global Surveyor is currently in a fixed 11.5-hour orbit around Mars, coming as close as 170 kilometers (106 miles) above the surface of Mars during each looping orbit. The spacecraft will resume aerobraking to lower and circularize its orbit for the start of the mapping mission in mid-March 1999.

GALILEO MISSION FINDS STRANGE INTERIOR OF JOVIAN MOON

Taken From The NASA JPL Web Site <http://www.jpl.nasa.gov/releases/98/>

New data from NASA's Galileo spacecraft have prompted scientists to modify their concept of the interior structure of Jupiter's moon, Callisto, and suggest that Callisto has evolved differently than the other largest Jovian moons -- Io, Ganymede and Europa. The new findings, to be published in the journal *Science* on Friday, June 5, will be presented Monday, June 8 at the American Astronomical Society meeting in San Diego, CA.

"Previous Galileo data had indicated that Callisto's interior was totally undifferentiated," said Dr. John Anderson, planetary scientist at NASA's Jet Propulsion Laboratory, Pasadena, CA. "But new information suggests Callisto has a strange interior--it's not completely uniform nor does it vary dramatically. There are signs that interior materials, most likely compressed ice and rock, have settled partially, with the percentage of rock increasing toward the center of Callisto."

The new information was collected during Galileo's third Callisto encounter in September 1997. Anderson reported on the findings, along with UCLA geophysics and planetary physics professor Gerald Schubert, a Galileo gravity investigator, and Dr. William B. Moore, also of UCLA; and Dr. Robert A. Jacobson, Eunice L. Lau, and William L. Sjogren of JPL.

Scientists now believe Callisto is different from Io, Ganymede and Europa, which have differentiated structures with separated layers. There is strong evidence that Ganymede is separated into a metallic core, rock mantle, and ice-rich outer shell, while Io has a metallic core and a rock mantle but no ice.

"The fact that Callisto is the only one of the four large Jovian moons that is not completely differentiated raises an intriguing possibility," said Schubert. "Because Io, Ganymede and Europa are closer to Jupiter, they have been more affected by gravitational squeezing and subsequent heating. Over time, the forces exerted on the three inner moons have caused different constituents such as water ice, rock, and metal to separate into different layers. However, because Callisto is farther from Jupiter, it is "half-baked" compared to the other moons, with its ingredients somewhat separated but still largely mixed together," he said.

"Learning about the structure of these celestial bodies enhances our knowledge of how all planets and moons form and evolve, including our own Earth and Moon," Schubert added.

Scientists had previously reported a differentiated interior for Europa, consisting of a metallic core surrounded by a rock mantle and a water ice-liquid outer shell. They are now refining the model by studying the newest Galileo data, including that gathered during the closest-ever Europa flyby in December 1997, at an altitude of 205 kilometers (127 miles). Europa's metallic core could be up to half the size of the moon's radius, with the water ice-liquid shell estimated to be between 80 to 170 kilometers thick (50 to 106 miles), with 100 km (62 miles) considered the most likely thickness. As more data become available from additional flybys, scientists hope to learn more about Europa's structure. Europa is of particular interest because of the prospect that liquid oceans may lie beneath its icy crust.

Information about the interior structure of Jupiter's moons is obtained by studying radio Doppler data that is gathered when the Galileo spacecraft flies by the satellites. Each moon exerts a gravitational tug, and the strength of that tug is affected by the distribution of rock inside. The tug, in turn, changes the spacecraft's speed and the radio frequency of its signals. By studying those changes, scientists can characterize the rock content and structure of the body.

The Galileo spacecraft entered orbit around Jupiter on December 7, 1995, and spent two years studying Jupiter, its four largest moons and its magnetosphere during its primary mission. The spacecraft is now in the midst of a two-year extension, known as the Galileo Europa Mission. JPL manages the Galileo mission for NASA's Office of Space Science, Washington, D.C. JPL is a division of the California Institute of Technology, Pasadena, CA.

Additional information about the Galileo mission and images sent back by the spacecraft is available on the Internet at: <http://www.jpl.nasa.gov/galileo/>. Images are also available at: <http://photojournal.jpl.nasa.gov> .

Hubble Takes First Image of a Possible Planet Around Another Star and Finds a Runaway World

Taken From The STScI Web Site <http://oposite.stsci.edu/pubinfo/pr/1998/19/pr.html>

NASA's Hubble Space Telescope has given astronomers their first direct look at what is possibly a planet outside our solar system -- one apparently that has been ejected into deep space by its parent stars. The discovery, made by Susan Terebey of the Extrasolar Research Corporation in Pasadena, CA, and her team using Hubble's Near Infrared Camera and Multi-Object Spectrometer (NICMOS), further challenges conventional theories about the birth and evolution of planets, and offers new insights into the formation of our own Solar System.

