

Star Stuff



THE FORD AMATEUR ASTRONOMY CLUB NEWSLETTER

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October 1997

BLOBS IN SPACE: THE LEGACY OF A NOVA

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Nova eruptions by dying stars were thought to be simple, predictable acts of violence. Astronomers could point a telescope at the most recently exploded novae and see an expanding bubble of gaseous debris around each star. Scientists using NASA's Hubble Space Telescope, however, were surprised to find that some nova outbursts may not produce smooth shells of gas, but thousands of gaseous blobs, each the size of our solar system.

Astronomers acquired this new information by focusing the Hubble telescope's cameras on the recurrent nova T Pyxidis, which erupts about every 20 years. Images from ground-based telescopes show a smooth shell of gas surrounding the nova. But closer inspection by the Hubble telescope reveals that the shell is not smooth at all, but a collection of more than 2,000 gaseous blobs packed into an area that is one light-year across. Resembling shrapnel from a shotgun blast, the blobs may have been produced by the nova explosion, the subsequent expansion of gaseous debris, or collisions between fast- and slow-moving gas from several eruptions.

Back to the Drawing Board

This new evidence suggests that astronomers may have to rewrite their theory of nova eruptions and accompanying debris. "Based on these observations, our previously standard view of what nova shells should look like may be fundamentally wrong," says Michael M. Shara, of the Space Telescope Science Institute in Baltimore, Md. "The view is that a nova explosion is the same in all directions, with debris traveling at the same speed, so that a fairly smooth cloud is formed. Instead, we've found this myriad of individual knots [blobs]. This observation suggests that shells of other novae do the same thing, as recently ejected material plows into older, fossil material from previous explosions."

Stellar Detectives

Shara and his colleagues collected this new information from four observations taken by the Hubble telescope's Wide Field and Planetary Camera 2 during a 20-month period from 1994 to 1995. Their results appeared in the July issue of the *Astronomical Journal*. The scientists selected T Pyxidis because of its closeness to Earth and its long track record of outbursts. T Pyxidis is 6,000 light-years away in the dim southern constellation Pyxis, the Mariner's Compass. Within the last 110 years, T Pyxidis has been very active, erupting in 1966, 1944, 1920, 1902, and 1890.

The nova's active record lured Shara to its debris trail more than a decade ago. His pre-Hubble spectral studies in 1985 using ground-based telescopes showed that the apparently smooth shell was expanding at the rate of 780,000 mph (350 kilometers per second). His recent Hubble observations, however, surprisingly reveal that the material has slowed down considerably since 1985. In fact, the debris is barely moving at all. Images taken months apart show no measurable expansion of the debris. Shara determined that the knots must be moving slower than 90,000 mph (40 kilometers per second). This may seem fast, but actually the gaseous debris was racing through space almost 100 times faster when it was first blown off the nova.

Waves of Violence

Ground-based and Hubble telescope observations have allowed Shara to reconstruct a sequence of a T Pyxidis blast. When the nova erupts, it flings waves of gaseous material at progressively slower speeds: the first wave of hot gas flies through space at 4.5 to 6.7 million mph (2,000 to 3,000 kilometers per second), the last at 446,000 to 670,000 mph (200 to 300 kilometers per second).

About a few weeks after this eruption, the first waves of speedy debris collide with slow-moving fossil material from the previous outburst, possibly forming the gaseous blobs. Shara observed, for example, fast-moving gas from the 1966 eruption plowing into slow-moving material from the 1944 detonation. As the speedy, newly ejected material slams into the older, plodding debris, it heats up, glows brilliantly, and slows almost to a halt. (This explains the tremendous difference in the material's speed between the 1985 and the 1994-95 observations.) Eventually, the bright material fades as it cools down. This collision scenario is like cannonballs zipping through a furnace, heating up and glowing, then cooling and fading. Images of a few blobs brightening and fading over several months were captured by the Hubble telescope.

Stellar "Tree Rings"

The blobs are distributed in eight concentric circles around the exploding star, producing a pattern similar to tree rings. Just as tree rings furnish scientists with information about a tree's life, so the circles of debris around T Pyxidis provide astronomers with a history of this prolific nova. "We think that we're seeing the collision between pairs of eruptions all the way back to a successive pair generated in the early 1800's," Shara explains. "But we are seeing only the inner, brightest part of the ejected material; there are probably many more knots out there that are too faint for even the Hubble telescope to detect without the nova's future cooperation."

Fortunately, the central star is due for another explosion. Shara is scheduled to take observations with the Hubble telescope within a few days of the next eruption so that he can map the faint, ancient outer debris field, which will be illuminated by the nova's next bright flash. The debris map will show if the recurrent nova has been regularly active for the past thousand years or more, or if its eruptions occur in cycles. It also might offer clues to explain why some novae produce no visible shells at all.

Vampire Star

Nova explosions are extremely powerful, equal to a blast of 100 billion billion tons of dynamite. All this punch comes from dying, faint, low-mass stars that have exhausted their hydrogen fuel. Called white dwarfs, these stars have puffed away most of their mass until only their cores are left. A nova erupts when a white dwarf has siphoned enough hydrogen off a companion star to trigger a thermonuclear runaway. As hydrogen builds up on the surface of a white dwarf, it becomes hotter and denser until it detonates like a colossal hydrogen bomb, leading to a million-fold increase in brightness in one day. This tremendous flash of light prompted astronomers to call these objects novae - Latin for "new" - because they abruptly appeared in the sky. A nova quickly begins to fade in several days or weeks as the hydrogen is exhausted and blown into space.

