



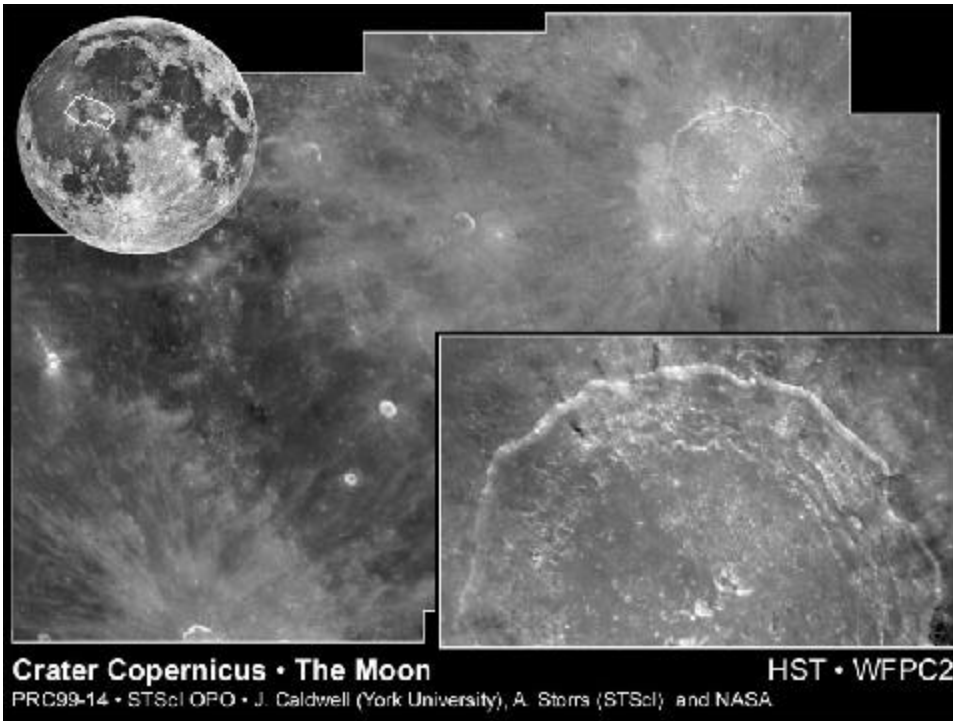
## Astronomy Day: Saturday May 22<sup>nd</sup>, 1999

Located at the Eastern end of Frontenac Mall, on Bath Road

Astronomy Day is fast approaching. This year we will celebrate and share with the public on May 22nd at the Frontenac Mall. We will be set up between the grocery store and the dollar store, a very busy section of the Mall. There are six tables to fill with active, inspiring, breath-taking displays. This is our chance to catch the attention of new people, draw attention to ourselves and point out our environmental interests. Telescopes are always a big draw, especially if we can actually see something through them (solar filters are a hit). Bright displays, astrophotos, models, mirror grinding, binoculars and celestial

maps have all had an impact in the past. This year we really want to grab the public and let people know we exist. We need members to help man the tables. It's a very long day if there are only a few of us. The more the merrier. We also need displays so bring out something that interests you. Leading up to the Saturday event, there will be a week long series of

evening public observing culminating with the Saturday night. It should be a lot of fun. Come on out and lend a hand. Questions? Volunteering? Contact Peggy Hurley.



### Hubble Shoots the Moon

In a change of venue from peering at the distant universe, NASA's Hubble Space Telescope has taken a look at Earth's closest neighbor in space, the Moon. Hubble was aimed at one of the Moon's most dramatic and photogenic targets, the 58 mile-wide (93 km) impact crater Copernicus.

The image was taken while the Space Telescope Imaging Spectrograph (STIS) was aimed at a different part of the moon to

measure the colors of sunlight reflected off the Moon. Hubble cannot look at the Sun directly and so must use reflected light to make measurements of the Sun's spectrum. Once calibrated by measuring the Sun's spectrum, the STIS can be used to study how the planets both absorb and reflect sunlight.

**(upper left)** The Moon is so close to Earth that Hubble would need to take a mosaic of 130 pictures to cover the entire disk. This ground-based picture from Lick Observatory shows the area covered in Hubble's photomosaic with the Wide Field Planetary Camera 2.

**(center)** Hubble's crisp bird's-eye view clearly shows the ray pattern of bright dust ejected out of the crater over one billion years ago, when an asteroid larger than a mile across slammed into the Moon. Hubble can resolve features as small as 600 feet across in the terraced walls of the crater, and the hummock-like blanket of material blasted out by the meteor impact.

**(lower right)** A close-up view of Copernicus' terraced walls. Hubble can resolve features as small as 280 feet across.

