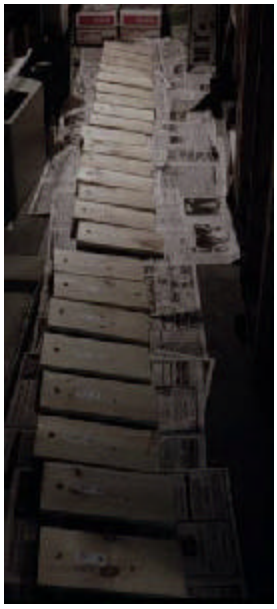
# Regulus

**Issue 1999-02** **Newsletter of the RASC Kingston Centre** **1999 March/April**

## The Great Barndoor Project of 1999

*http://www1.kingston.net/~rasc/barndoor.htm*



We've been meaning to add barndoor trackers to our inventory of projects for quite some time. Several designs were looked at and shelved due to some perceived flaw or design aspect that we just didn't like. In the summer of 1998 Starfest offered for sale non-assembled kits of a basic Type I Barndoor Tracker. Several of these were purchased on the thoughts that anything was better than nothing and our own construction project was going nowhere fast.

They were assembled onsite and testing over the next few weeks showed that we were not happy with the design of this model either. These trackers were mostly left on shelves and the project went into hiatus again.

Just before 1999 the opportunity came up with our Youth Group program to build a large number of trackers and give them to the participants.
Everyone was gung ho over this idea (most of the organizers having been interested in astrophotography for years > decades and most didn't even have their own tracker!). Time was a problem so we decided to stick with a Type I right angle drive. We found some good ideas for design modifications and Tom Dean went ahead and built a prototype over one weekend in January. A few more design changes occurred after that and materials were purchased for 35 barn doors, 30 for the group giveaway and 5 for the loan program. Sample photos were taken and the results were very good for what we were expecting (5 minute tracking). On the 1st of February, construction started.

Quickly the project took on a life of its own. What was initially thought to be a weekend and a few evenings of work turned into 120 man hours over the course of the next two weeks, every spare hour in the evening and two long weekends. Much of the time involved coming up with assembly line techniques, waiting for the varathane to dry and juggling the production order. In the haste to complete the project (and after 'way too many fumes!) on Sunday February 16th a slight assembly error occurred and wasn't noticed until all 35 units had been finished. Whups! Another two hours to disassemble, fix the problem and reassemble and the project was declared DONE!

The last regular meeting of the funded Youth Group was held Saturday Feb 27th (the youth program will continue, albeit it in a different format) and 24 trackers were handed out. We are planning to have an observing session for all of the members and their equipment in the near future. A smaller construction project with an isosceles drive Type I tracker and a double arm tracker are being planned for the near future, to allow members to borrow from the Loan Program and see the tracking accuracy differences for themselves. The prototype is shown below. More information is available on the web page listed above: parts list, handout of instructions, ideas for upgrades, links to other barndoor web pages and more. Complete assembly instructions will be posted at a later date.



# 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 (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***



To Send E-mail to all members of the Kingston Executive, address it to: **<*rascexec@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

Friday Jan 8th Peter Ceravolo on “"Adventures in Astrophotography: Developing and Using Modern Astrographs."
Friday Feb 12 Leo Enright (Kingston Centre)
Friday Mar 12 Michael Watson (National Treasurer) on Computer Simulations
Friday Apr 9 John Percy - Astronomy education in public schools
Friday May 14 Prof RN Henriksen - cosmology, dark matter, new discoveries
Friday Jun 11 Don Mastrianni (Kingston Centre) on NASA
Friday Jul 9 Speaker: TBA
Friday Aug 13 Annual BBQ Meeting
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

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 UTP) since the master January list was published:
Welcome new members:
Paul R. Stark, Kingston. ON
Peggy Brown Bath, ON

Change of address:
Dave Pianosi has moved to: Bath ON
William H Carlson has moved Orleans, Ontario

A short note to say that the newsletter timetable has changed slightly in order to improve the complex mailing process and to act as a meeting reminder... the newsletter will be mailed out 1 week before the meeting (on or before Friday March 5th) in hopes that when people receive it, it will remind them about the upcoming meeting.