Most novae spend 10,000 to 100,000 years collecting enough hydrogen from their companions to ignite an explosion. But T Pyxidis detonates several times a century. This nova has such a penchant for outbursts, astronomers believe, because its underlying star is about as massive as a white dwarf can get. A more massive white dwarf would collapse under the crushing force of gravity and become a neutron star or a black hole. Because of its high mass, T Pyxidis only needs to drain one part in 10 million of its companion's hydrogen (roughly the mass of our moon) to start an eruption. (The companion is a red dwarf, a small, cool, faint star.) This can be done in a mere 20 years or so, leading to the fascinating structure the Hubble telescope has now revealed.

Research team members are: Robert Williams, Dave Zurek (Space Telescope Science Institute); Roberto Gilmozzi, (European Southern Observatory); and Dina Prialnik (Tel Aviv University).

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☆

MOON FORMATION THEORY

from University of Colorado-Boulder

Research Indicates Earth's Moon May Have Formed In Year Or Less

New computer simulations by a team of scientists working at the University of Colorado at Boulder indicate a disk of debris orbiting Earth early in its history may have taken less than a year to coalesce into the moon we see today.

The researchers modeled a variety of conditions leading to the formation of the moon based on the widely held scientific assumption that a rogue "protoplanet" sideswiped Earth 4.5 billion years ago, vaporizing much of its crust and mantle into a swirling disk around the planet. The so-called "giant impactor theory" was first proposed in the 1970s following extensive research by NASA Apollo scientists.

Although "giant impactor" models created by a Harvard University group in the 1980s and early 1990s indicated the protoplanet was about the size of Mars, research presented at a July 1997 planetary science meeting in Cambridge, Mass., by CU-Boulder research associate Robin Canup indicated the object must have been at least three times more massive than Mars to create enough debris to form our moon.

The newest modeling results, which estimate the year-long time frame for the moon's formation, were published in the Sept. 25 issue of *Nature*. Calculations by the research team also indicate less than half the orbiting debris coalesced into the moon, while the rest eventually fell back to Earth.

The *Nature* paper was authored by Shigeru Ida of the Tokyo Institute of Technology and research associates Robin Canup and Glen Stewart of CU-Boulder's Laboratory for Atmospheric and Space Physics. Ida spent the 1996-97 academic year on sabbatical at CU collaborating with Canup and Stewart on the project.

A "ballpark figure" for the cooling of material blown off Earth by the violent collision with the impactor and its accretion into swarms of large, orbiting debris particles is thought to be somewhere between one and 100 years, speculated Canup.

At this point in the process the team began modeling a variety of scenarios that may have taken place, including the numbers of large debris particles in orbit and their distances from Earth. Twenty-seven different computer models produced by the team varied the number of particles from 1,000 to 2,700 and assumed sizes of up to 60 miles across for some of the larger debris particles, said Canup.

In each of the simulations, the particles invariably clumped together to form the moon in a year or less, always at a distance roughly 14,000 miles from Earth, she said. This is the equivalent to about 3.5 to 4 Earth radiuses from the planet.

In the outer regions of the disk, the debris particles apparently clumped together quite easily, she said. But in the inner regions of the disk "they probably bounced off each other" due to the effects of Earth's gravity.

The reason the particles in the inner portion of the disk failed to coalesce is due to their proximity to the "Roche limit," said Canup. The Roche limit is the distance from any planet or star inside of which tidal forces from the object pull orbiting particles apart rather than allowing gravity to hold them together.

For Earth, the Roche limit is about three Earth radiuses from the planet. "That's why the moon always forms just outside that region in our models," she said.

"Once the particles in the outer disk accreted to form the moon, its gravitational forces likely scattered the inner disk material back onto Earth," said Canup. In each of the computer simulations, only about 15 percent to 40 percent of the material from the initial debris disk wound up being incorporated into the moon. "This was a result we did not anticipate," Canup said.

The researchers calculated the debris particles were orbiting Earth every nine to 10 hours, and that it would have required about 1,000 orbits — the equivalent of about one year — for the large particles to coalesce into our single moon.

Interestingly, about one-third of the simulations formed two similarly-sized moons rather than one larger moon. "If this were the case, a two-moon system may have persisted for some time," she said. "That would have been quite a sight."



STAR STUFF

Monthly Publication of the Ford Amateur Astronomy Club

Star Stuff Newsletter

P.O. Box 7527

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1997 CLUB OFFICERS

President:	Bob MacFarland	313-33-79754
Vice President:	George Korody	248-349-1930
Secretary:	Harry Kindt	313-835-1831
Treasurer:	Ray Fowler	313-8292182 (pager)

GENERAL MEETINGS

The Ford Amateur Astronomy Club holds regular general meetings open to the public on the fourth Thursday of the month at 5:00 PM. Meetings are held in conference room 100 in the Ford Worldwide Web & Internet Applications (WWW&IA) building, at 555 Republic Drive in the Fairlane Business Park in Dearborn.

OBSERVING SITE

The Ford Amateur Astronomy Club has an established observing site, by permit, at the Spring Mill Pond area of the Island Lake Recreational Area in Brighton, Michigan located near the intersections of I-96 and US-23. Members are responsible for opening and closing the gate after the parks 10:00pm closing time. The combination for the lock should be available on our hotline number. Always close the gate behind you after 10:00pm whether entering or leaving the park.

OBSERVING HOTLINE NUMBER - (313) 39-05456

On Friday and Saturday nights, or nights before holidays, you can call the hotline number up to 2 hours before sunset to find out if we will be observing that night. Assume that any clear Friday or Saturday night is a candidate observing night unless something else is going on or none of the club officers are able to make it.