Credit: John Caldwell (York University, Ontario), Alex Storrs (STScI), and NASA



## 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](mailto: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 (WP6.1 for windows preferred) via E-mail or 3.5" DOS floppy disk

Our Web page can be found at:

<http://www1.kingston.net/~rasc>

### 1999 Officers and Executive Council

**President:** Doug Angle

**Vice President:** Laura Gagné

**Secretary:** Kim Hay

**Treasurer:** John Hurley

**Editor:** Kevin Kell

**National Council Rep:** Susan Gagnon

**Librarian:** Brenda Shaw

**Honorary President:** David Levy

### Committee Chairs:

Observing Group: Tom Dean

ATM Group: Kendra Angle

Youth Group: Brenda Shaw

Astronomy Day: Peggy Hurley

Publicity: Kim Hay

To Send E-mail to all members of the Kingston Executive, address it to: <[rascexec@cliff.path.queensu.ca](mailto:rascexec@cliff.path.queensu.ca)>

To join the National E-mail List, send a message to:

<[listserv@astrotech.stmarys.ca](mailto:listserv@astrotech.stmarys.ca)>

In the body of the message put:

subscribe raslist 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

When: Friday May 14 Prof RN Henriksen - cosmology, dark matter, new discoveries

Friday Jun 11 Don Matrianni (Kingston Centre) on NASA

Friday Jul 9 Speaker: TBA. GA Reports

Friday Aug 13 Annual BBQ Meeting at the home of Mark

Kaye

Friday Sep 10 Denise Sabatini - Archaeoastronomy - civilization to be announced later

\* Friday Oct 1 (thanksgiving Mon 11th) Roger Hill - How to build an observatory for \$500

Friday Nov 12 Annual Elections and General Meeting

Friday Dec 10 TBA

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

**W**here: 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).



The Sky is the Limit Festival '98  
(this year Saturday July 3<sup>rd</sup>, 1999 at Lemoine Point)

Regulus is published 6 times per year. Views and opinions expressed herein do not necessarily reflect the official position of the Royal Astronomical Society of Canada or its officers and members.

**Subscriptions:** Members of the Kingston Centre receive Regulus as a benefit of membership. Advertisements are free to members of the Centre. Commercial advertising is \$10/quarter, \$20/half page, \$50/ full page and should be in electronic format.

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## From The Editor

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

### Welcome new members:

Ian Levstein (ex-Past-President-for-life, no less!)  
Micheal Drew, Brad Sherwin, George Wiens, Fred Werthman, Richard Baccarri, S. E. Quesnel

### Change of address:

Brenda Shaw (New email)

### Changes to the Web Site in the last two months:

☆ Donation info page ☆ Realtime lunar phase image, solar image and planetary links now online. ☆ Education Group page ☆ Slide set documentation ☆ More photo album entries ☆ In the near future watch out for a section of photos from past Astronomy Days ☆

The Current Web Site Userid and Password for the secure Centre-Member-only pages are (all lower case) :

Userid: rasckington password: regulus2xena

## From The Prez

The Kingston Center continues to be very active. The booklet Careers in Astronomy was well received by the funding agency, and has even resulted in some outside sales. The education committee is reviewing the new high school curriculum, and making their plans to help the public school system. The ATM group continues to grind away at the 25", and Astronomy Day is coming up quickly.

All together, there are lots of things to get involved with. All you need to do now is get involved! If any of these activities interest you, contact the committee chair, or one of the executive, listed in every issue of Regulus, or me. Also, if you have any suggestions, ideas or comments, please let us know as well. I am particularly interested in opinions from our remote members, as many of our activities require a local presence.

## From The Secretary

**March 12,1999 Kingston Centre-RASC General Meeting** Start 8:05 p.m.

Guest Speaker: Michael Watson, Unattached Member  
Topic: Computer Simulations Using Redshift and ECU

**Secretary Report (KimHay):** Newsletters arrived, a card of sympathy being passed around for signatures to send to Father Lucien Kemble's remaining sister in British Columbia.

**Treasurer's Report (John Hurley):** 1999 Calendars still left, New Bog's available from National purchase for \$10.00 to Centre's selling for \$12.00. Soft cover bound with title on side, blue in colour. The finance report was given from December till now, if any questions or wish to see figures please contact John.

**National Council Report (Alt-Rep Tom Dean):** The National Council meeting was held in Toronto on March 6-7, 1999. A report was given on the various motions and heated topics, such as family memberships, different awards. A more detailed account was submitted to the executive. The final minutes will be available to all members from the website once the National Recorder (Peter Jedicke) has them done.