Not For Sale:
TICKLE ME ELMO, still in box, comes with it's own
Celestron C8 EXCELLENT CONDITION $6800

# From The Secretary

## Kingston Centre RASC Meeting
## January 8, 1999

This January mother nature didn't give us ice rain, but snow and lots of it. Number attending: 20
Guest Speaker: Peter Ceravolo from the Ottawa Centre
*"Adventures in Astrophotography: Developing and using modern astrographs"*

Important notes for the Month:
Jan 13-14 Theta Orionis (Trapazium) eclipsing binary at minimum will be at 5:17-7:47 UT ( 12:17-2:47 am EST) magnitude 8
January 26-27 Lunar Occultation of Aldebaran. Disappearance at 750 UT ( 2:50 am EST)
Formula for calculating local sidereal time in 1999
LMST=6.61473504 + .0657098244 d(day- sidereal day vs day) + 1.00273790934 t (time (hours UT)sidereal day) +5.11 (longitude of your site-west of Greenwich)
Mail from November to December handed over from Laura.

**President's Report**: Doug Angle, our new president, gave an introduction to everyone
**Secretary** (Kim Hay) Kim introduced herself to the group, and asked if everyone could sign in on the sign up sheet.
**Treasurer** (John Hurley) told us that he had some 1999 calendars left
**Observing Chair**: (Tom Dean) Tom said that this months members observing session would be at Don Mastrianni's house. Which would be January 16,1999. The Public Observing session would be held on January 26,1999 at Murney Tower, and that some members of the Kingston Centre would be helping Kathy Perrett with the Queen's Open House on January 25,1999.
**ATM**: (Kendra Angle) There would be an ATM meeting on January 24,1999 at Kendra's house.
**Youth Group** (Laura Gagné & Brenda Shaw): Laura and Brenda stated that the youth group would be held on January 24, 1999 with a talk on the Sudbury Neutrino Observatory. February's youth group speaker would be Kathy Perrett from Queen's.
**National Rep** (Susan Gagnon) - Susan stated that there would be a National Council meeting on March 6-7, 1999 in Toronto. She would be unable to attend, but our alternate rep, Tom Dean would be going.
**Astronomy Day Co-ordinator:** (Peggy Hurley) Astronomy Day will be on May 22,1999 originally thought April 24, however found out the date, more details to follow. On a side note, Peggy will write a letter to Carolyn Shoemaker and her daughter in law for taking the tape of Gene Shoemakers talk at the 1997 GA and transcribing it for the Journal, Dec 1998.issue.

Our Guest Speaker tonight was **Peter Ceravolo** who is an associate editor of Telescope Making magazine. Spent some time at the National Research Centre in the optical shop, now owns Ceravolo Optical Systems. He makes a variety of professional and amateur optics including Mak-Newts. Wrote " A Practical guide to Building and Using your own interferometer" aka, kitchen interferometry. Was part of the Comet Odyssey video production team. He was the first to actually test the Rayleigh criteria by building 4 telescopes identical except for wave front error.
You can also check out
*http://www.cyanogen.com/ceravolo/index.html* and *http://www.cyanogen.com* .
Ceravolo Optical Systems is a manufacturer of custom optics and high-end astronomical telescopes. Products include specialized industrial laser optics, compact laser interferometers, and Maksutov-Newtonian Telescopes.
Peter gave us a talk on the trials and tribulations on creating the video Comet Oddessy. He showed slides of Comet



Hyakutake. Had a video tape on computer animated graphics with an explanation of how a comet comes in from outer space, encounters an object to get thrown into an orbit to the Sun. As it approaches to the sun, gysers come off the comet as it heats up. Comet Hyakutake was .1 AU from the Earth. The video team spent a 10-night duration filming the comet. Paul Boltwood at the same time used a 7-inch telescope and CCD camera and captured the head geysers of the comet. This video captured a lot of scientists around the world. They could work with raw data and watch a comet in motion, something that never had been done before. Many people were on the team of filming, computer work, editing it was a team effort. Peter also showed us a small clip of Hale Bopp coming in the solar system and to Earth. Peter got his start in capturing comets on video with Comet Divico, using a 6-inch telescope and CCD camera. In August /September 1995. After splicing the pictures together, he noticed the changes in the tail within a few seconds. So he built a telescope for photography.

We were all amazed that such beauty can be seen and captured on film. After the meeting wrapped up around 10:30 PM, we headed out to our gathering spot, Harvey's on Bath Road and closed the place. Though the snow kept falling and observing was not to be, that didn't stop the astronomers from talking about their common passion, Astronomy.