WWW PAGE

Computers inside the Ford network or on the Internet can access the F.A.A.C. web page at one of the following addresses:

Ford Intranet:	http://pt0106.pto.ford.com/faac/
Internet:	http://kode.net/~dougbock/faac/

MEMBERSHIP AND DUES

Membership to the Ford Amateur Astronomy Club is open to both Ford and Non-Ford Motor Company employees. The general public is also welcome to join. The dues structure is as follows:

Annual Individual/Family	\$20.00
Lifetime Membership	\$100.00

Membership benefits include a subscription to the Star Stuff newsletter, discounts on subscriptions to *Astronomy* and/or *Sky & Telescope* magazine(s), after hour use of the observing site at Island Lake, and discounts at selected area astronomical equipment retailers.

NEWSLETTER STAFF






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NEWSLETTER SUBSCRIPTION

A yearly subscription at a rate of \$12.00 is available to those who are not members of the Ford Amateur Astronomy Club. Subscriptions are free to other astronomy clubs wishing to participate in a newsletter exchange.

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OCTOBER 1997

SUN	MON	TUE	WED	THU	FRI	SAT
			1 	2	3	4
5	6	7	8	9 	10	11
12	13	14	15 	16	17	18
19	20	21	22	23 	24	25
26	27	28	29	30	31 	

- Oct 01 New Moon (12:53 pm)
 Oct 07 Asteroid 1994 TF2 Near-Earth Flyby (0.264 AU)
 Oct 09 First Quarter Moon (8:23 am)
 Oct 09 Draconids Meteor Shower Peak
 Oct 10 Saturn at Opposition
 Oct 11 Comet C/1997 D1 Mueller Perihelion (2.248 AU)
 Oct 12 Comet Kowal 2 Closest Approach to Earth (1.199 AU)
 Oct 15 Full Moon (11:47 pm)
 Oct 15 Moon Occults Saturn
 Oct 17 Comet Mueller 2 Closest Approach to Earth (1.428 AU)
 Oct 18 Jupiter Occults PPM 722396 (9.7 Magnitude Star)
 Oct 19 Moon Occults Aldebaran
 Oct 20 Asteroid 4 Vesta at Opposition (6.4 Magnitude)
 Oct 20 Asteroid 1993 PC Near-Earth Flyby (0.382 AU)
 Oct 21 Orionids Meteor Shower Peak
 Oct 23 Last Quarter Moon (12:50 am)
 Oct 24 Asteroid 1989 VA Near-Earth Flyby (0.2404 AU)
 Oct 25 Venus Passes 2.1 Degrees South of Mars
 Oct 26 Daylight Savings Set Clock Back 1 Hour (USA)
 Oct 29 Asteroid 1989 UR Closest Approach to Earth (0.676 AU)
 Oct 31 New Moon (5:02 am) ☆

MEETING ANNOUNCEMENT

The Ford Amateur Astronomy Club (FAAC) holds regular general meetings on the fourth Thursday of each month, except November and December. Our next meeting will be **Thursday, October 23, at 5:00 pm.**

The FAAC meets in conference room 100 in the Ford WorldWide Web & Internet Applications (WWW&IA) building, at 555 Republic Drive in the Fairlane Business Park in Dearborn. The find the building take the Southfield Freeway to Rotunda Drive. Go east on Rotunda and take the first right into the Fairlane Business Park (there is a sign). The WWW&IA building is the first building on the left. Park on the south or east side of the building and come to the south door (there is a big "425" over the door). The WWW&IA building is secured with a card entry system. If no one is at the door to let you in, then dial 18388 on the lobby phone and we will send someone. When you enter the building, turn left and follow along the windows to the conference room. ☆

9/25/97 FAAC MEETING MINUTES

by Harry Kindt, Sec'y FAAC.

The meeting of the Ford Amateur Astronomy Club was called to order at 5:07 PM by our president Bob MacFarland. There were 20 members and guests present. Two new members were introduced and welcomed to the club.

Bob MacFarland passed out a flyer from the Detroit Astronomical Society promoting two of their upcoming events. The first is a Swap Meet on October 17, 1997 at 7:00 PM at the Southfield Civic Center, 10 1/2 mile road at Evergreen. The second event, a Software Fair, is scheduled for Tuesday November 11, 1997 at 7:00 PM, also at the Southfield Civic Center. Contact Barry Craig at 248-351-2221 Ext. 35 or 248-597-1299 for more information about these events. Two events, which will have passed by the time you read this, were reported on by Doug Bock. His annual Autumnal Equinox Party held at his Northern Cross Observatory in Fenton, MI. on 9/27/97, and his Far Northern Cross Observatory near Cadillac MI. on October 3-5, 1997.

October 1997

Old business consisted of a report by Don Klaser, re-capping the club's 5th Annual Star Party on September 6th. By all accounts, the party was a rousing success. More than 400 people attended the event coming from 80 different communities throughout Southeastern Michigan. One person made the trip from Chicago, Illinois. There were more than 60 telescopes, of all shapes and sizes, set up for the public to look through. Owners of the telescopes and binoculars were kept busy answering questions about their equipment, the night sky, and about amateur Astronomy in general. Prize drawings were held. The grand prize, a Meade ETX, provided by The Nature Co., was won by one of our own members, Barry Craig—congratulations Barry. The club would like to thank The Nature Co. and Riders Hobby for their participation in this event and for their help in defraying part of the cost for setting up the large tent at the site. Our thanks also go out to all of the members who volunteered their time and effort in making this a very successful star party. We are all looking forward to next years party.

George Korody reported on the two star parties scheduled for the Lake Hudson State Park dark sky observing site. The first is scheduled for October 3rd, 1997, the second for October 31st, 1997. Check the hot-line for further details or contact one of the club officers. Over our usual pizza and pop, those present were given the opportunity to introduce themselves and too briefly describe their viewing experiences since our last meeting.

