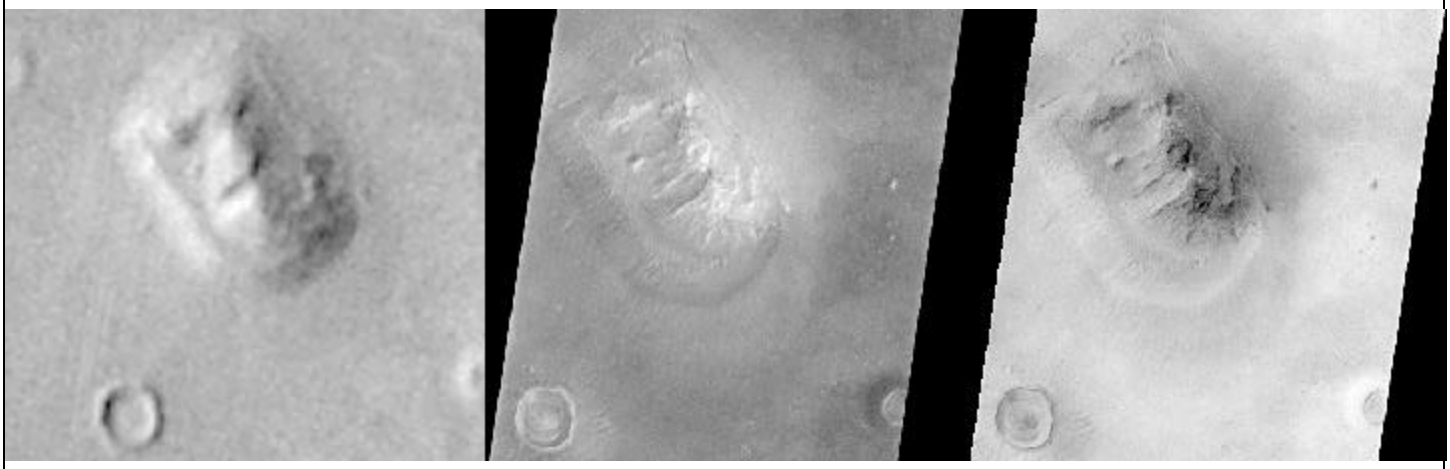
# Regulus

Newsletter of the RASC Kingston Centre Issue 98-03
May/June 1998

## It's A Hill!



### Comparison of the Best Viking and Reduced Resolution MOC Images

In the comparison above, the best Viking image has been enlarged to 3.3 times its original resolution, and the MOC image has been decreased by a similar 3.3 times, creating images of roughly the same size. In addition, the MOC images have been geometrically transformed to a more overhead projection (different from the mercator map projection of the preceding images) for ease of comparison with the Viking image. The left image is a portion of Viking Orbiter 1 frame 070A13, the middle image is a portion of MOC frame 22003 shown normally, and the right image is the same MOC frame but with the contrast reversed (that is, light features were forced to be dark, and dark features were forced to be light) to simulate the approximate lighting conditions of the Viking image.

### Mars Orbiter Camera Views the "Face on Mars"

Shortly after midnight Sunday morning (5 April 1998 12:39 AM PST), the Mars Orbiter Camera (MOC) on the Mars Global Surveyor (MGS) spacecraft successfully acquired a high resolution image of the "Face on Mars" feature in the Cydonia region. The image was transmitted to Earth on Sunday, and retrieved from the mission computer data base Monday morning (6 April 1998). The image was processed at the Malin Space Science Systems (MSSS) facility 9:15 AM and the raw image immediately transferred to the Jet Propulsion Laboratory (JPL) for release to the Internet. The images shown here were subsequently processed at MSSS.

The picture was acquired 375 seconds after the spacecraft's 220th close approach to Mars. At that time, the "Face", located at approximately 40.8° N, 9.6° W, was 275 miles (444 km) from the spacecraft. The "morning" sun was 25° above the horizon. The picture has a resolution of 14.1 feet (4.3 meters) per pixel, making it ten times higher resolution than the best previous image of the feature, which was taken by the Viking Mission in the mid-1970's. The full image covers an area 2.7 miles (4.4 km) wide and 25.7 miles (41.5 km) long.