## Kingston Centre RASC Meeting February 12,1999

Snow -3C
Reports:
**Secretary** (Kim Hay) nothing to report, slow month
**Treasurer's Report** (John Hurley) Members report in from UTP for December. The question was asked if we are keeping stat files and follow up on non-renewing members. Treasurer stated we could do that and start to follow up.
**Youth Group** (Brenda Shaw) The end of the funding for the youth group is almost at hand. It is imperative that the Centre has more initiative in the group. It will be necessary to set up a Youth Group Committee. Brenda sent a sign up sheet around. The people who sign it will be notified on what the next step is.
**Library**: (Brenda Shaw) There has been an addition of several new books to the library. These books are from the youth group. The list includes the following

National Audubon Society Field guide to the Night Sky ISBN 0-679-40852-5 July 1998
The Planet Observer's Handbook by Fred Price ISBN 0521627087 1998
The Ultimate Universe by David Levy ISBN 0671012045 Nov 1998
The Complete Idiot's Guide to Astronomy by Christopher and Alan De Pree ISBN 0028621204
The Observer's Year by Patrick Moore ISBN 3540761470 1998
Do Your Ears Pop in Space? By Mike Mullane ISBN 0471 154040 1997
Gems of Hubble by Jacqueline Mitton ISBN 0521571006 1996
Comets Creators and Destroyers by David Levy ISBN 068482551
365 Starry Nights by Chet Raymo ISBN 0671766066
The Practical Astronomer by Brian Jones ISBN 0671693034 1990
Observing Variable Stars by David Levy ISBN 0521627559 1998
Summer Stargazing by Terence Dickinson ISBN 1552090140 1996
Nightwatch by Terence Dickinson (3rd ed) ISBN 1552093026 1998

Terry Dickinson donated some books (listing available later on after books catalogued). Tessa Clarke donated the tape "Comet Oddessy " By Cyanogen And Kim Hay donated a book called Aurora, The Mysterious Northern Lights by Candace Savage. A hardy thank you to all whom made contributions to the Library.

**Newsletter:** A new twist on the next newsletter. Due to the number of newsletter copies picked up and the need to work through several lists to send out newsletters the next day after a meeting, the newsletter will be sent out about a 1 1/2 weeks before the next meeting. We hope to see more members at the meetings with the subtle reminder. There is also a cut down version of the newsletter available on the Kingston Centre website http://www1.kingston.net/~rasc

**Committee Reports:**
**Observing** (Tom Dean) The last observing session was clouded out, however the next members observing session is February 13,1999 at Dough Angles. The next public observing session is on February 23 at Murney Tower off King Street. On January 25,1999 some of the Kingston Centre members was helping Kathy Perrett with the Queen's Observatory Open House. It was a good turn out with between 80-100 people. Some people were so astounded with the sites that they phoned their friends to come down. Kathy will keep us posted on the next event at the Observatory.



**ATM** (Kendra Angle) The 25 " Mirror blank is set up at Kevin and Tom's. We will be grinding the mirror to an f4.5, which means a lot of grinding to a depth of 2.4 ". Currently the measurement is at .1", roll up your sleeves and pitch in your hands, as there will be a grind -a-thon on February 20, 1999 from 10 am till 4 pm There will be an ATM meeting before hand at 9:00 am. All are welcome to come.
A sheet will be passed around for sign up times for grinding. This can give you and idea of when your turn will be.
**Education**: (Laura Gagné) Laura is looking for Committee helpers. A sign up sheet was passed around. Any help at all will be gladly appreciated. The driving force behind the Education Committee will be to educate the public on astronomy and create a resource for the teachers, classrooms, guides, cubs, brownies, beavers. Laura will be giving a talk to the 1st Barriefield Beavers group. Anyone wishing to help by giving a talk to any school is encouraged to do so.
**Astronomy Day** (Peggy Hurley) At this time the location has not been picked yet, but the Astronomy Day Chair will be working on that next week (more details later).
The International Astronomy Day is May 22,1999
**Door Prize Winners:**
Calendar - America in Space won by Ruth Hicks
Calendar - Astronomy by T.Dickinson won by Susan Gagnon
Redshift", The beverage before time". P. Hurley

**Guest Speaker: Leo Enright**
**Title: Star Atlas and the Hipparcos Astrometry Mission**
Leo gave an overview of all the different star atlases that are available now, and editions that are no longer in print. He had made a personal chart comparing different star atlases and how effective they were: (Leo if some of these notes are wrong, please send in the corrections, as this chart is very handy-Kim)

His new main item of interest, though not replacing his trusted well used star atlases, was the newly released Millenium star atlas. This collection of 3 Gores, contains the following:

Overlays are supplied to go over the charts. Stars are not binned in the Millenium Collection. Binned stars mean, different magnitudes grouped together.

