Regulus

Issue 1999-06 Newsletter of the RASC Kingston Centre 1999 November-December

Expanding Their Universe Project

http://members.kingston.net/rasc/educate.htm

The education group is about to have our first ever teachers' seminar for astronomy. We are reaching out to help area grade 9 science teachers with the astronomy component of the new Ontario Science curriculum. We have written a guidebook based on the new curriculum with submissions from many of our centre members, but the work doesn't stop here. As chair of the education group, I have a grander vision than a one-day session for the education of our area youth. This is where I need your help. Kevin will be setting up a beautiful webpage just for teachers. On this site we would like to have crossword puzzles and word searches that change weekly/biweekly with the answers for the previous puzzle appearing with the new puzzle. We would like book reviews of books suitable for high school students (and younger if you wish), reviews of websites/software etc. Any interesting freebees that teachers might want could also be added to this page. We would also welcome activities, photos or other items to be used in a new edition of this book, or for the grade 6 book which will be available next year. Basically, anything that has to do with astronomy and high school students/teachers would be most welcome. Send your submissions electronically to <xxxx@xxxx.xxxx.xxx>, or by mail to Laura Gagne Joyceville, Ontario K0H 1Y0

Annual Awards Dinner

at the Travelodge Lasalle Motor Inn (2360 Princess St.) , 2nd Floor (elevator available) (Outer Princess Street between Sydenham Road and Highway 38, beside Chapters) Tickets are $25/person. Purchase yours at the next meeting Nov 12. Tickets can be paid for at the door only if reserved before Nov 19 when the numbers must be passed on to the hotel. Reserve with Susan Gagnon at 389-4710 or email <sdgagnon@post.kosone.com> 18:30 cash bar opens 19:30 dinner buffet begins.

Menu: BBQ Chicken,Lasagna(meat and meatless), Roasted Potatoes, Assorted Sautéed vegetables, 3 Salads: Caesar, Garden, Pasta, Spring Rolls, Dinner Rolls, Dessert, Tea and Coffee.

Guest Speaker: **Peter Ceravolo** "The talk that I have in mind is entitled "Fly Me To The Stars". I'll have video and slides to show if it's possible. As usual it will be entertaining and touch on a few issues that would be of interest to Kingston Centre members in particular.

Friday November 12th, 1999 20:00pm EDT Annual Elections and General Meeting

President, Vice President, Treasurer, Secretary, Editor, Librarian, National Council Rep

The Kingston Centre

The Newsletter of the Kingston Centre of the Royal Astronomical Society of Canada
Newsletter Submission Info: The deadline is the Friday before regular meetings in odd numbered months. The preferred method is E-MAIL, then disk, lastly paper.
E-mail: <***kell@cliff.path.queensu.ca***>
Fax: 1-613-533-2907 (with cover page to Kevin Kell)
Post: Box 2033 Kingston Ontario K7L5J8 Canada
ascii or most major word processors (Corel WP7 for windows preferred) via E-mail or 3.5" DOS floppy disk
Our NEW Web page can be found at:
http://members.kingston.net/rasc

To Send E-mail to all members of the Kingston Executive, address it to: **<*rascexec@cliff.path.queensu.ca*>**
To join the Kingston Centre Email Chat List, send a note to <***kell@cliff.path.queensu.ca***>
To join the National E-mail List, send a message to: <***listserver@astrotech.stmarys.ca***>
In the body of the message put:
subscribe rasclist Your Human Name (Center Affiliation)

Centre Location: RASC - Kingston Centre, PO Box 1793, Kingston, Ontario K7L 5J6 Canada
Approx Lat: 44 deg 14 min N Long 76 deg 39 min W

Events for 1999

** special meeting dates one week early due to holiday Fridays*

Friday November 12 Annual Elections and General Meeting
Saturday November 27th Annual Awards Dinner at the Travelodge Lasalle Motor Inn Tickets are $25/person. **Guest Speaker: Peter Ceravolo** See front page for more details.
Friday December 10 Room Change to another room in the same building. Watch for signs. Guest Speaker: Dieter Brueckner. Topic: TBA
Friday January 14th, 2000 Guest Speaker: Dr. Judith Irwin (Queen's University) about her time on sabbatical in India
Friday February 11th, 2000 Guest Speaker: Walter MacDonald (Kingston Centre) "A CCD Imaging Primer: Imaging Made Easy and Fun" This CCD Primer will discuss CCD imaging for the beginner, using a minimum of equipment and effort.