**Observing Chair (Tom Dean):** This month's members observing night will be held at Fred Werthman's home. A map will be supplied to anyone wishing to go. There has been talk of Observing sessions at Murney Tower the week of Astronomy Week, which is the week of May 17-22, 1999. Details to be worked out with the Astronomy day Co-ordinator. It is with great pleasure that Tom presented to Leo Enright his NGC Certificate for finding all 110 Deep Sky Objects.

**ATM Chair (Kendra Angle):** The grinding is still going on the 25-inch mirror. Target is .343" and so far as to date we are at .02 ". Next ATM Meeting will be at Doug Angle's March 21,1999 at 2:00 p.m.

**Astronomy Day Co-ordinator (Peggy Hurley):** According to the Official International Book, Astronomy Day is April 24 Th, however the RASC Calendar and the date given by the National Astronomy Day Co-ordinator is May 22,1999. As of yet, a mall has not been booked yet.

**Library Report (Brenda Shaw):** A book was donated by Hank (via Laura) to the Library, Children of the Sun, by Arthur John L'Hommedieu. It is a pull out book of the solar system.

**Youth Group Report (Brenda Shaw):** Next meeting is Marching 27,1999 at 2:00 p.m. room D216. The Youth Group Committee will be contacted for an upcoming meeting.

**Vice President (Laura Gagne):** Nothing to report.

**Education Chair (Laura Gagne):** There will be a meeting of the Education Committee at my place March 19,1999 at 8:00 p.m. Topics for discussion will be budgets for the year.

Other Topics from members: **Ruth Hicks** announced that she received a tape and information on the 2nd annual



Manitou Star Party, being held August 10-15, 1999 at Gordon Park & Carter Bay Resort, Manitoulin Island. Contact Mark Oldfield at 1687 Carol Street, Val Caron, Ontario P3N 1H1, or at 1-705-897-4518 or [moldfiel@ctv.ca](mailto:moldfiel@ctv.ca). There are also some registration forms available from Kim Hay.

**Mark Kaye** had some slides on trying a new focusing instrument. He also had some lunar shots, Aldebaran and moon occultation using P200 film.

**Leo Enright** showed slides of Jupiter/Venus Conjunction, and how it progressed over the days. He had a shot of Mercury, Jupiter, Venus, and Saturn.

Our Guest Speaker tonight is Michael Watson from Toronto, who gave us a great in depth comparison on using computer simulations for conjunctions and occultation's using the programs Red Shift (currently version 3 is out, with Michael's preference being Red Shift II.) and ECU (Earth Centred Universe) written by Dave Lane. He uses both of these programs side by side for Astronomical Events. There are many configuration files that can be accessed for the planets and years of conjunctions, occultation's. These were created using information supplied by Sky & Telescope. For example he had loaded the Cairo observation of the conjunction of the Planets, (which is thought to be the Bethlehem star). Accuracy with these programs is very important. Most astronomical programs are graphically good for showing the movement of the planets. Michael showed us the movement of the planets, plus the retrograde motion of the orbits. Also shown was the illusion of Venus on the limb of the sun, which makes Venus look like it hardly moves then takes off across the sun.

It was a very interesting presentation. I asked later if Michael used Starry Nights at all, but he said that he had not tested it as of yet, though he does own a copy. Kim Hay, Secretary, Kingston Centre RASC

### **Kingston Centre General Meeting April 9, 1999-**

**Guest Speaker** John Percy from University of Toronto

**Topic:** Astronomy in our Schools and how you can help.

The meeting started with our guest speakers talk. Dr. John Percy from the University of Toronto, is very involved in bringing Astronomy to the classroom. This year, at the 1999 General Assembly, there will be a 3 day teachers workshop starting Sunday afternoon. The hope is to try and help as many teachers, caregivers and educators as possible, with the new curriculum that has been passed down from the Provincial Government. This includes both the public and secondary schools. The new Secondary curriculum has just been released this spring by Dave Johnson, Minister of

Education. If anyone is interested in what the new curriculum's for both levels are you can write to the Ministry of Education and they will send you the information. The Ministry of Education also has a website <http://www.edu.gov.on.ca/eng/welcome.html>

### **Why is Astronomy useful?**

It is used to illustrate concepts of physical science, light and gravity. It deals with cosmic origins, and our place in time and space. It has the historical, philosophical and multicultural connections.

In our current education system, Astronomy is taught at the Grade 6 and 9 levels. Statistics show where the Grade 7 & 8 fit in, with Canada in the middle or bottom of the list compared to other countries, depending on how the statistics are presented. In a US survey of gain/loss of knowledge in Astronomy that was taught in high school, from the information gathered showed that the students did not know anymore at the end of the year than when they started. A main reason for this observation, information overload. This survey is from Andrew Ahlgren, from the American Association for the Advancement of Science, who created a project called "Project 2061" (the year that Halley's comet returns).