# The 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 (I hate retyping... too many mistakes happen). E-mail: <***kell@cliff.path.queensu.ca***> Fax: 1-613-545-2907 (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***

**Officers and Executive Council**
**President:** Peggy Hurley
**Vice President:** Bill Broderick
**Secretary:** Laura Gagné
**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: Tom Dean
Youth Group: Brenda Shaw & Laura Gagné

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 Name (Center)

**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

# Upcoming Meetings


## 1998

**Friday May 8th** Telescope Tuneup night. Some quick lectures on care and cleaning of scopes, collimation crude & refined and a workshop on your scope (bring it in!)
**Friday June 12th** Peggy Hurley "Summer Solstice celebrations and traditions"
**Friday July 10th** Laura Gagne with "Black Holes, Wormholes and Time Travel."
**Friday August 14th** 2nd Annual BBQ Dinner Meeting at the home of Mark Kaye
**Friday September 11th**
**Friday October 2nd***
**Friday November 13th** Annual General Meeting
**Friday December 11th**
* 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).

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 $25 per half page, $50 for full page and must be camera ready copy.
Contributions are more than welcome. Submitted material may be edited for brevity or clarity. 



# From The Editor

New Brochures! In a crash effort last month we created a new **Centre Brochure**. In addition 2 other new brochures were made, one called **Getting Started in Amateur Astronomy**, and one for the **Youth Group**. They are all timestamp with an expiry date, to force us to renew them on a regular basis.

Do you have a personal web site with some astronomy on it? If so send me the URL and I will add it into the Kingston Centre Home Page links!

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:
Change email to BobGent
Change (Rev.) Mark M. Payne,

# From The Prez

Wendee and David Levy are delighted to announce that Wendee's daughter, Nanette, has discovered a a lovely baby girl comet named Summer. Mother and child are well; father (Mark) is recovering. Grandparents are thrilled!
Orbital elements follow:

| | | |
|---|---|---|
| T= 1998 March 14.75 | W= 8 lbs. 3 oz. | |
| H= 20 inches | IQ= 287.7 | Pi= 3.14159 |

# From The Secretary

Here are the better-late-than-never minutes for the **Friday, March 13, 1998** meeting, called to order 8:13 pm
**President's report:** Doug Angle has donated two bottles of wine to the centre from his eclipse cruise. They will be raffled at the next meeting - tickets are available at the break, and at the next meeting.
**Treasurer's report**: There are currently 156 names on the membership list. February's income was $140.90, and expenses were $149.90.
**National Council:** Minutes of the last national council meeting are available on the RASC website if anyone is interested. All the motions are given in the centre newsletter.
**Dieter:** Dieter has cards available for purchase during the break.
**Observing Group:** The next meeting of the observing group will be on March 29th at Peggy and John's place. The April session will be on the 17th of April at Doug Angle's house.
**Slide Collection:** The centre is establishing a slide collection for use in giving public talks. Hank Bartlett is looking after the collection and would appreciate all and any donations. If anyone has slides to donate, please contact him. If you have slides you would like to have duplicated, contact Mark Kaye and he can give you a good deal!
**General Assembly:** Kim Hay announced that the back account is now officially closed for the General Assembly last June. She presented the centre with a cheque for $1763.53. Kim made a motion to dissolve the GA committee. It was seconded by Laura Gagne. ....carried
**Speaker:** Kendra Angle showed us her science fair project. She built her own telescope with a new design for the mount which she created herself. She had a 4-tube truss mount made so that it could come apart in two sections. The top part of the telecope nests into the bottom for easy storage and transport. It took her one month to grind her mirror. She showed us slides documenting her progress as she assembled and tested her telescope. It was very well done.
**Slides:** Doug Angle and Tom Dean both went south for the eclipse and brought their slides to show us. Doug was on a cruise ship, while Tom was on an Island. The slides were fabulous and all of us are quite jealous!
The meeting was adjourned at 10:50 pm. There was no observatory sessions since it was cloudy. We can try again next meeting.