Where: Regular Meetings of the Kingston Centre are held on the 2nd Friday of each month (unless noted otherwise) at 20:00 local time in **Room B-201, Mackintosh-Corry Hall** at Queen's University (parking available off Union Street at Frontenac).

From The Editor

Changes/corrections of address received (I pass any I receive on to the Centre Treasurer who passes them on to the RASC National Office) since the master March list was published:

New Members:

I haven't received the new list yet but the last one showed us with 180 members! That jumps us to the fifth largest centre in Canada (when compared against other centres' 1998 numbers). And we are hoping for more. 200 even!

We can directly attribute these increased numbers to are ever increasing activity list (ATM group, Education group, Youth Group, Observing Group, our Web presence, to name a few).

Change of address:

Don Timperon has moved back to Kingston with a temporary address in Kingston, Ontario
Don Mastrianni has a new email home.
David Joiner, has moved to Aurora ON L4G 3H7
Tim Seitz,, Kingston, ON
Brenda Shaw

Changes to the Web Site in the last 2 months
http://members/kingston.net/rasc

* Huge new additions to education page
* updated 2000 meetings, loan program, benefits of membership, fee summaries across Canada, other centre's home pages,

National News

The National Address & contact info:
Royal Astronomical Society of Canada
Bonnie Bird, Executive Secretary
136 Dupont Street Toronto, Ontario, Canada M5R 1V2 Voice: 416-924-7973 Fax: 416-924-2911
email: <rasc@rasc.ca>

2001 General Assembly

At the 1999 General Assembly in Toronto, the London centre was chosen to host the 2001 General Assembly. Since then, the Centre has been actively forming committees, planning events, and seeking out interesting speakers. We are pleased to announce that Fanshawe College has been selected and booked for the event.

Fanshawe College has just completed construction on a brand new Residence and Convention Centre. This well-planned facility has everything we are looking for, including comfortable rooms, convenient access to all meeting rooms, and a brand new state of the art hi-tech theater. Also available for our use are recreation rooms with billiard tables and televisions, a fully equipped exercise room, patios, a licensed restaurant, and banquet facilities. Best of all, it comes at a great price.

Fanshawe College is located on Oxford Street near the London International Airport, which has connections to many major cities in Canada and the United States. London is located on all the major bus and train routes. You may also arrive by car as Fanshawe College is only a few kilometers north of the 401 highway and has lots of free parking.

The London Centre hopes the 2001 General Assembly will be both educational and fun. We plan on having some new and exciting events to coincide with the new millennium. We would welcome any suggestions that would help make the 2001 General Assembly an outstanding event.

Yours Truly, Christopher Fleming,
London Centre Representative

OBSERVING CERTIFICATE COMMITTEE REPORT

The objective of this committee is to inspire people to observe a range of objects from beginner to advanced levels. It is hoped that by giving observers a goal to reach, they will continue their interest in observing and therefore stay members of the RASC. By creating a variety of certificate programs, we will be sure to catch the interest of every type of observer. We also have to consider the type of observing equipment that people own, since good quality binoculars are the recommended certificates in our program. On the other end of the scale, experienced observers who have completed their Messier and Finest NGC lists could have an extended list of Herschel objects that would keep their interest in observing alive.

Many RASC members live in cities with moderate to heavy light pollution, and it is difficult for them to complete their Messier and Finest NGC lists. To keep their interest in observing up, we could create Lunar and Double Star certificate programs. The Moon is a fascinating object to observe and reveals more detail than any other object in the solar system. A significant list of all types of interesting lunar features would keep a city bound observer busy for quite a while.

Another good project for members in a light polluted area is observing Double Stars. There is a large number of beautiful double stars visible from the city, and it is a great way to learn how to star hop -- a skill useful when they do get to a dark site. Even binocular observers can enjoy double stars as there is a surprising number of bright ones with separations more suitable to binoculars.

The committee is actively compiling and observing the best objects to be included on these lists. We would welcome suggestions and list of objects you think should be included. Please mail them to:
Christopher Fleming, xxxxx London, ON Phone: xxx-xxx-xxxx

Report of the Special Public Education Committee October 23, 1999

Chair:	David Orenstein	Toronto
Mary Lou Whitehorne		Halifax
Leo Enright		Kingston
Don Hladiuk		Calgary
Randy Attwood		Ex-officio

We are progressing in many directions: sharing information, throwing around proposals, and recruiting members for a larger public education group.