Located in the sky within a star-forming region in the constellation Taurus, the object, called TMR-1C, appears to lie at the end of a strange filament of light that suggests it has apparently been flung away from the vicinity of a newly forming pair of binary stars. At a distance of 450 light-years, the same distance as the newly formed stars, the candidate protoplanet would be ten thousand times less luminous than the Sun. If the object is a few hundred thousand years old, the same age as the newly formed star system which appears to have ejected it, then it is estimated to be 2-3 times the mass of Jupiter, the largest gas giant planet in our Solar System.

Also possible is that the object is up to ten million years old, the same age as other young stars nearby, in which case it may be a giant protoplanet or a brown dwarf star. A brown dwarf star is a small star that has failed to sustain nuclear fusion. The candidate protoplanet is now 130 billion miles from the parent stars and predicted to be hurtling into interstellar space at speeds up to 20,000 miles per hour (10 kilometers/sec) -- destined to forever drift among the Milky Way's starry population. Hubble researchers estimate the odds at two percent that the object is instead a chance background star.

"If the results are confirmed, this discovery could be telling us gas giant planets are easy to build. It seems unlikely for us to happen to catch one flung out by the stars unless gas giant planets are common in young binary systems," said Terebey. "The results don't directly tell us about the presence of any terrestrial planets, like Earth," she adds. "However, we believe gas giants do influence the formation of much smaller rocky planets."

Current models predict that very young giant planets are still warm from gravitational contraction and formation processes. This makes them relatively bright in infrared light compared to old giant planets such as Jupiter. Even so, young planets are difficult to find in new solar systems because the glare of the central star drowns out their feeble glow. Young planets ejected from binary systems would therefore represent a unique opportunity to study extrasolar planets with current astronomical technology.

The discovery also challenges conventional theories that predict gas giant planets take millions of years to coagulate from dust in space. Instead, it favors more recent ideas that large, low-density planets may condense out of gas very quickly, at the same time their parent star does. "This observation pushes back the clock on planet formation and offers short time scales which allow us to see how things form. This provides valuable new clues to the origin of our Solar System," says Terebey.

The candidate protoplanet was accidentally discovered by Terebey and colleagues while studying Hubble infrared images of newly formed protostars in a molecular cloud in Taurus. The exquisite sensitivity and sharpness of NICMOS clearly revealed the object's pinpoint image. However, it might have been dismissed as a background star if not for the presence of a bizarre 130-billion-mile-long filamentary structure that bridges the space between the binary pair and the candidate protoplanet.

"I said to myself, 'This is really weird, what in the world could it be?'" recalls Terebey. She speculates it could be a tunnel the runaway object burrowed through a dust cloud surrounding the stars. This created a "light tube" which channels light from the stars deep inside their dusty cocoon - like a light beam traveling through a length of fiber optic cable.

This brought Terebey to the tantalizing possibility that the planet had been flung into deep space by a gravitational "slingshot" effect from its parent stars. This could have happened if the planet's orbit allowed it to rob momentum from the stars and pick up so much speed that it escaped the system, similar to the way spacecraft perform gravitational "slingshot" maneuvers to pick up speed by flying close by a planet. "We know that many triple star systems eventually toss out the lowest mass star. And we can predict the speed at which the object should be moving, based on the separation of the binary stars," said Terebey.