**April 3 1998 minutes** meeting called to order 8:05 pm
**Astronomy Day** will take place May 2nd this year. We will be in the centre court at Cataraqui Town Centre. If it is clear that evening, all members with telescopes are asked to meet at Kingston Field, Queen's University for a public star night. Our centre hopes to have a mirror grinding display which may or may not be interactive.
**Observers' group**: next meeting is April 17th at Doug Angle's home. The May meeting will be May 23rd at the home of Laura Gagne. See Regulus for directions. Some members of the group wish to have a "floating day" around the new moon each month in the summer. The first clear night available members can meet at a designated spot to be announced if there is sufficient interest. Ken Kingdon will host this meeting.
**Telescope making:** The next meeting of the ATM group (amateur telescope makers) will be April 19, 2:00 pm at Doug Angle's home. The next two meetings will be May 3rd and 24th; same place, same time.
**Guest Speaker**: Mark Kaye spoke to us about his 30 years of observing and photographing the night sky. He showed slides of several of his observing devices and observatories, including a very nice observing tent which he made himself specifically for observing. His slides were breathtaking and



he even included part of Holst's "The Planets" in his slide show. We have many great ideas now for our own personal observatories! Anyone who missed this meeting certainly missed something very special!

**Fundraising Draw:**
The Angle family donated two bottles of wine and two corkscrews they received while on their eclipse cruise. The winners were as follows: Corkscrew only: Kevin Kell, Wine only: Brenda Shaw, Wine and corkscrew: Ruth Hicks Congratulations to all the winners!

**Centre business:** Future planning:
It has been suggested that we have counsellors appointed for our centre who would advise the executive regarding issues for the membership. Doug Angle suggested that we survey the membership, including distant members, to see how they feel about this.

**Science fair prize discussion:** Brenda Shaw is a judge for the Frontenac County (local) science fair. The Kingston Centre gives a prize to be awarded to the best Astronomy project each year. Brenda feels that awarding the prize to a youth member of the centre is a conflict of interest, or at least is unfair to other contestants who are not members of the RASC. Peggy suggested that the centre has always been available to help any school or person requesting our help. Having RASC members excluded from winning the prize may encourage our youth to quit the centre in order to qualify for the prize. Judith Irwin suggested having two prizes; an astronomy book or magazine subscription (Astronomy) for the member, and a gift membership and Beginner's Observing Guide for the non-member. Hank Bartlett pointed out that other organizations which donate prizes to contests do not allow their members to win. Laura Gagne suggested that if the clear winner is a RASC member, then we could provide two first prizes of a RASC Youth membership and an astronomy book of the recipient's choice (from a selection we are willing to purchase). Youth members must pay annually, so the membership prize is good for them too. The decision need not be made until next March and Brenda would appreciate input from any of the membership. Please send your ideas to her via the regular centre mailing address.

**Librarian's Report:**
Christine Kulyk has a couple of boxes of books pulled from her own and Terence Dickinson's libraries. Brenda will pick them up and have them available at the next meeting. Terence has donated a copy of his latest gorgeous book "Splendours of the Universe" for raffle as a centre fundraiser.

**David Levy:** David has a new book about to be released and is working on two more which are nearing completion. He is on the cover of Parade magazine and may be appearing on the Letterman show. He is one busy guy....one wonders how he finds the time to find all those comets! **Mark Kaye** donated an eyepiece warmer for the club telescopes. It is hand made and we will try to make more of them for sale. Details to follow... **Kevin Kell** showed us some wonderful constellation slides which he donated to our centre slide library. He and **Hank Bartlett** are still requesting slides to help our public education initiative. Any slides or duplicates that any members care to donate would be very much appreciated. Either give them to Hank or Kevin (or any Centre executive member), or send them to the centre mailing address. Kevin also showed us part of a hilarious slide set that he has been working on with the help of two cats. The set is entitiled "Cats and Astronomy" and will be used for public shows for all ages. The cats teach us how to build and use a telescope...and we were rolling in the aisles watching this show!!

Meeting adjourned 10:40.....too cloudy to go to the observatory. Maybe next month!

# Youth Group News

**April 25th: Guest Speaker: Christine Marton** (from SEDS Canada ) : Students for the Exploration and Development of Space. The nation's only student-run organization dedicated to educating Canada's youth about Canadian achievements in space exploration and furthering student interest in the space sciences.