Project 2061 of the American Association for the Advancement of Science is dedicated to reforming K-12 science education nationwide..

You can receive more information on this project from Andrew by contacting him by email at [aahlgren@aaas.org](mailto:aahlgren@aaas.org). or visit <http://project2061.aaas.org/>

The Society of the Pacific, has a good Astronomy Education program set up that can help educators. It is the "Project Astro". Books and information are available at the following website: <http://www.aspsky.org/>

### **The current issues in the schools are :**

- Getting the right science into the curriculum
- Age appropriate
- Understanding students misconceptions
- Effective teaching and learning methods
- Simple, inexpensive, hands on activities
- Pre-service and in service teacher support
- Reaching under served groups
- Cultivating science as an interest in a career.

There are two teaching systems in the world, the American and European (classical teaching). The best way to reach a student, is when taught through an activity based on hands on approach. The School Boards all across Canada tried to help by the Pan-Canadian Science Project. This was from grades K through 12. It was a government based project that



has lasted a few years. Research in the US showed that by teaching a bit of science in every year helped the student to grasp more. In the elementary grades, they are taught Earth Sciences, with the Grade 6 being taught Astronomy. In the high school level, grades 9 and 10 are taught Earth and Space Sciences (both the applied and academic). It is up to everyone to try and help our students become involved in astronomy and there are now several places for teachers, educators, and parents to achieve information to help.

**Project Astro-** The how to Manual for Teachers and Astronomers available from the ASP (url listed above) Lets talk Science- Outreach programs and teachers workshops from the University of Western Ontario- Bonnie Schmidt

Science Outreach- undergraduates to work with the educators with hands on activities- University of Toronto Project Star- ASP Teachers can get a free newsletter by using the schools letter head send it to the ASP, call at 1-800-335-2624 or go to the website at <http://www.aspsky.org/> Also available "The Universe at your fingertips" for \$29.95 US, binder with 800 pages of information.

Astronomy Kit- Ontario Science Centre  
Innovators in the school- Ontario Science Centre  
The AAVSO has a project on Astrophysics based on a database from observers data, you can see this at <http://www.aavso.org/>  
Parents Council in the schools, can help bring these items to the schools  
Local Astronomy clubs, helping with Cubs, Guides, Brownies and local observing nights.

At 9:45 after a short break the reports from the executive were read.

**Treasurer( John Hurley)** We should have a balanced budget this year. On the Youth Group front, all money that was allocated for the project has been spent.

**Secretary: ( Kim Hay)** News letters from other centres, we have a letter from a member, B. Morin on some astrophotography problems and would like some help, slides provided.

A poster board is put together on all the star party information that we have, if you are looking for anything on Starfest, Saskatoon Summer Star Party, The Great Manitou Star Party, contact Kim Hay at 353-1189 or [kimhay@kingston.net](mailto:kimhay@kingston.net)

**Librarian (Brenda Shaw)** New books in the library, not catalogued yet. A new video was donated by Don Mastriani

**Youth group: ( Brenda Shaw)** Speaker Brenda Shaw on

Meteorites and Impacts, in room B216 at MacCorrey Hall.

**ATM( Kendra Angle)** Report given by Tom Dean, since Kendra was at the Science Fair. The 8" needs a new secondary made. Work is still going on the 25" mirror. As of this date the mirror was at .277 need .343

**Observing(Tom Dean):** April 20,1999 there will be public observing session at Murney Tower. In February there were over 100 people, mainly the conjunction had a great show, in March 40-50 people. Times from observing, 8:30 to 10:00 pm On April 17,1999 Private Observing session for members only at John & Peggy Hurley's place in Sharbot Lake. Also if anyone is interested in the book offered by the Saskatoon Centre "Astrophotography" let Tom know. Cost is \$15.00 per book, but if a large order sent, price could be discounted.

Astronomy Day is May 22,1999. We would like to have observing sessions all week long. Daytime, Solar and nighttime at Murney Tower. Please contact Tom for information to help out.

Also looking for volunteers for the Fireball Hotline.

**Astronomy Day Co-ordinator(Peggy Hurley)** This year it will be at the Frontenac Mall, at the Food Basics end. We will have 6 tables with electricity. Material needs to be brought in early in the morning and can not be taken down until the Mall closes.

**Education Committee( Laura Gagné):** The goal is to get information into the Education system on Astronomy by September, in both levels of teaching, however will concentrate on the elementary level. There may be a possibility of a seminar for teachers.