The treasurers report was read and accepted. Bob MacFarland notified the club members the T-Shirts and light bracelets were still available from the star party. The light bracelets would make ideal Halloween gifts for the youngsters who will be going out trick or treating Halloween eve.

Greg Burnett and Chuck Boren were our featured speakers for the evening. Greg's program consisted of a description of prime focus and eyepiece projection techniques used in conjunction with a telescope for astro-photography. Chuck described and demonstrated a program he had written in Excel to predict Aurora's based on daily geomagnetic data provided on the "Net" by the U.S. Dept. of Commerce (NOAA), Space Environment Center. Thank you Greg and Chuck.

The meeting was adjourned at 6:45 PM. ☆

OCTOBER SPACE HISTORY

The following October events come from the 09/11/97 edition of "Space Calendar." This calendar is compiled and maintained by Ron Baalke (baalke@kelvin.jpl.nasa.gov).

- Oct 03 35th Anniversary (1962), Zagami Meteorite Fall (Mars Meteorite)
- Oct 03 35th Anniversary (1962), Sigma 7 Launch (Walter Schirra)
- Oct 04 40th Anniversary (1957), Sputnik 1 Launch, 1st Man-Made Object Launched Into Earth Orbit
- Oct 05 Robert Goddard's 115th Birthday (1882)
- Oct 05 European Southern Observatory's 35th Birthday (1962)
- Oct 08 5th Anniversary (1992), Pioneer Venus burnup in Venus atmosphere
- Oct 09 5th Anniversary (1992), Peekskill Meteorite Fall (Hit Car)
- Oct 09 20th Anniversary (1977), Soyuz 25 Launch (USSR)
- Oct 10 35th Anniversary (1962), Mariner 2 Discovery of Solar Winds
- Oct 14 50th Anniversary (1947), Chuck Yeager Breaks the Sound Barrier
- Oct 18 150th Anniversary (1847), Hind's Discovery of Asteroid 8 Flora
- Oct 18 30th Anniversary (1967), Venera 4, Venus landing
- Oct 18 20th Anniversary (1977), Kowal's Discovery of Chiron
- Oct 19 30th Anniversary (1967), Mariner 5, Venus Flyby
- Oct 21 Yerkes Observatory's 100th Birthday (1897)
- Oct 22 5th Anniversary (1992), STS-52 Launch (Columbia), LAGEOS-S
- Oct 30 30th Anniversary (1967), 1st Automatic Docking, Kosmos 186 & Kosmos 188 (USSR) ☆

OCTOBER 1997 SPACE EVENTS

The following October 1997 events come from the 09/11/97 edition of "Space Calendar." This calendar is compiled and maintained by Ron Baalke (baalke@kelvin.jpl.nasa.gov). Note that launch dates are subject to change.

- Oct 02 MAQSAT-H/B/AMSAT-P3D Ariane 5 Launch
- Oct 07 Apstar-2R Long March Launch
- Oct 15 Step-4 Pegasus XL Launch
- Oct 16 GFO-1 Taurus Launch
- Oct 18 Galileo, Orbital Trim Maneuver #34 (OTM-34)
- Oct 28 Sirius-2/Indostar-1 Ariane 4 Launch ☆

OCTOBER 1997 STAR TRAILS

by Bob MacFarland, President FAAC

Congratulations to all who participated in the very successful **FAAC Fifth Annual Island Lake Star Party!** The park management, the vendors, the presenters, the concessionaire, the amateurs and of course the weatherman all pitched in to make this event a major success. They all should be proud of the fruit of their efforts.

Visitors to our party were greeted and guided to the star party by a 2.9 mile long scale model of the solar system (a **Donna and Kevan Granat** product). The display put the Sun at the park entrance and all of the planets were set proportionally along side the road Burma Shave style. Pluto was set up just outside of the registration tent at the Spring Mill Pond picnic area. The lighted 32' x 40' tent worked out quite well as it housed the tables for our registration and the Rider's Hobbies and the Nature Company displays.

The Ford Amateur Astronomy Club gave out 100 food/beverage/chip coupons and handed out over 350 door prize drawing tickets to those who registered. We estimated the crowd to be over 400 - 500 strong which included over 50 members. (Look for the registration summary at the end of this article)

Bob Justin of the **Eastern Michigan University Club** kicked off the presentations by giving an informative talk on understanding telescopes for beginners. **Barry Craig** from the **Detroit Astronomical Society** (a.k.a. Astronomy's Galleger sp?) enhanced his foaming, popping, fizzing, comet making skit to include a comet impact simulation. By sling shooting chunks of his freshly made comet into a box filled with flour he generated a neat crater with a good cloud of "dust". He did all this with his hard hat, goggles, boots, heavy gloves inside of his environmental hazard jumpsuit! Everyone loved it.

Greg Burnett gave his usual super job at giving his Astronomy 101 slide talk and **Norb Vance** also of the **Eastern Michigan University Club** spoke on Light Pollution and what we can do about it. **Gery Kissel** presented a new talk on how to tracking satellites using information that can be found on the internet. All were received quite well.

Some of the FAAC officers gave out our club prizes to warm the crowd up for the big door prizes that both **the Nature Company** and **Rider's Hobbies** presented. These included two telescopes, some binoculars and many other astronomy related items.

Throughout the afternoon, evening and even during the presentation time, dark clouds were threatening. I had fears of a replay of last year's Hurricane Fran party. However, by the time the last of the prizes were given away, it cleared up for the rest of the night. A blessing!