- continued on page 7 -

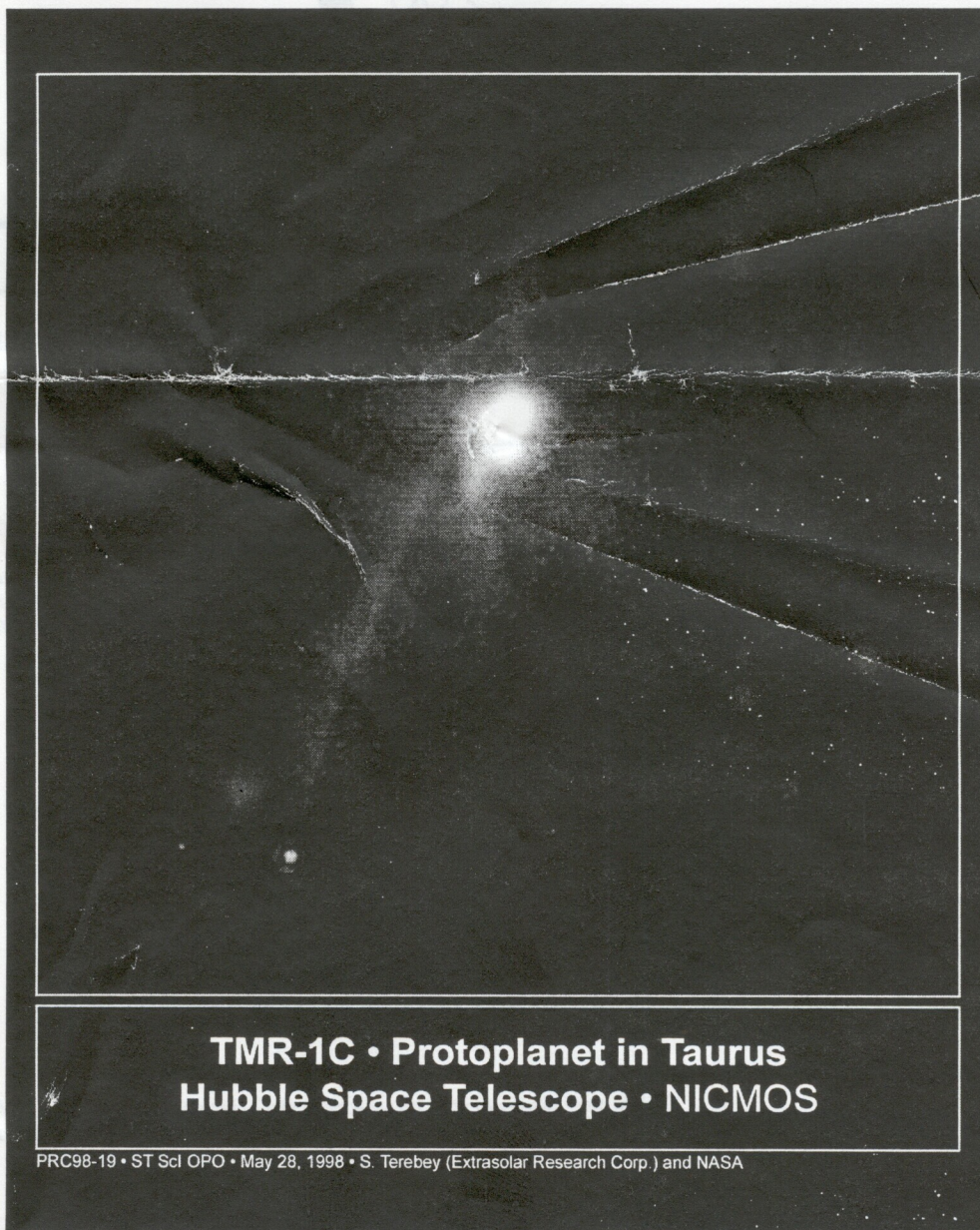
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Future observations call for images taken at a later date, to confirm the object's predicted movement across the sky. In addition, the spectrum of the object will tell whether the object is a background star, brown dwarf, or something whose spectrum is less easy to predict, such as a giant protoplanet.

"We will just have to wait and see if future observations confirm this picture," said Terebey. "However it turns out, we have come to appreciate that protoplanet ejection by young binary stars ought to happen, and it offers a new way to search for giant planets."

"These future observations will be critical in verifying that this object is truly a planet and not a brown dwarf," said Dr. Ed Weiler, Director of the Origins Program at NASA Headquarters, Washington, DC. "We are sharing this preliminary data with the public at a very early stage in the research process because of its potential importance and because of the compelling nature of the image. If the planet interpretation stands up to the careful scrutiny of future observations, it could turn out to be the most important discovery by Hubble in its 8 year history".

The members of the research team include Susan Terebey (Extrasolar Research Corp.), Dave Van Buren, Deborah L. Padgett, Jet Propulsion Lab, Pasadena, CA (JPL), Terry Hancock (Extrasolar Research Corp.), and Michael Brundage, JPL.



* * * * *

ASTRO MAN

By Dave Scherping

HELLO.... IOTA? THIS IS ASTROMAN...
I WAS WONDERING IF YOU COULD CHANGE THE
DATE OF THAT OCCULTATION SO IT WILL OCCUR
ON A WEEKEND. I NEED GET UP EARLY FOR
WORK THE NEXT MORNING. IF NOT, COULD
YOU MAKE IT HAPPEN EARLIER IN THE NIGHT ?