**Information from other Members:**

Christine Kulyk had some price lists from Preceptor, and editions of Equinox with a story that she wrote called Pursuits for sale. Also a new magazine for the Kingston Area that she is working on called Kingston Life will be available in bookstores. Currently on 2 issues will be run this year.

We had the slide presentation on B.Morin's slides and the problems that he is encountering. On advise from several members present, they suggest, to stay away from ASA 200 film when shooting the moon, use an ASA100 film, and take shorter exposure times to eliminate the over exposure. The flashing is caused by internal reflection. It was also suggested that he use a finer filter screen. A fax was sent to B.Morin on the information.

The night ended after 10:30 pm with those who wanted to attend to go to Harvey's on Bath Road.

**Next meeting,** May 14,1999 at 8:00 pm, Guest Speaker: Prof. RN Henriksen (Queen's University)



Submitted Kim Hay Secretary

## National News

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

As of May 1, 1999, the National Office will officially take over the handling /processing of RASC memberships. All renewals, new membership applications, address changes, problems (hopefully few!) should be directed to National Office.

Isaac McGillis will be the Membership Coordinator at National Office, handling most of the memberships. His email is: [member@rasc.ca](mailto:member@rasc.ca), the phone number: 416-924-7973, ext. 1 or 1-888-924-7973, fax: 416-924-2911.

Once a week, UTP will forward to National Office any membership items, which UTP receives.

Continue to use the UTP membership form for the present. We have a new membership application form drafted, but it is not completely ready yet. We will send you copies as soon as we have them, presumably some time in May. Cheques should now be made out to the RASC rather than UTP. Clear skies, Bonnie

## Youth Group News

The Careers in Space Booklet has come back from it's 2<sup>nd</sup> printing. Demand from various training boards around the area causes a 2<sup>nd</sup> run of 500. We are reselling them at \$3/copy and hopefully will make a little money out of this project for future Youth Group activities.

## Observing Group News

March was cloudy with a few breaks. April 17<sup>th</sup> was completely clouded out and it even rained a bit.

### 1999 Observing Group Schedule

Contact Tom Dean for Directions.

**Saturday 1999 May 15th:** at the home of Tessa Clarke, near Kingston Mills

**Saturday 1998 June 12th :** at the home of Steve Manders, near Railton

New Equipment in the **Loan Program:**

Binoc Set #1: Bushnell 7x50 Binoculars, tripod and binocular adapter.

Binoc Set #2: Bausch & Lomb 7x50 Binoculars, tripod and binocular adapter.



Binoc Set #3: Bausch & Lomb 10x50 Binoculars, tripod and binocular adapter.

## 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.

The next scheduled dates are:

**Tuesday May 18th 8:30-10:00 pm**

**Tuesday June 9:00-10:00 pm**

## ATM Group News

The 8" has now been painted, and most of the parts assembled. The equatorial table has only just been started. We are still rough grinding the 25". At first we ground quickly because we ground a small area in the middle but as we progressed we ground a larger and larger area, so it appears to go slower and slower. Recent measurements show the total depth is 0.300". We need to go to 0.335". We are expecting 12-15 hours more of rough grinding. If you would like to grind, contact Tom or Kevin. We had a 16" mirror blank donated to us. We will leave that to a later project. We will be putting the 25" on the grinding machine when rough grinding is complete, so if you are, or will be using the grinding machine to grind a mirror, you may want to finish grinding quickly. If you want a 7" blank contact Kendra Angle.



## Fireball Group

Submitted by Tom Dean

Fireball Report Line: 533-6000 ext 77608.

Fireball Web reporting form:

<http://www.astro.queensu.ca/~irwin/fireballs/fbhome.html>

## Submissions from Members

### SETI@Home

<http://setiathome.ssl.berkeley.edu/>

SETI@home is a scientific experiment that will harness the power of hundreds of thousands of Internet-connected computers in the Search for Extra-Terrestrial Intelligence (SETI). You can participate by running a screensaver program that downloads and analyses radio telescope data. There's a small but captivating possibility that your computer will detect the faint murmur of a civilization beyond Earth.

SETI@home started in April 1999. Software for Unix machines is now available for downloading. Versions for the PC will be available on or about May 15th.

On Kevin's 486 dx2-66 computer running Linux, it can process one packet of data in about 20 hours. On Tom's PentiumII-333 running Linux, it can process one packet in about 2 hours. We will see how well the windows based screen savers compare.