It is an all sky atlas comprising over 1,058,332 stars to visual magnitude 11from the Hipparcos & Tycho Catalogues and 10,000 non-stellar objects, three times as many as any other all-sky atlas in print:

The Hipparcos Mission was launched in 1989; the Hipparcos satellite spent more than three years measuring stellar positions, brightness, and distances with unprecedented accuracy. After several additional years of painstaking data analysis, project astronomers have now begun to share the scientific fruits of this historic mission with the world.
These volumes have so much information contained on their pages, that you could take years to take it all in. You can however visit the following website for more information on the Atlas.
http://www.skypub.com/store/msa/msa.html
http://astro.estec.esa.nl/Hipparcos/hipparcos.html

Not for Sale:
1 MAN, 7 WOMAN OBSERVATORY DOME -- $850/offer

# 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>***

# Youth Group News

The Youth group had Dr. Barry Robertson, from Queen's University, talking about the Sudbury Neutrino Observatory, and both the kids and the adult hang-er-on-ers learned more about subatomic particles and the new field of neutrino astronomy that you can imagine!
The Last scheduled meeting of the existing youth group is on Saturday February 27h with guest speak Kathy Perrett, director of the Queen's Observatory.

Not for Sale:
FREE 1 CAN OF PORK & BEANS WITH PURCHASE OF 12" LX-200

# Observing Group News

Don't forget about Comet Linear doing its close passage by the North Celestial Pole this month, on March 14/15... for a number of hours, it will even appear 'stationery' to us!! It's easily visible in amateur scopes....
There is also a map showing this on page 111 of the April Sky and Tel.... yes, April. The event's in March!
- Cathy Hall

Following is from Don Machholz's Comet Comments for March... EPHEMERIDES



C/1998 M5 (LINEAR)

| Date(00UT) | R.A. (2000) | Dec | El | Sky | Mag |
|---|---|---|---|---|---|
| 03-03 | 19h42.9m | +77d30' | 89d | M | 9.0 |
| 03-08 | 19h49.2m | +82d24' | 90d | M | 9.0 |
| 03-13 | 20h03.8m | +87d29' | 92d | M | 9.1 |
| 03-18 | 07h38.5m | +87d20' | 92d | E | 9.1 |
| 03-23 | 07h52.5m | +82d09' | 93d | E | 9.2 |
| 03-28 | 07h58.9m | +77d03' | 92d | E | 9.3 |

## 1999 Observing Schedule

**Contact Tom Dean for details.**

**Saturday 1999 March 13th:** held at the home of Fred Werthman (xxx xxxx Road). Plan to arrive around sunset. From Hwy 15 & 401: Follow 15 north past Joyceville, turn east onto Sandhill Road xxxx

**Saturday 1998 April 17th:**The home of Peggy and John Hurley (Sharbot Lake) . From Kingston & the 401 Highway. Head north on Highway #38 for approx 65 km. Go through Harrowsmith, Hartington, Parham and Tichbourne. Go past Crow Lake Road (on your right), go past St. George Lake (on your left), go past Shibbley Road (on your right). You are very close now. Xxxxxxx

# 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

The next scheduled dates are:

**Tuesday March 23rd 6:00-8:00 pm**
**Tuesday April 20th 8:00-9:30 pm**

### Yes, there is interested life on Earth.

***by E. Kliptic***

Three members of the Kingston Center found out on Monday (Jan. 25, [only 11 months until Christmas]) night that "WE ARE NOT ALONE", there is interested life on Earth. In a co-operative venture the Kingston Centre is offering our services as barkers for the Queen's observatory open house nights.

Many people were aware through advertising, that there was an open house, but there also were those who were just passing by and were curious. From three year olds to seniors, all went away happy with their new or renewed view of our night sky. Many visitors were filled with honest and intelligent questions about our solar system and the equipment we use to view it.

It was surprising how many had not seen the Moon, never mind Jupiter, Saturn or M42 through a telescope before, and this is where our reward for enduring the cold comes in. For those of you who have not yet experienced the joy of treating over 150 people in two hours to the celestial delights of our night sky, you should try it. We can never have too many scopes at a public observing session.