We aim to share our Centres' expertise in general public education and to better position the RASC to support formal astronomy instruction in elementary and secondary schools. The RASC is already doing much work across Canada as individuals, in Centres and through national publications. Can the Society move to a more effective and cohesive national approach?

As chair, everything I attempt leads to yet further opportunities: new contacts suggested, potential websites, and teaching packages. Can Danforth C.T.I. be a shining example of implementing a substantial astronomy programme? Our principal, **Bob Gooding**; science head, **Mike Pal**, math head, **Peter Joong**, and physics specialist, **Roberta Tevlin**, are all very supportive. Ontario's science curriculum provides an opening: this year's grade 9 science course is now 25% astronomy.

Bonnie Bird (National Office) and **Isaac McGillis** (National Office) have led me to such opportunities as **Guy Nason** (Toronto) conducting a very successful star part at our school last week, or **Cathy McWatter's** (Toronto) forthcoming Starlab presentation to my classes. Mathematical astronomy will be taught second term. Using class sets of the **Observer' s Handbook 2000, The Beginning Observer's Guid (4th ed.) and RASC 2000 Calendar**, it will culminate in major projects: rigorous 3-dimensional modelling of constellations and the solar system to be presented at the 2000 Winnipeg General Assembly.

The Toronto Centre, in conjunction with the science department of the Toronto District School Board, is working on a proposal for a professional development day for Toronto high school teachers for next February.

Obviously, **Leo Enright's** (Kingston) **The Beginning Observer's Guide** is the RASC's key tool for making astronomy an **experiential** science in Canada's schools. We'v discussed yet further improvements to the BOG to make it more applicable to classroom use and would greatly appreciate reports from other teachers using it in their classes. The BOG should be recognised as an official Ontario textbook. "Being listed on circular 14" is the jargon. The National Executive may have to formally request this.

Leo encouraged **Laura Gagne** (Kingston) to join our group. She is preparing a workshop for the teachers of Ontario's new grade 9 astronomy unit. The accompanying book is already published.

Mary Lou Whitehorne (Halifax) has superbly summarised official astronomy education in the Atlantic Provinces. Currently concentrated in grades 4, 5 and 6 with nothing formal in high school, they are moving forwards to the Pan-Canadian Science Curriculum with its astronomy and space science units. In prince Edward Island, for example, astronomy is a context for primary grades.

Date: Sat, 23 Oct 1999 07:30:53 -0400
From: "Peter Jedicke" <pjedicke@fanshawec.on.ca>
Subject: FLASH Minutes of National Council

FLASH MINUTES
Note: these MOTIONS of the National Council on 1999 10 23 are completely unofficial and are presented merely to foster communication and discussion within the Society. The National Recorder is entirely responsible for these notes. For official purposes, wait until the official minutes are announced, early in the next millennium.

MOTION 99401
It was moved by Mr. Jedicke and seconded by Mr. Horvatin to accept the minutes of the meeting held 1999 07 01, as posted on the Society's web site on 1999 10 19.
The motion was CARRIED.

MOTION 99402
It was moved by Mr. Jedicke and seconded by Mr. Pihack to accept the minutes of the meeting held 1999 07 03, as posted on the Society's web site on 1999 10 19.
The motion was CARRIED.

MOTION 99403
It was moved by Mr. Kaye and seconded by Mr. Fleming to accept the list of unattached members and life members as circulated.
The motion was CARRIED by special resolution.

MOTION 99404
It was moved by Ms. Hay and seconded by Mr. Kaye that Messier Certificates be awarded to Mr. Alexander Dutkewych (Unattached), Mr. Geoff Gaherty (Toronto Centre), Ms. Johanne Gamache (Montreal Centre), Mr. Guy Mackie (Okanagan Centre), Mr. Ron C. Scherer (Okanagan Centre), and Mr. Jan Wisniewski (Victoria Centre).
The motion was CARRIED.

MOTION 99405
It was moved by Ms. Hay and seconded by Mr. Kaye that an NGC Certificate be awarded to Mr. Alexander Dutkewych (Unattached).
The motion was CARRIED.