### How to select a telescope – a different perspective

#### Part II - build or buy? by Doug Angle

We are looking at the considerations in acquiring a new telescope. Perhaps you have outgrown binoculars or been stricken with "aperture fever". But there are so many confusing choices, and not always clear choices. I've made this choice a couple of times, and in this series of articles, I will give my perspective on the issue. Last time we looked at the relative merits of refractors, Newtonian reflectors, and SCT's. In this installment, we will consider the merits of building our own instrument.

Amateur telescope making goes back right to the beginning. Galileo, Newton, Huygens, Herschel, in fact all the early contributors to astronomy started by building their own instruments. Richley started as an amateur telescope maker, then went on to grind and polish the big glass at Palomar.

The next major telescope advancement – the Hubble Space Telescope – was built by professionals, and look what happened to it!

Well, ok, we aren't going to build a 2 billion dollar instrument suitable for launch. It is, however, entirely practical to build an instrument as good or better than commercially available equipment. The simplest telescope to build is the Newtonian reflector. I believe it is also the best all-round telescope in use. So let's look at what it would take to build a simple, Newtonian telescope.

"The mirror's the thing" as Scientific American's Amateur Telescope Making says. More precisely, a layer of aluminum only about 70 nm (yes, that nano-meters, about 2 millionths of an inch) thick. This is supported by a piece of glass, usually 1-2 inches thick, and that is where we will put most of the effort.

Traditionally, two glass disks were used, one which will become the mirror, and a second used as a grinding tool. Abrasive grit is spread between the two, with some water, and the upper disk pushed back and forth. The upper disk would eventually wear concave, and the lower one convex. Using this method, the center will wear about twice as fast as the edge, so much more glass is removed than is necessary to get the right shape. Instead, many builders now use a metal disk or ring about half the size of the mirror blank for the initial grinding. This wears the center much faster, and will give the desired curve quicker. Once the correct depth is reached, the metal disk is discarded. Plaster is then cast against this curve, and when dry, coated with ceramic tiles. The tool has now been formed to the right shape without having to grind it that way.

The mirror and tool are now ground together using progressively finer abrasives to remove the rough surface left by the initial grinding. During this process, the two disks form nearly perfectly spherical shapes, which happens to be very close to the final shape we want. So close is it that we can safely ignore any testing until the mirror is fully polished. Fine grinding is continued down to a grit size of about 10 microns, equivalent to about 1500 to 2000 grit. Then the tool is covered in melted pitch and coated with polishing compound, usually rouge. The back and forth motion is continued until the glass is fully polished. Again, this is not particularly difficult. The only problem is that pitch and rouge are the two messiest substances known to man. I am convinced that King Midas was really a telescope maker, and that the Greek word for "rouge" was mis-translated as "gold".



The polished mirror can now be examined to determine how close to the correct shape it is. This is accomplished by illuminating the mirror with light from a pinhole or slit at the center of curvature. Where the light returns to a focus a knife edge cuts the beam. Imperfections in the mirror will send the light rays somewhere other than the correct focus, and either hit the knife edge, or miss by a (relatively) wide margin. You will see a series of bright and dark shadows that represents the shape of the mirror. The test is sensitive to about 1/50 th wave or better, equivalent to the diameter of the average atom! It now remains simply to remove a little more glass in the high spots until the surface profile is better than 1/8<sup>th</sup> the wavelength of light, or about 70 nm or 2 1/2 millionths of an inch. In practice, this involves some trial and error, frequent testing, and a moderate dose of patience.

To put this in perspective, Kendra (age 12) ground, polished, and figured a 7" mirror in 31 hours. The finished mirror tests much better than 1/8<sup>th</sup> wave, except for the very edge (a common problem for beginners). It performs as well as any telescope it's size, and better than many commercial scopes. Cost of the completed scope is about \$200, about 1/4 the cost of buying a new scope of that size.

If you do decide to build a telescope, there are two things that can help you, and improve the odds of success. One is the grinding machine the center owns. This won't reduce the time a lot, but does cut down on the tedium of hand grinding. The other is the ATM group. Before you proceed on your own, contact a member of the group and we will give more detailed advice, as well as help along the way.

The remaining aspects of building the tube and mount will be left to another article.

**next: What size should I build?**

### RASC Kingston Centre Donation Info

from <http://www1.kingston.net/~rasc/donate.htm>

We are actively seeking donations of money and/or equipment from our own members, the public at large and local companies.

Contributions can be specifically earmarked for any one of the following projects, or not targeted at all:

**ATM Group:** 62cm (25") f4.5 telescope. Currently under construction (1999 January) Estimated completion Date 2000 December 1st

**Observing Group:** A permanent observatory building to

house the 62cm (25") scope (Planned for the end of 2000)

**Observing Group:** Regular monthly public observing sessions have been in place since the summer of 1998 and we fully intend to continue indefinitely. A little funding is needed for handouts, signage, and advertising.