4.5" to 10" or even a pair of mounted binoculars it does not matter. Given the light pollution in the city, you are still going to show some people sights they just cannot imagine. One example is a young woman who by character I would not expect to be the least bit interested in astronomy. After having looked at Jupiter 3 or 4 times and then Saturn and the Moon she HAD to find a pay phone to call her boyfriend, he showed up about 15 min. later, other friends in tow, and they all got their fill of the night sky. It is that kind of enthusiasm in these frigid temperatures that assures us we are not the strange nerds of yester year, but conveyors of true images of the sky around us. So, watch the newsletter for public nights and come out and join us, even if all you bring is your enthusiasm.

Hello from the wastelands of Rogues' Hollow, if you are an astronomer remember "Share the View".
Hank Bartlett and Family

### VJ Day (Tues 1999 Feb 23rd)

***by E. Kliptic***

Rasc Kingston's Public observing night for February '99 was held on VJ (Venus - Jupiter) Day, Feb. 23. Observing began around 5:00pm and when I arrived around 6:15pm it was obvious the crowd was wowed!

Unfortunately the clouds were not cooperative and some haze was drifting in constantly from the west but the larger scopes still gave a good view of the alignment. It had been my intention to check out the some of the larger scopes, but suddenly we were overwhelmed with interested observers and I never left my station. On public request I set my scope on Saturn, there it remained aimed for the next hour as people wowed at the view of the rings. Other scopes provided views of Venus & Jupiter, M42, the Moon and some of the brighter stars. There was a constant buzz of enthusiasm from the crowd as they shared experiences and impressions of what they had seen at the half dozen or so scopes set up (there was no opportunity to take an actual count or list of who was there).

More this time than previously a positive response from our guests in thanking us for being there and especially



for braving the finger and toe nipping cold (even Brenda's binoculars froze up!) was evident. Many star map handouts and RASC Kingston brochures were given out along with friendly invitations to attend a meeting. Recruiting new members is of course secondary to sharing our love for the night sky, however a warm invitation never hurts to encourage those who may be intimidated by a scientific hobby.

A big thanks to those whose schedules allowed them to be there with their scopes or just for crowd control and speaking to the public about what they were seeing. This turn out was the largest I have seen yet, good advertising and a special astronomical event sure help. As usual I would like to end with encouraging anyone who can make it to the March night to come out and join us. As the spring and summer sky unfolds there will be longer nights and more to see.

Remember, "SHARE THE VIEW".

# ATM Group News

We must have been good this year...Christmas came early to the Kingston Centre Submitted by Kim Hay, ATM Group member

As the sleigh bells rang and the mistletoe was hung with care, the Kingston Centre received an early Christmas present. What a sight to see. A 25 inch diameter, 4.5 inch thick, 170+ lbs. piece of glass that was donated to the Kingston Centre on behalf of the late Robert Venor. Ron Pow, delivered the glass to Kingston on December 5, 1998 and put it under the tree, so to speak at its resting and working place at Kevin and Tom's. We are very thankful that the Kingston Centre was thought of for this large and aggressive project.

To date the ATM members and Kingston members have started to rough grind the glass using 60 grit and a large weight approximately 10-15 lbs. We have just achieved our first grind-a-thon put on by our ATM Chair Kendra Angle. The grind-a-thon lasted for five hours and the glass is now at a modest .179 inches on its way to .333 inch depth. If you would like to tone up those arm and chest muscles have we got a job for you. If you are interesting helping out or just want to take a peek at what will be a very large part of the f/4.5 telescope , come and see for yourself. I believe that there will be many a grind-a-thon, so if you missed the first one, please feel free to come to the next. If you just want to pop by one night and pitch in, contact our ATM Chair Kendra. Stay tuned to the next issue of Regulus with an update on the 25-inch mirror.

# 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

## Cub Asronomers

*by Hank Bartlett*

Friday Feb. 5 was Cub night in Newburgh. The Napanee Cubs were having their Cub camp night in Newburgh and took advantage of the less light polluted air to achieve their Astronomy Badge (contact me at xxxx@x.x.xx if you require badge requirement info or check our web page). It was a beautiful clear night (the first, of three badge nights in the past year) and young eager eyes were treated to Jupiter, Saturn, M42 and a few brighter stars. After an hour of observing and questions we retired to indoors to warm fingers and toes. Once settled we gathered around the table for one of my favorite readings from The Universe and Beyond (by T. Dickinson)the - JOURNEY THROUGH SPACE AND TIME - on page 11, four paragraphs. I find this little story really gets the kids and adults, thinking about the emensity of our universe.