MOTION 99406
It was moved by Ms. Hay and seconded by Dr. Garrison that a Membership Certificate be awarded to Mr. Chris Aikman (Victoria Centre) for over twenty five years membership.
The motion was CARRIED.

MOTION 99407
It was moved by Mr. Watson and seconded by Mr. Kaye that a grant of $5,000 be made to the Toronto Centre from the special projects fund.
The motion was CARRIED

MOTION 99408
It was moved by the Publications Committee that the editorial structure proposed in the report of the Committee be adopted, with the position of Managing Editor to be called
Editor-In-Chief.
The motion was CARRIED.

MOTION 99409
It was moved by the Computer Use Committee that $70 be authorized to register and maintain the domain name www.srac.ca.
The motion was CARRIED.

MOTION 99410
It was moved by Mr. Cheaney that the meeting adjourn.
The motion was CARRIED at 14h23.

Youth Group News

Submitted by Hank Bartlett

YES, there really is a Youth Group

Final arrangements are still being made but approval has been given By Holy Cross Secondary School for the use of a classroom. The Kingston Centre, Youth Observing Group (YOG) will commence at 6:30pm-8:00pm on Nov. 17, 1999. Meetings will be held the **1st and 3rd Wednesday** of each month as long as the school is open. This first Meeting will be an orientation of how the group will run, what we have to offer and what will be expected of the members. There will be no fee and all youth ages 12 - 17 are welcome (exception to the age restriction will be made to younger children of RASC members). Parents who wish to share in this hobby with their child will be welcome to participate. It would be desirable to keep the size down around 15 youth members therefore registration will be on a first come basis.

As the name of the group states this will be primarily an observing group. Regardless of the time of year members should come prepared (adequate clothing) to go out and observe. As long as it is clear we intend to get out there. When the weather is poor we will show slides, videos, have discussion and some talks by RASC members or YOG members.

If you are interested or wish more information call Hank Bartlett at xxx-xxxx evenings

and weekends or email <xxxx@xxxx.xxxx.xxx>

Public Observing Sessions

at Murney Tower Museum park (King & Barrie Sts) on Kingston's waterfront. We are committed to having a public session once a month about 1 week after the new moon, **WEATHER PERMITTING.** Contact Tom Dean for Details: We need 2 or 3 scopes and people to man them and just talk to the people wandering in. We normally set up at or about sunset. The next scheduled dates are:
Tuesday November 16th
Tuesday December 14th

Observing Group News

1999 Observing Group Schedule

Contact *Tom Dean* for Directions or check the secure web site for more info.

Saturday November November 6th at the home of Fred Werthman (302 Pelo Road). Plan to arrive around sunset. From Hwy 15 & 401: Follow 15 north past Joyceville, turn east onto Sandhill Road (County Road 13). Continue past Hwy 32 and Sandhill becomes Pelo Road (pavement turns to dirt) and follow it to the end. Last house on left/north.

Dec cancelled! Too many other activities this month!

ATM Group News

Work on the 24" mirror (24.2" to 24.5" plus bevel) continues. To date grinding with 600 grit has been completed on the f4.5 blank. 1000 grit comes next with an expected finish of the end of November. Polishing we are expecting to start in January as folks want to take a break.

Education Group

We have succeeded in putting together a seminar for high school (grade 9) science teachers for the new curriculum. It is scheduled for early November and we will be providing our 120+ page guide to the curriculum, chock full of activities, notes and resource material. In addition we have compiled two slides sets of 40 slides each will be available for purchase to the schools, showcasing what amateur (Canadian) astrophotography is like.

This is a good example of a small good idea that has blossomed into a huge project for the Centre. More news in Regulus and the Journal after the seminar has run.

Fireball Group

Submitted by Judith Irwin
Fireball Report Line: 533-6000 ext 77608.
Fireball Web reporting form:
http://www.astro.queensu.ca/~irwin/fireballs/fbhome.html

Submissions from Members

How to select a telescope – a different perspective

Part V - The Optical Tube Assembly and Mount *by Doug Angle*

The Optical Tube Assembly and Mount
In the early days of telescope making, every effort was made to keep the system rigid. That generally meant heavy. It was also considered essential to have an equatorial mount. Starting in the 50's people like Couder, Texereau and others offered other solutions. Simpler, wooden tubes and alt-azimuth mounts are easier to construct, and generally satisfactory for visual use at low and moderate powers.