#### Centre library collection

**Equipment Loan Program** (The acquisition list includes: \*good\* high end binoculars, smaller 10cm (4") reflecting scopes for beginners, higher end accessories (Solar filter, eyepieces, CCD camera, solar observing telescope)

**Education Group:** Funding to help bring astronomy into our schools. Publishing aid with brochures, teaching booklets, slide sets, etc.

**Newsletter:** Like the newsletter? Want to see more of it or more often? We are considering options like colour, more pages, more issues, etc.

**Youth Group:** Started in 1998 with external funding which has now ceased, we are trying to continue monthly youth group activities.

**Awards Group:** Funding for new award programs is needed

**Light Pollution Activities:** mainly needed for Public Education material.

Donations of material is also encouraged. Some examples are: binoculars, telescopes, eyepieces, dew-zapping accessories, ATM accessories, books, slides, laptop computers (old 386-486 would be fine for telescope control). Donations of more than \$10 may be eligible for tax receipts. Please contact our Centre Treasurer for more details.

Donations in the 1990's for Kingston Centre

1999	\$0 (to date)
1998	\$325
1997	\$101
1996	\$15
1995	\$229
1994	\$217
1993	\$330
1992	\$215
1991	\$51
1990	\$0

To aid us in the corporate fundraising side of this project, we ask a favour from you. If you do any public service work (ie school visits, star nights, provincial park talks, etc) in the name of the Centre, could you please request a thank you letter from the organization you helped out and pass it on to us. Having a good public service track records does wonders



when applying for any kind of funding or donations.

In April the Centre dropped off 5 copies of the 1998 Observers Handbooks at the Kingston Public Library Turner Branch. Yes they do indeed accept donations of reference books. The 5 copies will be spread throughout the other branches. We have approx 100 copies from National Office and are handing them out at public events as a reference (a lot of material doesn't change from year to year) and PR (look what you get when you join).

If anyone has any back issues of any astronomy magazine that they no longer want, Kevin Kell or Susan Gagnon can distribute them throughout the Kingston General Hospital via the volunteer staff in place. They are always looking for more material (preferably newer rather than older, but what the heck).

#### **SUSPECTED VARIABLE STAR BM ERIDANI**

Submitted by Ray Berg, Crown Point, Indiana  
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In 1943, the star BM Eridani abruptly dropped in brightness from the 7th magnitude down to the 9th, and didn't regain it's composure until the following year. The best theory at that time (and still suggested today) is that the change was due to an eclipse of the star by a close companion. A search was made of earlier photographic plates to determine the period of this suspected eclipsing binary. However, a similar minimum could not be found for as far back as plates were available, to 1889. If the star is indeed an eclipsing binary system, this would mean an incredible period of 55 years or more. It would also infer that the next dimming of the star would not take place until 1998 or later.

Intrigued by the possibility of catching the next dimming, if it ever does occur, I began monitoring BM Eridani in the late summer of 1998. Checking the brightness every clear night of a star that has remained unchanged for 55 years is not particularly exciting, but it only takes a minute to quickly note its brightness with binoculars as it is quite easy to locate. It lies less than a degree due south of the magnificent triple star system Omicron 2 Eridani, right next to the 5th magnitude star 39 Eridani. With a spectral type of M6, it is quite red and at 7th magnitude, it is readily visible in the binoculars. I began monitoring this suspected variable star in the early morning hours of August, 1998 and have checked it at every opportunity until late April, 1999 when it was lost in the early evening twilight. To date, no change in brightness has been noted, but the quest will resume next

August. The biggest question in my mind is whether this variable star will ever become active again within my lifetime.

Meanwhile, to keep things a little more interesting, I have also been following the eclipsing binary YY Eridani, which is in the same field of view as the suspected variable. This binary really does vary often, with eclipses occurring about every four hours. The total brightness variation is not great, from magnitude 7.7 to 8.4, but with care the changes can be visually measured to check the period, which itself varies slightly. Thus, over a 4 year interval, small period changes have accumulated to a deviation of 15 minutes in the predicted time of eclipses.

#### **STARFEST '99 [JULY 15-18, 1999]**

The North York Astronomical Association invites you to attend its annual astronomy convention.

Starfest is Canada's largest annual observing convention and star party. It attracts over nine hundred astronomy enthusiasts from Ontario, and neighbouring provinces and states. It has been ranked among the top seven star parties in North America by Sky and Telescope magazine.