After a brief question and answer period I was rewarded with a rousy hip hip hurray and a wonderful insulated wolf cubs mug. Little did they know I had already been rewarded when the first eye peered into my eyepiece followed by WOW!

If you haven't treated yourself to this experience yet, contact a youth group and give it a try. All they expect is a little time, some knowledge and your friendship. Remember, "SHARE THE VIEW".

## Space Rocks Land at Queen's

*by Christine Kulyk*

The next time you're on the Queen's University campus, be sure to stop by Stirling Hall to see the Alice Vibert Douglas meteorite collection which has recently been mounted in a display case located near the big Foucault pendulum. The collection, consisting of five excellent specimens that belonged to the late Dr. Douglas, was recently donated to Queen's by Dr. William Hanson of Port Rowan, Ontario, who had preserved the meteorites after Dr. Douglas passed away in 1988.

Dr. Alice (Allie) Vibert Douglas is well-known to many Kingston Centre members as one of the founders of our Centre. The highest award of our Centre is named in her honour: the A. Vibert Douglas Award for Service and/or Achievement in Astronomy. Our first Centre telescope was also christened in her honour.

#2 - Two H4 chondrites recovered from Plainview, Texas, around 1935.

She was also well-known to the Queen's community: she served as Dean of Women from 1939 to 1958, and was a Professor of Astronomy from 1946 until her retirement in 1964. Among the many accomplishments of her long and distinguished international career, Dr. Douglas was honoured with the Order of the British Empire in 1918 and became an Officer of the Order of Canada in 1967. She was a Fellow of the Royal Astronomical Society in Britain and a president of the RASC. In 1967, the National Council of Jewish Women named her as one of 10 Women of the Century. In 1988, asteroid 3269 was named Vibert Douglas in her honour.

#3 - A H5 chondrite recovered from Richardton, North Dakota, in 1918.

The meteorites in the newly mounted collection were formerly used by Dr. Douglas as teaching tools. They include samples representing most of the main types of meteorites.

One is an iron meteorite believed to originate from the 50,000-year-old impact that created Meteor Crater (the Barringer crater) in Arizona. This was the first crater on Earth to be positively identified--by Dr. Eugene Shoemaker--as being caused by an impact from an extraterrestrial object, a discovery which was of paramount significance in the field of planetary science. Some 30 tons of meteoritic material have been recovered from that impact altogether.

#4 - Sliced, etched iron meteorite from the Henbury crater field in Australia.

Two H4 chondrites come from Plainview, Texas, where 900 stones were collected from a 26-km field around 1935, following a bright fireball that had been seen in the area around 1903. One of the two, known as an "oriented" stone, has a distinct pyramidal shape produced during its passage through Earth's atmosphere.

The H5 chondrite comes from a fall at Richardton, North Dakota, on June 30, 1918, where a fireball had been observed on the day of recovery. It has a black fusion crust that is still intact.

A second iron meteorite shows a striking silver colour. The rock has been cut and etched to reveal a crystalline pattern (known as a Widmanstaetten pattern), characteristic of nickel-iron alloys, that indicates slow cooling, probably originating in a planetesimal from the early stages of formation of our solar system. This meteorite comes from the Henbury crater field in Australia's Northern Territory. REGULUS readers will recall an article titled "Exploring Australian Meteor Craters" in the May/June 1998 issue, in which Kingston Centre member Ray Berg of Crown Point, Indiana, described his visit to the site, consisting of 13 small craters. The impacts that created the craters are believed to have been produced by a meteoroid swarm 30,000 to 75,000 years ago.

Queen's Physics Department was delighted to receive and display the Alice Vibert Douglas meteorite collection in Stirling Hall, giving visitors and students the opportunity to learn firsthand about meteorite composition.

This display and the nearby historical displays of astronomical equipment and teaching tools, maintained by Bernie Ziomkiewicz of the Physics Department, are well worth a look on your next visit to Queen's.

Thanks to Dr. Judith Irwin and Kathy Perrett of Queen's University for information used in the above article; to Dr. Richard Herd of the National Meteorite Collection in Ottawa for meteorite identification and information; and to Scott Young for the photographs.
All photos by Scott Young.