In the 70's another evolution in the design occurred, popularized by John Dobson. Although the "dobsonian" term is used to describe all sorts of

designs, the true dobsonian was made from Sonotube® (the cardboard tubes used as concrete forms) and plywood. A plywood box held the Sonotube® and the mirror (usually on a hinged back plate for easy removal). ABS rings on the side of the box rode in Teflon® pads attached to a large plywood fork mount called the rocker box. The bottom of the rocker rotates around a single bolt as it sits on a ground board. The bottom of the rocker is coated with Formica®, and rides on more Teflon® pads attached to the ground board.

Like the Amateur's Telescope of the 1930's the dobsonian inspired a generation of telescope builders. Soon apertures in the double digits were no longer considered large, and 20+ inches of aperture were common. However, despite it's popularity, there are serious flaws in the design. Soon other amateurs were refining the design, a process that continues today.

The first limitation is that the tube was solid, and could not be dismantled for travel. It wasn't long before truss tube telescopes were seen. The plywood box still held the mirror, but was now attached to another box that held the diagonal and focusser using aluminum tubes. The small ABS rings that formed the altitude bearings were replaced with large radius arcs of wood or metal. This allows the rocker box to be made lower, and therefore lighter. This design culminated in Dave Kreige's design, marketed as Obsession telescopes. These are elegant, well built and superb performers.

Even so, this design still contains more mass than necessary. In the latest designs, the bottom box is replaced with a ring or plate that holds the mirror. The truss tubes attach to another ring from which the focusser and diagonal hang. The arcs of the altitude bearings still ride in Teflon® pads, but now on a rocker box with virtually no sides. One such design houses a 16" aperture and weighs only 40 lbs. The mirror is fully exposed on all sides in the completed telescope.

Many people are combining this type of mechanical design with modern electronics. Some of the supports are replaced with shafts driven by stepper motors. The optical tube is driven in both altitude and azimuth by amounts equivalent to the equatorial rate. Done carefully, tracking can be at least as good as an equatorial mount. Thus the scope can be used at high powers, without the nuisance of objects passing through the field quickly. The only remaining problem is field rotation when doing photography, and that can be taken care of with a third motor that rotates the focusser.

DO Draconis Dazzles and Amazes!
Walter MacDonald [MDW] Oshawa, Ontario, Canada.

DO Draconis (1137+72) is a U Geminorum type star located about 10 degrees east of M81 and 82, and less than 3 degrees from lambda Draconis. I have been following it for a couple of years and wondered if it would ever do anything! Night after night it would just sit there at magnitude 14-15. Then around September 20th, it went into outburst!

The AAVSO email "News Flash" (No. 499) announced the outburst on September 21st. According to the AAVSO International Database this star's most recent outburst occurred in mid-October 1996, when the star reached a mean visual magnitude of 10.4 (announced in News Flash No. 68). Below are the observations reported in the News Flash, along with my own (not reported in the News Flash):

AAVSO Observer

UT	Mag.	Initials
SEP 13.838	<15.0	PYG
SEP 17.823	<13.7	MUY
SEP 18.81	<13.5	SPK
SEP 19.8951	<14.3	
SEP 20.830	11.2	MUY
SEP 20.9035	11.0	WDM
SEP 21.142	10.7	SPK
SEP 22.8611	11.4	
SEP 23.8903	12.0	
SEP 26.8889	<13.2	

You can see that the star does not stay "up" very long! My last observation (on Sept. 26) was done with a full moon in the sky and was very difficult, but I just had to know what DO was doing (or should that be DOing?)!

Interestingly, the AAVSO chart for DO Draconis also lists it as YY Draconis. This is good because my LX200 returns a "No matching object..." message when I try to go to DO Draconis (star #340137), but it will go to YY Draconis (star #340052). AAVSO member John Isles was kind enough to tell me the details of how this strange situation arose:

"The object originally designated YY Dra was an eclipsing binary with range 12.9 to below 14.5 photographic and period 4.21123 days. Unfortunately this object is lost. There is no star like this near the co-ordinates published by the 1934 discoverer, W. Zessewitsch. Probably there was a large error in the reported position.