**May 30th: Terry Dickinson** (Editor of SkyNews)

**June 27th: Guest Speakers: Dr. Martin Duncan** (Queen's University) on the topic of Planetary Science and Chaos Theory; **Leo Enright** (editor of the Beginners Observing Guide) on the topic of Beginning Observing

**July 25th: Guest Speakers: Leo Enright** (local Crater Historian) and Mark Badham (Queen's University) with a field trip to the Holleford Crater and the Miller Hall Museum of Geology

**August 29th:** Lemoine's point with the RASC Kingston Centre ATM (Amateur Telescope Makers) Group, a picnic dinner and an evening observing session.

# ATM Group News

The next ATM Group meetings are Sunday May 3rd and Sunday May 24 at 2:00pm

# Observing Group News

Nuts! Got clouded out again at the Friday April 17th session. Did get to see a lot of slides and a marvelous 3 week old



kitten tried to eat my prime focus lunar shots.

## 1998 Observing Schedule

Saturday 1998 May 23: At the home of Laura Gagne
Phone: 613-xxx-xxxx
Email:

How to get there: (approx 30 minutes from Kingston)
From Kingston and the 401 Highway
Head north on Highway 15, past the Joyceville Institution, to the Joyceville road cutoff. It is just past the sign that says "Joyceville" on it. Turn left immediately onto concession 6. Xxx

**June: To Be Announced July: To Be Announced**

**Syracuse Summer Seminar** The summer seminar is August 14 - 16. The new president is Arnis Sprancmanis and he can provide more details nearer the time.

**StarFest** Thursday-Sunday August 20-23 NYAA sponsored Canada's largest star party held in Mount Forest (west of Barrie). See the website for details: ***http://www.interlog.com/~nyaa***

# National News

National Council meeting report….somewhat overdue!
Meeting date Feb.14

**Membership info:** There was a proposal to change the renewal date to a floating one rather than fixed. This seems to require a bylaw change and after some discussion it was decided to wait until the UofT press gets its act together with respect to the delta lists. Nobody wants a new master list of members each time there is a change. Once the lists of changes stabilize these things can be discussed again. Everyone seems to have the same problems with U of T and Randy Attwood is on the case!

**BOG:** The discount coupons were in the new member kits and many are being redeemed. All of Leo's concern's wrt Husion House as a publisher for the BOG were unanimous. A reprint of the Bog in the Otabind format as suggested by Leo was approved.

**Travel Policy Revisited:** A motion to change the travel policy was defeated. The new policy would reimburse for 3 meetings at 100% and the 4th at 0%. It was felt that this would cause the 4th meeting of the year to just fade away.

**Nominations**: The report from the nominations committee contains the following names.
National President: Randy Attwood, Toronto
National 1st Vice pres: Robert F. Garrison, Toronto.
National 2nd Vice pres: Rajiv Gupta, Vancouver.
National Treasurer: Michael Watson, Toronto.

There was a comment made by another rep at the end of the meeting which I felt was appropriate. There is a need to improve the timing of committee reports. Bonnie said that she was working on it.

I had printed out the Agenda from the net and read the reports several times. I had questions from Peggy for which to get answers. I felt that I was prepared, and would have been had there not been a pile of reports that I had to scan while listening to the discussion and trying to take notes. This was unfortunate as now I am sure that in the published minutes there will be things that I'm sure you all should know now. This would not be as big a problem if there were not so few meetings.

In an attempt to serve you all better I will try to get together with Bill and Leo before the next meeting (GA) and discuss their reports.

I also need to get any Agenda items in the next month. The only one that I am sure of now is a motion requesting the approval of National's support of the Kingston Centre's request for a charitable donation registration #. I will write out a motion for the exec to approve at the May meeting.

The GA 2000 in Montreal is not a sure thing in that the English centre is quite daunted by the prospect. They would like any help that we could offer.

Thank you all. Susan Gagnon.

# BBS News

Watch out for the Media! Last March they reported on a MIR pass as if it only happened once in a blue moon. Mir passes occur quite often. Granted the passes are not all overhead but they still happen!
New on Starstream are IRIDIUM satellite flare predictions. The program is also available for downloading with the satellite element info so you can predict your own!