Throughout the rest of the night, the kids (or parents rather) bought up much of our supply of light bracelets and necklaces. They were everywhere. On the kid's necks, arms, feet, wiggling across the landscape and at times flying through the air - Frisbee style. (Next time we'll pass on the bright green ones).

I would estimate that some 50 or more scopes were set out for our visitors to view through. Our sky guides had many stories of peoples reactions to seeing various objects for the very first time. Most of the scopes had long lines of excited new observers throughout the night. The Sky Tour was quite popular as we awarded 67 certificates of achievement and the accompanying Edmund Scientific planesphere. These were the rewards to those who completed the six object worksheet. Most of these were awarded to the kids.

Both **The Nature Company** and **Riders Hobbies** folks were very happy with the event traffic in the tent. And we had many appreciative comments from our guests some of whom had never been to such an event before and others who had come back from prior years. My legs were giving out at after 2:00AM. So, I headed home while maybe some 10 scopes were still setup. What a terrific night!

Credits

Special mention goes out to the following volunteers for their part in making the party a reality. Please forgive me if I overlooked someone or a specific task - they all played a very important part in the success:

Doug Bock, Greg Burnett, Bob Fitzgerald, Patti Forton, Ray & Susan Fowler, Jack Kennedy, Harry & Ada Kindt, Gery Kissel, Don Klaser & Jan, Pat & George Korody, Aurora & Chris Lee and family, Paul Mrozek, and Phil Rodrigo, for all the planning, phone calls, coming early and/or staying late, set up/tear down coordination, vendor recruitment & coordination, registrations,

tee shirt design, graphic design, tent, paperwork, tee shirt making & sales, bracelet & necklace sales, presentation coordination, prize drawings, bullhorn, coffee, banner & Solar System display, financial coordination, Sky Tour certificate award distribution and so many other tasks.

Thank you to **Bob Justin, Barry Craig, Greg Burnett, Norb Vance and Gery Kissel** for the time and effort put into their terrific presentations. Thank you also goes to **Island Lake State Recreational Area's Joanne Stritmatter and her staff** for all their kind support.

The Nature Company's Doug Penick and Mark Simmons and Rider's Hobby's John Kirchoff and their crews deserve much credit for their presence at the party and for such outstanding door prizes. These vendor's presence complimented the event very well. I hope that they will see much business as a result of their participation.

Thank you also to **David Lee** for the comet photograph prizes and to all of the club's Sky Tour (blinking light) **volunteers**, and those who showed the skies to all of our guests and answered their questions. This wouldn't be complete with mentioning all of **our fellow clubs** who came out to share in the fun. It is sure fun to participate in each other's events.

Let's do it again next year!

FIFTH ANNUAL ISLAND LAKE STAR PARTY REGISTRANT CITIES

Adrian	1	Harrison Township	2	Roseville	1
Algonac	4	Hazel Park	2	Royal Oak	15
Allen Park	5	Highland	6	Saginaw	1
Ann Arbor	3	Howell	2	Saline	7
Berkley	8	Hudson	2	Shelby Township	3
Beverly Hills	1	Inkster	4	South Lyon	4
Birmingham	1	Lake Orion	1	South Rockwood	2
Brighton	3	Lansing	4	Southfield	2
Brooklyn	1	Lincoln Park	3	Southgate	4
Canton	15	Livonia	21	St. Clair Shores	5
Carleton	1	Madison Heights	1	Sterling Heights	14
Chicago	1	Manchester	1	Troy	4
Clarkston	2	Midland	1	Unknown	1
Clinton Township	5	Milan	1	Utica	2
Davidson	1	Millford	5	Walled Lake	1
Dearborn	8	Monroe	2	Warren	5
Dearborn Heights	5	Mount Pleasant	2	Waterford	1
Detroit	7	New Hudson	4	Wayne	1
Eastpointe	1	Northville	9	West Bloomfield	9
Fair Haven	1	Novi	7	Westland	14
Farmington	5	Oxford	5	White Lake	1
Farmington Hills	2	Pickiney	9	Whitmore Lake	1
Fenton	1	Plymouth	10	Wixom	4
Ferndale	4	Redford	2	Wolverine Lake	2
Frasier	1	Rochester Hills	1	Woodhaven	6
Fremont	3	Romeo	1	Wyandotte	5
Grosse Pnt. Woods	5	Romeo	2	Ypsilanti	18

338 Total Registrants including 57 FAAC Club Members



OBSERVATIONS

by Greg Burnett

Dusk settles on a late Summer evening. Familiar backyard colors fade to gray and black. The world of a child expands, surrounded now by shadowy terra incognita. Each movement becomes an exploration, every place a discovery. Gentle floating lights flicker in the heavy air, now here, suddenly over there, moving as if by a fairy's magic. A delicate winking light draws a dotted line in the evening air. Pursuing, jar in hand, tiny fingers reach out to capture the mysterious fairy-light, and hold it as their own for a time. Behind curved glass the captive blinks in plaintive incomprehension. But now we are grown, and we have put away childish things.

Dusk settles on a late Summer evening. The familiar hillside fades to gray and black. Our world expands, to the unknown horizons of the cosmos. As if by magic, distant beacons appear in the heavens, here, over there, too many to count, tracing patterns in the sky older than human memory. We are explorers again. With curved glass finely polished, we capture ageless starlight, possessing it as our own for a moment, and once more we see through the eyes of a child.