When a long-cycle dwarf nova was later found very close to the published position of YY Dra, it was at first assumed to be the same object, and for a time observers called it YY Dra. Then the Moscow team that names variable stars decided the dwarf nova was really a different object, and gave it the new designation DO Dra. You should therefore call it DO Dra in your reports. I don't know why your LX200 doesn't find DO Dra, but possibly its database includes only the variables in the 1985 edition of the General Catalogue of Variable Stars, whose listing for Draco ended at DN."

When will DO Draconis go into outburst again? The only way to know for sure is to keep watching!

Models by Don Mastrinni <xxx@xxxx.xxx>

News from the Net

RELEASE: 99-117
HEAD OF MARS CLIMATE ORBITER INVESTIGATION BOARD NAMED

NASA Administrator Daniel S. Goldin today named Arthur G. Stephenson, director of NASA's Marshall Space Flight Center, Huntsville, AL, to be the head of the Mars Climate Orbiter Mission Failure Investigation Board.

The investigation board will look independently into all aspects of the failure of the mission, which was lost Sept. 23 as the spacecraft was entering orbit around Mars. The Board will report its initial findings to NASA Headquarters by Nov. 3, 1999. Other members of the board will be established shortly.

Preliminary findings by an internal peer review at

NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA, indicate that a failure to recognize and correct an error in a transfer of information between the Mars Climate Orbiter spacecraft team in Colorado and the mission navigation team in California led to the loss of the spacecraft. *As reported last week, the peer review preliminary findings indicate that one team used English units while the other used metric units for a key spacecraft operation.*

>Does anyone know what happened to the people who didn't check the units in the Mars Climate Observer disaster?

1. Their coworkers won't touch them with a 10 gallon pole.
2. They're all buried 6 kilograms under.
3. They've all received promotions to the IRS.
4. They've gone back to the basics and are now working for Kellogg's counting the two scoops of raisins in every box of Kellogg's Raisin Bran.
5. They've all gone mad trying to calculate the value of PI in square ounces.

Oct. 6, 1999 RELEASE: 99-107
STARRY BULGES YIELD SECRETS TO GALAXY GROWTH

NASA's Hubble Space Telescope is uncovering important new clues to a galaxy's birth and growth by peering into its heart -- a bulge of millions of stars that resemble a bulbous center yolk in the middle of a disk of egg white.

Hubble astronomers are trying to solve the mystery of which came first: the stellar disk or the central bulge?

Two complementary surveys by independent teams of astronomers using Hubble show that the hubs of some galaxies formed early in the Universe, while others formed more slowly, across a long stretch of time.

Hubble confirms that the evolutionary paths of bulges and disks are connected. The central bulge stabilizes a galaxy's development and largely controls the ebb and flow of star birth in the core. The central bulge holds secrets as to how and when a galaxy formed. Before Hubble, astronomers had detailed information only about the complex core of our galaxy, which has a small bulge peppered with massive young star clusters and a telltale bar structure funneling gas to the center. Hubble allows astronomers to see bright star clusters, bars and other structures deep inside the bulges of other galaxies.

A group led by Reynier Peletier from the University of Nottingham, in the United Kingdom, has confirmed that the central bulges of more tightly wound spirals were all created at more or less the same time in the early universe.

A second team, led by C. Marcella Carollo of Columbia University in New York, surveyed galaxies that have small bulges and bar-like structures that bisect the nucleus like the slash across a no-smoking sign. They found that the bulges in these galaxies grew more recently, through markedly different processes happening within the galaxy's disk.

NOTE TO EDITORS: Image files are available on the Internet at:
http://oposite.stsci.edu/pubinfo/latest.html and
http://oposite.stsci.edu/pubinfo/pr/1999/34/pr-photos.html

Oct. 1, 1999 RELEASE: 99-114
NEW MARS IMAGES: NO EVIDENCE OF ANCIENT OCEAN SHORELINES

Scientists studying high-resolution images from NASA's Mars Global Surveyor spacecraft have concluded there is no evidence of shorelines that would have surrounded oceans that may have once existed on Mars.

One argument that such a body of water once existed was suggested by features in images from the NASA Viking missions taken in the 1970s, which were interpreted by a number of researchers as remnants of ancient coastlines. The images from Mars Global Surveyor, taken in 1998, have a resolution five to 10 times better than those that Viking provided. With this closer inspection, none of these features appears to have been formed by the action of water in a coastal environment.