#1 - Iron meteorite, probably from the 50,000-year-old Barringer crater in Arizona.

## How to select a telescope – a different perspective

*by Doug Angle*

**Part one - refractor or reflector?**

So you've gotten into astronomy, and outgrown binoculars. You are looking at acquiring a telescope. But there are so many confusing choices. Do you build or buy? Refractor or reflector? How big? I've made this choice a couple of times, and in this series of articles, I will give my



perspective on the issue. I hope this will give some ideas and help make your decisions a little easier.

First, let's look at the big picture: what kind of telescope is best?

Often you will hear that refractors are for planetary observing and reflectors for deep sky. The basis for this statement is that refractors, for the same aperture, give higher resolution and better contrast due to the lack of a central obstruction.

Let's examine this in a little more detail. While stars are essentially point sources, the image in a telescope is actually a small disk, surrounded by a series of faint rings. If there is no central obstruction, the disk will have a diameter of 120/D where D is the diameter of the telescope in mm. A central obstruction changes this pattern so the disk is smaller, and the rings are brighter. Thus, the resolution is actually better, for some kinds of objects, in a reflector. (but don't count on this for too much)

It's true that the central obstruction does reduce contrast, again by spreading the light from the diffraction disk. However, experiments have shown that this effect is not visible until the obstruction is more than 20% of the aperture, and not noticeable below 25%.

I think the main reason people associate refractors with planetary work is that they used to only be available in long focal lengths – f/15 or higher. It is then easier to get high magnifications, but tends to be poor for wide fields. Thus, the only thing you will enjoy looking at is planets.

The real considerations, however, have little to do with resolution. Even if a refractor and a reflector of the same size gave the same image, that isn't the right comparison to make. A six inch refractor is a large, expensive instrument, probably about 7 feet long, and a couple thousand dollars. A six inch reflector, however, is a starter instrument. The real choices are not what do I see per inch of aperture, but what can I see per dollar and per pound of telescope. Also, will it fit in my car? All of these considerations favour the reflector.

For example, an 8" f/4.5 Newtonian reflector will be about 3 feet long, so it will fit most cars easily. It can be carried by one person. Best, it can be built for about $200 or purchased for under $1000. Yet it will have 4 times the light gathering power, and twice the resolution of a 4" refractor. That refractor will be about 9 feet long so it will have to ride on the roof racks. It will be proportionately heavier, and probably about the same cost.

Schmidt-Cassegrain Telescopes or SCT's are also small and light for their aperture, and so can be convenient in use. The reason I don't recommend them is that they are often paired with heavy, expensive, yet inadequate mounts. Thus you are paying a lot more for the amount of aperture you get. Also, most have a relatively large secondary mirror, and so the loss of contrast starts to become noticeable. Never the less, SCT's are popular, and can be a satisfactory telescope.

Of course, the final choice is up to you. It will depend on how much you need to transport your scope, and how easily you can handle large, awkward loads. Mostly, your budget will determine your choice. All things considered, however, the short focus Newtonian reflector, on an alt-azimuth mount is hard to beat.

There is one exception to the above rule. The one thing that Newtonian reflectors can't do is give a very wide field. For this, the undisputed champion is the apochromatic refractor. About 10 years ago I was shopping for a new telescope, and this was my choice. My 4" refractor is only 22 inches long, and weighs in at 15 lbs. It will fit as carry-on luggage in an airplane. It can deliver an awe inspiring 4.8 degrees of field, in a 2" eyepiece, so it will fit all of the Pleiades, or the coat hanger asterism. If I had the camera for it, the diffraction limited field is 2.7" in diameter. The only bad side to this is that apochromats require special glasses and extreme accuracy in fabrication. Consequently, it takes some really serious cash to get one.

Next – build my own telescope or purchase commercial?

**THE LAKE AT DAWN - AN OBSERVER'S ODYSSEY**

*by Laura Gagné*

The world lay blanketed in thick darkness. Only the shadows of things could be perceived. Tall pines gathered around the meadow in solemn ceremony, their forms sharply silhouetted against the moon-kissed sky. Blacks and greys competed for dominance in the shadows cast by the moon, while the other colours slept in darkness. A crippled dirt road stumbled through the forest, tumbling up and down hills until it reached a lonely gate. It crawled under the barrier and limped across the meadow, disappearing into the trees once more. The meadow undulated like the sculpted waves of an ocean frozen in time which flowed from the edge of the forest to the shores of a small lake. The glassy surface of the water mirrored the beauty of a star-sprinkled sky, sparkling and glittering with a myriad of twinkling points of silver light. Jupiter shone unblinking from his seat in the heavens as a gibbous moon watched over the land. The glory of the milky way hung reluctantly in the west, bidding adieu to the night sky until its vernal reawakening.