Starfest offers a wide variety of observing-oriented activities that address the needs and interests of experienced observers and astrophotographers, as well as those of people new to the hobby. Activities include observing sessions, formal and informal slide presentations, workshops, commercial exhibits, and a children's program. You are invited to bring your telescope, astronomical images, and share your observing experiences with others.

#### **STARFEST '99 [JULY 15-18, 1999]**

See <http://www.interlog.com/~nyaa/> for more info.

## **News from the Net**

### **Lunar Data Support Idea That Collision Split Earth, Moon**

Analysis of data from NASA's Lunar Prospector spacecraft has confirmed that the Moon has a small core, supporting the theory that the bulk of the Moon was ripped away from the early Earth when an object the size of Mars collided with the Earth.

Scientists presented this result and other findings in a series of papers at the 30th Lunar and Planetary Science Conference in Houston, TX. Their data show that the lunar core contains less than four percent of the Moon's total mass,



with the probable value being two percent or slightly less. This is very small when compared with the Earth, whose iron core contains approximately 30 percent of the planet's mass. "This is a critical finding in helping scientists determine how the Earth and Moon formed," said Dr. Alan Binder of the Lunar Research Institute, Tucson, AZ, principal investigator for Lunar Prospector.

"Further analysis of Lunar Prospector data to refine the exact size of the lunar core and the amounts of elements like gold, platinum and iridium in lunar rocks -- all of which are concentrated with metallic iron -- is required," Binder added. "This will do much to pin down for good if the 'giant impact' model of the formation of the Moon is correct, or if the Moon formed in a different manner."

The current data come from gravity measurements conducted by Dr. Alex Konopliv of NASA's Jet Propulsion Laboratory, Pasadena, CA. His results indicate that the Moon's core radius is between 140 and 280 miles (220 and 450 kilometers). This result is consistent with independent magnetic data, evaluated by Dr. Lon Hood of the University of Arizona, Tucson, which suggest that the core radius is between 180 and 260 miles (300 and 425 km).

Lunar Prospector conducted its primary mapping mission at an altitude of 63 miles (100 kilometers) for almost one year after its arrival in lunar orbit on Jan. 11, 1998. In December and January, the spacecraft's altitude was lowered to approximately 15 miles by 23 miles (24 kilometers by 37 kilometers). Analyses of data from the lower-altitude observations are expected to further improve scientific understanding of the origin, evolution and physical resources of the Moon.

Further information about Lunar Prospector, its science data return, and relevant charts and graphics can be found on the project website at: <http://lunar.arc.nasa.gov/>

### Space Tourism Company Shuts Down

A Texas company that was planning to launch paying passengers on a reusable suborbital rocket from the Gulf of Mexico has gone out of business, the Houston Chronicle reports.

Advent Launch Services, who planned to build the "Mayflower" rocket to launch members of its Civilian Astronauts Corps (CAC), shut down operations within the last few weeks and started refunding fares

already paid to the company.

**Hubble Hits: The Hubble Space Telescope** has been struck nearly 800 times by micrometeorites and space junk, and the rate of impacts may be increasing, according to a report. Engineers at NASA's Johnson Space Center studied detailed video of the telescope taken during the February 1997 servicing mission and found 788 impacts visible on the surface of the telescope. Most are less than 0.8 cm (0.3 inches) in diameter, with the largest 4.7 cm (1.85 inches) across. A limited comparison with lower-quality images take the 1993 servicing mission also shows evidence that the impact rate has increased, perhaps due to more orbital debris in low-Earth orbit.

### April 29, 1999 RELEASE: 99-56 MAGNETIC STRIPES PRESERVE RECORD OF ANCIENT MARS

NASA's Mars Global Surveyor has discovered surprising evidence of past movement of the Martian crust, further evidence that ancient Mars was a more dynamic, Earth-like planet than it is today.

Scientists using the spacecraft's magnetometer have discovered banded patterns of magnetic fields on the Martian surface. The adjacent magnetic bands point in opposite directions, giving these invisible stripes a striking similarity to patterns seen in the crust of Earth's sea floors. On the Earth, the sea floor spreads apart slowly at mid-oceanic ridges as new crust flows up from Earth's hot interior. Meanwhile, the direction of Earth's magnetic field reverses occasionally, resulting in alternating stripes in the new crust that carry a fossil record of the past hundreds of million years of Earth's magnetic history, a finding that validated the once-controversial theory of plate tectonics.

### Buy-Sell-N-Trade

**18 inch Super Planetary mirror set 18" f/4.33**  
[f/5 with Paracorr] Newtonian mirror, 2" thick + 3.16" diagonal, most of 18 point cell, and wooden crate.

Brand new, with new coatings. Maker: Barry Arnold, Edmonton, Alberta [Dec/97 S&Tel.p81].  
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