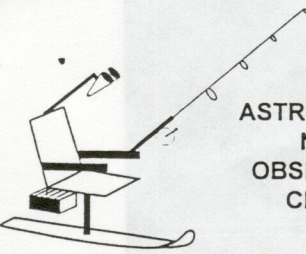
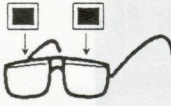
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Astro-Man

By: Dave Scherping

To assist you in preparing for the Nebraska Star Party, Astro-Man has developed the following checklist of essential supplies:

1.  **CLOUD FILTER GLASSES** Just in case the "Clear Skies Coordinator" lets you down. Available at most convenience stores.
2.  **ANTI-MILKY WAY GLASSES** Specially designed to prevent the bright NSP Milky Way from ruining your night vision. Features dark zones to safely shield you from this extremely bright light source. May be purchased at any of the Astronomy Supply Stores in Valentine, NE, or you can make your own using clear glasses & flat black paint.
3.  **HYPER-PROBABILITY DEVICE** A high quality HPD will nearly guarantee that you win a door prize and will prove to be extremely useful at the Rosebud Casino. Available at all "Crooks R Us" locations.
4.  **ASTRO-MAN'S NSP OBSERVING CHAIR** Allows you to observe the sky through 11x80 binoculars, while you Bar-B-Q, water ski, and fish for walleye all at the same time !!! Maximize your enjoyment at NSP ... time will no longer be an issue. Available in the popular slalom version and in the new "easy-to-use" 2-ski version for beginners. (Spatula, worms, & solar filters are extra). Manufactured, sold, and distributed exclusively by ASTRO-MAN, INC.
5.  **ANTI-AVERTED IMAGINATION GLASSES** Just insert slides of your favorite deep sky objects into these specially designed glasses, and you'll never again leave the eyepiece wondering if you really saw it. Very handy while working on the "Great NSP Deep Sky Challenge". Warning: AAI glasses should never be used while driving! (Astroman found out the hard way)

The PRAIRIE ASTRONOMY CLUB CALENDAR for JULY 1998

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
MAHONEY STAR PARTY DATES Friday June 26 th Friday August 21 st Friday September 25 th Friday October 23 rd			1 1 ST QUARTER 	2	3	4
5	6	7	8	9 NSP-5 Planning Mtg. 7:30 PM at Mahoney State Park Lodge	10	11
12	13	14	15	16 3 RD QUARTER 	17	18 NSP
19 NSP	20 NSP	21 NSP	22 NSP	23 NEW MOON 	24 NSP	25 NSP
26	27	28 PAC Meeting 7:30 PM Hyde Observatory	29	30	31 FULL MOON 	

LONG-TERM CALENDAR

JUNE '98	Friday June 26	MAHONEY STAR PARTY	- Mahoney State Park
	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
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

Favorite Quotes & Bumper Stickers

"OK, so you've seen some of these before and they're not astronomy related. But hey, it's all I've got since nobody submits any articles!"

- "He who laughs last thinks slowest"
- "Lottery: A tax on people who are bad at math"
- "Change is inevitable, except from a vending machine"
- "Time is what keeps everything from happening at once"
- "Out of my mind. Back in five minutes"
- "Your kid may be an honors student, but you're still an idiot"
- "Laugh alone and the world thinks you're an idiot"
- "We have enough youth, how about a fountain of Smart?"
- "I get enough exercise just pushing my luck"
- "I took an IQ test and the results were negative"
- "Where there's a will, I want to be in it"
- "OK, who stopped payment on my reality check?"
- "I don't suffer from insanity, I enjoy every minute of it"
- "Time is the best teacher; Unfortunately it kills all its students"
- "Warning: Dates in Calendar are closer than they appear"
- "Give me ambiguity or give me something else"
- "Make it idiot-proof and someone will make a better idiot"
- "Always remember you're unique, just like everyone else"
- "Very funny Scotty, now beam down my clothes"
- "Consciousness: That annoying time between naps"
- "i souport publik edekashun"
- "There are 3 kinds of people: those who can count & those who can't"
- "Why is 'abbreviation' such a long word?"
- "Ever stop to think and forget to start again?"

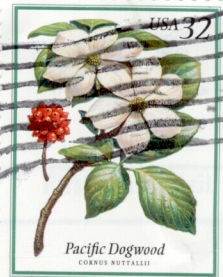
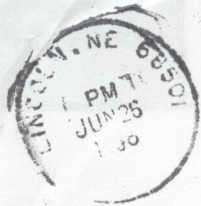
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