Cautious creatures moved carefully in the underbrush, knowing that a danger lurked in the shadows, stalking unwary prey. Tall trees bowed their heads, nodding wisely



and whispering to one another in the breeze. The air was alive with unseen sounds. Crickets chirred their shrill encouragements to one another, singing "cheer up, cheer up!" as though in optimistic anticipation of the dawn. Overhead a majestic horned owl floated from treetop to treetop, mournfully calling "who, who?" in a mournful voice. In the distance wolves howled lonely laments to each other across the still black lake. The lake was surrounded by a chorus of frogs; small ones singing "creep, creeep, creeeep" while big bullfrogs groaned monotone chants in their deep bass voices. Tenor frogs sung the endlessly repeating refrain of "wrunka, hrunka, wrunka". An accompanying troupe of fireflies danced and flickered above the tall grass at the edge of the tree-line.

The late summer air was crisp and cool, lightly scented with the sweet smell of damp grass. A thick, green scent of algae tinted the air near the lake, mingled with the pungent odour of nightcrawlers oozing from the moist earth. The final verdant smells of nature played out their final encore on the senses before being swept away by autumn's golden broom.

In the east the horizon began to change slowly from black to azure, and then to a deep rich red. Robins began to stir and sing praises to the morning, rejoicing in the new day. The frogs returned to their diurnal hiding places among the reeds. Small insects began to buzz and flit across the glassy, serene surface of the lake. Bass and trout could be heard breaking the surface to capture their hovering breakfast. Fireflies extinguished their lights and sought refuge in the thick grasses with the silent crickets as the birds awoke. The wolves ceased their lament as nature's reveille began, and the owl returned to his nest, exhausted by his nightly vigil.

The sky began to lighten above the blazing horizon as light chased the darkness relentlessly westward. A few bands of cloud streaked the eastern sky, pointing wispy fingers towards the dramatic breaking of the new day. The sun climbed sleepily over the distant landscape, paused thoughtfully for a few moments, then dragged itself up onto the hilltop. Fully awakened by the dutiful rooster crowing on a neighbouring farm, the sun sprang into the sky, thrusting golden swords of light through the clouds which hugged the horizon. The fresh morning dew began to steam itself into a mist which crawled across the ground and tiptoed across the surface of the lake. A soft breeze played with tufts of ground fog, rolling them around bushes and across a gravel road. The dew-kissed road flavoured the air with a warm, earthy morning fragrance as the sun drank up the evening moisture laid down under the light of the moon.

Rustling wings left tree-top sanctuaries in pursuit of unsuspecting crawling things. The sun's golden ascent into the heavens brought warmth and light to the meadow where warm winds carressed the earth and playfully sculpted the tall yellowing grass into fleeting wave patterns. A breeze tickled the surface of the water into tiny ripples that laughed across the lake. Waterfowl paddled and dipped, seemingly oblivious to the hilarity of the wavelets. The warm moist air rising at the edge of the lake lifted the pungent aroma of decaying water plants and spilled it out as far as the roadway. Busy insects buzzed about the open meadow looking for scarce blooms amid the uncut grasses. A riotous cacophony of twittering birds filled the forest with their songs. Panic-stricken ants ravenously gathered winter provisions, skittering chaotically across the road, darting between immense blocks of gravel with enormous morsels grasped in their tiny mandibles. Morning had broken. It was time to head home.

# News from the Net

Planning to see a shuttle launch? Here is the 1999 launch schedule. Official launch dates are announced following the Space Shuttle Flight Readiness Review, approximately two weeks before a launch. The following target dates have been set for planning purposes:

***STS-96 DISCOVERY** Space Station Assembly Flight 2A.1 May 20, 1999
***STS-93 COLUMBIA** Chandra X-Ray Observatory July 9, 1999
***STS-99 ENDEAVOUR** Shuttle Radar Topography Mapper Sept. 16, 1999
***STS-101 ATLANTIS** Space Station Assembly Flight 2A.2 Oct 14, 1999
***STS-92 DISCOVERY** Space Station Assembly Flight 3A Dec. 2, 1999