STATISTICALLY SPEAKING

Location (Dearborn, MI): 42°19'12" N, 83°10'48" W, 180 meters elevation
Local Time = Universal Time - 4 hours (Eastern Daylight Savings Time)

Abbreviations used in reports:

FM Full Moon FQ First Qtr Moon LQ Last Qtr Moon NM New Moon
MR Moon Rise MS Moon Set SR Sun Rise SS Sun Set

Calendar Report for October 1997

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
L Oct 01 NM: 12:53		1	2	3	4	
u Oct 09 FQ: 8:23		SR: 7:30	SR: 7:31	SR: 7:32	SR: 7:33	
n Oct 15 FM: 23:47		SS: 19:14	SS: 19:12	SS: 19:11	SS: 19:09	
a Oct 23 LQ: 0:50		MR: 7:20	MR: 8:17	MR: 9:14	MR: 10:13	
r Oct 31 NM: 5:02		MS: 19:26	MS: 19:55	MS: 20:25	MS: 20:59	
5 SR: 7:34	6 SR: 7:35	7 SR: 7:37	8 SR: 7:38	9 SR: 7:39	10 SR: 7:40	11 SR: 7:41
SS: 19:07	SS: 19:05	SS: 19:04	SS: 19:02	SS: 19:00	SS: 18:59	SS: 18:57
MR: 11:11	MR: 12:09	MR: 13:05	MR: 13:59	MR: 14:50	MR: 15:37	MR: 16:20
MS: 21:36	MS: 22:18	MS: 23:06	MS: None	MS: None	MS: 1:00	MS: 2:05
12 SR: 7:42	13 SR: 7:43	14 SR: 7:45	15 SR: 7:46	16 SR: 7:47	17 SR: 7:48	18 SR: 7:49
SS: 18:55	SS: 18:54	SS: 18:52	SS: 18:51	SS: 18:49	SS: 18:47	SS: 18:46
MR: 17:01	MR: 17:39	MR: 18:16	MR: 18:53	MR: 19:32	MR: 20:14	MR: 20:58
MS: 3:15	MS: 4:27	MS: 5:41	MS: 6:55	MS: 8:09	MS: 9:22	MS: 10:32
19 SR: 7:50	20 SR: 7:52	21 SR: 7:53	22 SR: 7:54	23 SR: 7:55	24 SR: 7:56	25 SR: 7:58
SS: 18:44	SS: 18:43	SS: 18:41	SS: 18:40	SS: 18:38	SS: 18:37	SS: 18:35
MR: 21:47	MR: 22:39	MR: 23:33	MR: None	MR: 0:29	MR: 1:25	MR: 2:22
MS: 11:37	MS: 12:36	MS: 13:28	MS: 14:14	MS: 14:55	MS: 15:30	MS: 16:02
26 SR: 6:59	27 SR: 7:00	28 SR: 7:01	29 SR: 7:02	30 SR: 7:04	31 SR: 7:05	
SS: 17:34	SS: 17:33	SS: 17:31	SS: 17:30	SS: 17:29	SS: 17:27	
MR: 2:19	MR: 3:16	MR: 4:12	MR: 5:10	MR: 6:07	MR: 7:06	
MS: 15:32	MS: 16:00	MS: 16:28	MS: 16:57	MS: 17:27	MS: 18:00	

Planet View Info Report for October 1997

Mercury	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
10/ 8/1997	7:16	18:59	12h40m21s	-22°42'45"	40°39'47"	0.989	1.37334
10/15/1997	7:52	18:56	13h24m27s	-7°57'33"	100°0'20"	0.999	1.41928
10/22/1997	8:25	18:53	14h07m26s	-12°48'09"	50°27'39"	0.989	1.43047
10/29/1997	7:57	17:52	14h50m04s	-17°04'01"	90°37'21"	0.967	1.41309
Venus	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
10/ 8/1997	11:39	20:48	15h47m27s	-22°23'02"	44°54'28"	0.624	0.88862
10/15/1997	11:53	20:45	16h20m17s	-24°06'20"	45°05'54"	0.596	0.83587
10/22/1997	12:05	20:44	16h53m18s	-25°41'08"	46°26'45"	0.567	0.78279
10/29/1997	11:15	19:45	17h26m08s	-26°35'40"	46°54'48"	0.535	0.72954
Mars	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
10/ 8/1997	12:08	21:17	16h17m18s	-22°28'15"	51°39'03"	0.919	1.82379
10/15/1997	12:06	21:07	16h38m47s	-23°07'19"	49°44'40"	0.923	1.85383
10/22/1997	12:03	20:59	17h00m47s	-23°45'50"	47°52'33"	0.927	1.88284
10/29/1997	11:00	19:52	17h23m14s	-24°22'58"	46°02'25"	0.931	1.91094
Jupiter	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
10/ 8/1997	16:28	2:19	20h59m44s	-18°04'28"	117°25'17"	0.992	4.50111
10/15/1997	16:01	1:52	21h00m01s	-18°02'37"	110°34'34"	0.991	4.60020
10/22/1997	15:34	1:26	21h00m58s	-17°58'01"	103°51'54"	0.991	4.70386
10/29/1997	14:08	0:00	21h02m32s	-17°50'42"	97°46'50"	0.990	4.81067
Saturn	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
10/ 8/1997	19:10	7:47	1h05m35s	3°59'11"	176°39'41"	1.000	8.40460
10/15/1997	18:41	7:17	1h03m32s	3°46'35"	173°45'37"	1.000	8.40830
10/22/1997	18:12	6:47	1h01m32s	3°34'29"	166°37'55"	1.000	8.42700
10/29/1997	16:44	5:16	0h59m37s	3°23'12"	159°44'47"	1.000	8.46047
Uranus	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
10/ 8/1997	16:04	1:42	20h29m03s	-19°41'06"	110°00'00"	0.999	19.47062
10/15/1997	15:37	1:14	20h28m59s	-19°41'10"	103°03'41"	0.999	19.58632
10/22/1997	15:09	0:47	20h29m05s	-19°40'38"	96°08'15"	0.999	19.70524
10/29/1997	13:42	23:16	20h29m21s	-19°39'30"	89°43'30"	0.999	19.82576
Neptune	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
10/ 8/1997	15:35	1:06	19h56m39s	-20°49'56"	102°25'48"	1.000	29.91660
10/29/1997	13:13	22:41	19h57m07s	-20°49'09"	81°41'30"	1.000	30.27434
Pluto	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
10/ 8/1997	11:10	22:08	16h15m46s	-9°00'32"	50°00'19"	1.000	30.64201
10/29/1997	8:50	19:47	16h18m20s	-9°41'17"	30°55'48"	1.000	30.86219