"The ocean hypothesis is very important because the existence of large bodies of liquid water in the Martian past would have had a tremendous impact on ancient Martian climate and implications for the search for evidence of past life on the planet," said Dr. Kenneth Edgett, a staff scientist at Malin Space Science Systems (MSSS), San Diego, CA, the institution that built and manages the Mars Orbiter Camera onboard the spacecraft. "The newer images do not show any coastal landforms in areas where previous researchers --working with lower resolution Viking images -- proposed there were shorelines."

About 2 percent of the Mars Orbiter Camera images were targeted to look in places that would test shorelines proposed by others in the scientific literature.

More information and images about the Mars Global Surveyor mission is available at:
http://mars.jpl.nasa.gov/mgs/ and
http://photojournal.jpl.nasa.gov/

Additional details about the paper and the new Mars

images are at:
http://www.msss.com/mars_images/moc/grl_99_shorelines/

Sept. 28, 1999 RELEASE: 99-109
CHANDRA DISCOVERS X-RAY RING AROUND COSMIC POWERHOUSE IN CRAB NEBULA

After barely two months in space, NASA's Chandra X-ray
Observatory has taken a stunning image of the Crab Nebula, the spectacular remains of a stellar explosion, and has revealed something never seen before: a brilliant ring around the nebula's heart.

Combined with observations from the Hubble Space Telescope, the image provides important clues to the puzzle of how the cosmic "generator," a pulsing neutron star, energizes the nebula, which still glows brightly almost 1,000 years after the explosion.

"The inner ring is unique," said Professor Jeff Hester of Arizona State University, Tempe, AZ. "It has never been seen before, and it should tell us a lot about how the energy from the pulsar gets into the nebula. It's like finding the transmission lines between the power plant and the light bulb."

What is going on, according to Dr. Martin Weisskopf, Chandra Project Scientist from NASA's Marshall Space Flight Center, Huntsville, AL, is awesome. "The Crab pulsar is accelerating particles up to the speed of light and flinging them out into interstellar space at an incredible rate."

The nebula is located 6,000 light years from Earth in the constellation Taurus. The Crab pulsar, which was discovered by radio astronomers in 1968, is a neutron star rotating 30 times per second. Neutron stars are formed in the seconds before a supernova explosion when gravity crushes the central core of the star to densities 50 trillion times that of lead and a diameter of only 12 miles.

Chandra images are posted to the Internet at:
http://chandra.nasa.gov/ and http://chandra.harvard.edu/

Oct. 13, 1999 RELEASE: 99-119
NO WATER ICE DETECTED FROM LUNAR PROSPECTOR IMPACT

The controlled crash of NASA's Lunar Prospector spacecraft into a crater near the south pole of the Moon on July 31 produced no observable signature of water, according to scientists digging through data from Earth-based observatories and spacecraft such as the Hubble Space Telescope.

This lack of physical evidence leaves open the question of whether ancient cometary impacts delivered ice that remains buried in permanently shadowed regions of the Moon, as suggested by the large amounts of hydrogen measured indirectly from lunar orbit by Lunar Prospector during its main mapping mission.

Research group leaders from the University of Texas at Austin announced their results today at the annual meeting of the American Astronomical Society's Division for Planetary Sciences meeting in Padua, Italy.

Worldwide observations of the crash were focused primarily on using sensitive spectrometers tuned to look for the ultraviolet emission lines expected from the hydroxyl (OH) molecules that should be a by-product of any icy rock and dust kicked up by the impact of the 354-pound spacecraft.

"There are several possible explanations why we did not detect any water signature, and none of them can really be discounted at this time," said Dr. Ed Barker, assistant director of the university's McDonald Observatory at UT Austin, who coordinated the observing campaign. These explanations include:

* the spacecraft might have missed the target area;
* the spacecraft might have hit a rock or dry soil at the target site;
* water molecules may have been firmly bound in rocks as hydrated mineral as opposed to existing as free ice crystals, and the crash lacked enough energy to separate water from hydrated minerals;
* no water exists in the crater and the hydrogen detected by the Lunar Prospector spacecraft earlier is simply pure hydrogen;
* studies of the impact's physical outcome were inadequate;
* the parameters used to model the plume that resulted from the impact were inappropriate;
* the telescopes used to observe the crash, which have a very small field of view, may not have been pointed correctly;
* water and other materials may not have risen above the crater wall or otherwise were directed away from the telescopes' view.