Planet/Moon Apsides and Conjunction/Opposition Report for October 1997

10/ 5/1997	Venus @ Aphelion	Distance from Sun: 0.73 AU
10/ 9/1997	Saturn @ Opposition	Hour: 20
10/13/1997	Mercury @ Superior Conjunction	Hour: 20
10/14/1997	Moon @ Perigee	Hour: 22 Distance: 358866 km Dia.: 0.5550°
10/27/1997	Moon @ Apogee	Hour: 4 Distance: 405592 km Dia.: 0.4910°

Meteor Showers Report for October 1997

Date	Meteor Shower	ZHR	RA	DEC	Illum. Frac.	Longitude
10/12/1997	Piscids	??	1h44m	14°	0.84	200°
10/21/1997	Orionids	25	6h24m	15°	0.64	209°

Twilight Report for October 1997

Date	Sun Rise	Sun Set	Astronomical Begin	Astronomical End	Nautical Begin	Nautical End	Civil Begin	Civil End
10/ 8/1997	7:38	19:02	6:00	20:40	6:33	20:07	7:05	19:35
10/15/1997	7:46	18:51	6:08	20:28	6:40	19:56	7:13	19:23
10/22/1997	7:54	18:40	6:16	20:18	6:48	19:46	7:21	19:13
10/29/1997	7:02	17:30	5:23	19:09	5:56	18:36	6:29	18:04



Star Stuff

SKY & TELESCOPE NEWS BULLETINS

From the editors of Sky & Telescope magazine

ROYAL GREENWICH OBSERVATORY UPDATE

The decision to close Great Britain's Royal Greenwich Observatory has entered a new phase. Following the announcement made on July 4th by John Battle, science minister for the United Kingdom, observatory managers have presented a plan to form a nonprofit charity with the RGO title. The new Royal Greenwich Observatory would operate a data center, a visitor's center, run public-education outreach programs, and develop astronomical instrumentation. Some research would also be carried out at a stand-alone RGO. If the government agrees, funding will be raised through constructing telescopes and instrumentation for other observatories. A final proposal should be ready by mid-September. Until then, the fate of the RGO and its staff remains undecided.

CASSINI-HUYGENS MISHAP

In order to exploit favorable planetary alignments and reach Saturn in 2004 as planned, the Cassini-Huygens mission needs to leave Earth between October 6th and November 4th. Over the summer, a threat to the first-available launch date was averted when engineers quickly fixed leaks found in the Titan/Centaur launch rocket. However, at the beginning of September a major blunder forced a delay. The refrigeration unit within the launch vehicle's payload shroud was turned up too high, damaging insulation on the Titan-bound Huygens probe. The spacecraft has to be removed and disassembled to remove any pieces of insulation that might have contaminated its delicate interior. NASA managers remain optimistic that the mission will be able to depart during the window. Meanwhile, antinuclear activists want the launch to be canceled because Cassini is powered by radioisotope thermoelectric generators (RTGs), which use heat from the decay of plutonium to provide electricity. The generators are in canisters designed to survive even a catastrophic launch explosion.

ADVANCED COMPOSITION EXPLORER TAKES FLIGHT

Launched by a Delta rocket on August 25th, the Advanced Composition Explorer (ACE) is NASA's newest sentinel for studying the composition of the solar wind. The spacecraft will take roughly three months to reach the L1 Lagrangian point, 1.5 million kilometers from Earth in the Sunward direction, where terrestrial and solar gravity are in balance. Once there, ACE will characterize the elements and isotopes flowing outward from the Sun and arriving from deep space as cosmic rays.

BLACK HOLE BARES ALL

The Hubble Space Telescope has captured a startling new picture of the environment of a suspected black hole. Probing deep into the center of active galaxy NGC 6251, Hubble has uncovered what appears to be a warped disk or ring of dust caught in a blazing torrent of ultraviolet light. Previous close-ups of galaxy-mass black-hole candidates showed dusty donuts completely enveloping the "monster" within — the only radiation that escaped did so along narrow jets emerging from the donut's hole. (It is the awesome energy of such radiation that tells astronomers there must be a black hole at the root of it.) This time, however, Hubble found ultraviolet light shining from one side of the dust disk, as well as a brilliant blaze coming from a point near its center. Astronomer Philippe Crane and his colleagues believe this ultraviolet radiation comes from hot gas swirling around the black hole, and that we can see it in this rare instance because the dust disk is warped, giving us a line of sight to the immediate environs of the black hole itself.

MARS GLOBAL SURVEYOR BEGINS AEROBRAKING

Less than a week after reaching the red planet, Mars Global Surveyor has begun to gradually lower its orbit by aerobraking. On September 17th, during its fourth orbit, the spacecraft made its initial pass through Mars's upper atmosphere at an altitude of 150 km. An initial series of thruster firings to lower the orbit coupled with atmospheric passes will allow mission engineers get a firm understanding of the thickness of the Martian air and the effects atmospheric friction will have on the spacecraft. When the spacecraft drops to about 110 km, scientists expect that the atmosphere alone will be enough to alter the orbit. During the next four months, air friction will make the orbiter drop from its initial, highly elongated orbit into a circular orbit just 400 km above the surface. Nevertheless, intriguing data have already been returned to Earth. Global Surveyor has confirmed the existence of a Martian magnetic field. A magnetosphere was inferred from early Soviet spacecraft, however no probe since has been able to authenticate it. According to Mario Acuna, principal investigator for the magnetometer, the data is still being analyzed but the signal indicates a magnetic field stronger than expected. Global Surveyor will begin mapping the planet next March, and continue to make observations for an entire Martian year (687 Earth days). The Mars Orbiter Camera will produce close-up images with a resolution of 1.4 meters per pixel.

(continued on page 6)

(continued from page 5)

A TWINKLING GAMMA-RAY BURST

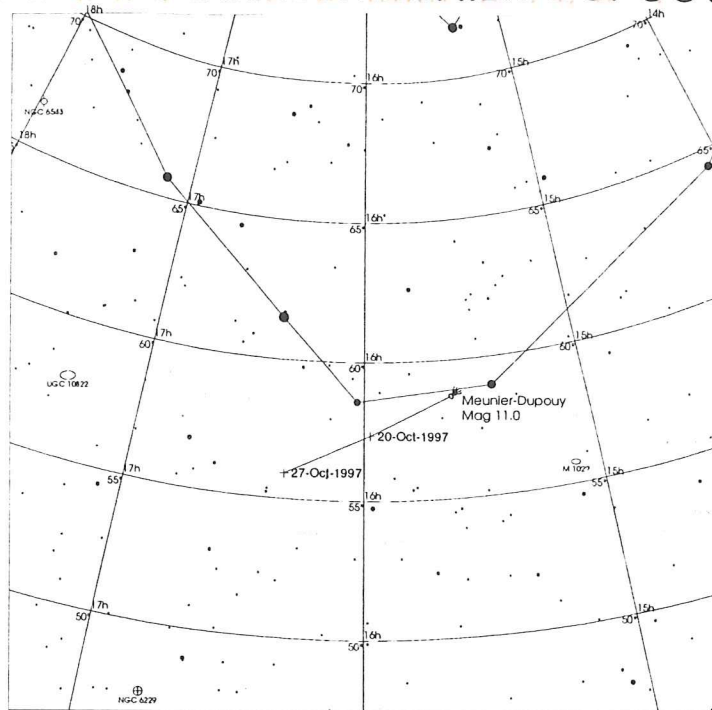
Astronomers have a new clue to the nature of gamma-ray bursts, mysterious eruptions of high-energy radiation that pop off about once a day at random points on the sky. Earlier this year, on May 8th, one such burst was recorded not only by orbiting gamma-ray detectors, but also by the BeppoSAX X-ray satellite, which pinpointed the burst's location on the celestial sphere almost instantly. Ground-based optical telescopes swung into action and found a previously unknown source of visible light at the position of the gamma-ray event. This soon faded, but not before astronomers were able to deduce that it was billions of light-years away, well outside our own galaxy. Radio telescopes observed a counterpart too, and over several weeks this source fluctuated in intensity like a twinkling star. Unlike visible twinkling, which is caused by irregularities in Earth's atmosphere, radio twinkling is caused by irregularities in the gas clouds pervading the Milky Way. Just as planets don't twinkle due to their finite angular size, so too should radio sources not twinkle if they are sufficiently large. As Shri Kulkarni (Caltech) and Dail Frail (National Radio Astronomy Observatory) report in *Nature* this week, the radio source coincident with the May 8th gamma-ray burst did stop twinkling after awhile, suggesting that the source of the radio emission had grown in angular size. From their detailed studies, Kulkarni and Frail deduce that the fireball must have expanded to a diameter of at least a tenth of a light-year since the eruption last May, implying that debris is flying outward at least 85 percent of the speed of light. This means the burst itself must have been outrageously energetic — perhaps resulting from the collision of two neutron stars in a distant galaxy, or even the collision of two black holes.

INFRARED SKY SURVEY BEGINS

A 3.5-year-long project to chart the heavens at infrared wavelengths has begun atop Arizona's Mount Hopkins. The Two-Micron All-Sky Survey (2MASS) consists of identical 1.3-meter telescopes in United States and Chile equipped with 256-pixel-square CCD cameras. The project, a collaboration between NASA, the National Science Foundation, the U.S. Naval Observatory, and the University of Massachusetts, will completely map the sky at the near-infrared wavelengths of 1.2, 1.6, and 2.2 microns. The first observations have now been taken using the Arizona telescope. The project is expected to catalog 300 million stars and one million galaxies down to 17th magnitude, and should also turn up numerous asteroids, comets, and brown dwarfs. Details can be found on the project's Internet home page at <http://pegasus.phast.umass.edu/>.



FINDING COMET MEUNIER-DUPOUY



STARS	SYMBOLS	
● <1	☉ Globular Cluster	
● 2	☾ Asteroid	
● 3	☼ Planetary Nebula	
● 4	☼ Galaxy	
● 5	☼ Quasar	
	☼ Open Cluster	
	☼ Other Object	
	☼ Bright Nebula	

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by Chris Marriott (www.skymap.com)
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Local Time: 20:00:00 12-Oct-1997 UTC: 00:00:00 13-Oct-1997 Sidereal Time: 19:53:38
Location: 42° 19' 12" N 83° 10' 46" W RA: 16h00m00s Dec: +60° 00' Field: 25.0° Julian Day: 2450734.5000

Ford Amateur Astronomy Club

Star Stuff Newsletter

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Dearborn, MI 48121