The following Kingston BBS's are RASC support boards:
✶Observatory East (Mark Kaye) 613-353-6495 FidoNet 1:249/109 2400-28800 bps 8N1V.34
✶ StarStream (Kevin Kell) 613-546-6403 FidoNet 1:249/112 14400-28800 bps 8N1V.34
✶ Moonlight Cascade (Kim Hay) 613-353-7369 FidoNet 1:249/133 2400-28800 bps 8N1V.FC



## Fireball Group

**Submitted by Tom Dean**

Fireball Report Line: 545-6000 ext 7608.
Fireball Web reporting form:
http://www.astro.queensu.ca/~irwin/fireballs/fbhome.html

## Comet Watch

Comets Currently Visible from
*http://encke.jpl.nasa.gov/whats_visible.html*
for ephermerides: *http://encke.jpl.nasa.gov/eph.html*
Last Updated: 1998 April 27

**Long-Period Comets**
C/1997 J2 (Meunier-Dupouy)
C/1997 T1 (Utsunomiya)
C/1998 H1 (Stonehouse)
**Short-Period Comets**
29P/Schwassmann-Wachmann 1
43P/Wolf-Harrington
62P/Tsuchinshan 1
69P/Taylor
78P/Gehrels 2
88P/Howell
103P/Hartley 2
104P/Kowal 2

## Space Calendar

The Space Calendar covers space-related for the coming months. This Calendar is compiled and maintained by Ron Baalke. Please send any updates or corrections to
***<baalke@kelvin.jpl.nasa.gov>***
You can find this on the web at:
***http://newproducts.jpl.nasa.gov/ calendar***

Due to a lack of space the calendar will not appear in this issue.

## Submissions from Members

### Exploring Australian Meteor Craters

By Ray Berg, Crown Point, Indiana

My two major highlights of the GA held at Kingston last year were (1.) having the opportunity to attend the late Gene Shoemaker's talk on meteor/asteroid impacts and (2.) visiting the Holleford impact crater near Kingston on the last day of the meetings. It was fitting preparation for the South Pacific vacation my wife, Lois, and I had been planning for over a year, which was to hopefully include a meteor crater site in Australia. This trip finally became a reality, spanning three weeks in March and the first week of April of this year. Numerous activities, including observing the southern night sky, were conducted at various locations in New Zealand, Fiji and Australia. This report describes our visit to a meteor crater site, of which a number are available in the Australian Outback.

With time being a major constraint on our journey, we finally chose the Henbury meteor crater field, located 150 km southwest of Alice Springs, right in the center of the desolate open desert. This site contains twelve craters which were formed when a meteor, weighing several tons and traveling at 40,000 km per hour, exploded in midair about 4700 years ago and rained debris down on the earth. Being a relatively young formation, it still looks like and has the characteristics of an impact site, as opposed to the ancient Holleford crater which has filled in with sediment over the millions of years of its existence. On the map, the site also appeared easier to get to than some of the other Australian craters.

In the early morning hours of April 4, Lois and I packed a few groceries, sunscreen, netting (the flies are a fierce nuisance in the Outback) and cameras into a rented 4WD vehicle and headed out from Alice Springs onto Highway 87. The scenery was much the same throughout the drive: flat, red, rocky semi-arid desert with scrub bushes and spinneflex grass in places. Kangaroos and an occasional cow are real hazards to fast driving here and we encountered eight dead ones alongside the road on our way. About 130 km out, we turned off onto a gravel road that was more ruts, big holes and sand drifts than road - hence the need for a 4WD. Fortunately, this part of the journey was only 20 km but it took quite a while because of the poor road.

Arriving at the craters, we found that the entire area remains quite primitive, although the Parks and Wildlife Commission of the Northern Territory has provided picnic tables and a pit toilet. Otherwise, there is nothing else in the area, including drinking water or shelter. An ill-defined trail winds through the crater field with an occasional interpretive sign. Five craters are quite well defined with the largest being 180 meters wide and about 15 meters deep. The walls of each of these were relatively steep and impact material was heaped up around the rim of the larger ones. The impacts of two of the craters were so close together that the wall between them was blasted away. Another crater contained a tiny creek (from a spring?) which wandered

through the crater and out through an eroded section of wall. Although no surface water was seen in the twisted dry creek bed on the day we visited, apparent underground moisture has provided for a number of very green trees and lush grass on the crater bottom. The remaining seven craters are barely recognizable, being about 5 meters or less wide and only a few centimeters deep. We roamed up, down and through all of these holes in the earth, snapping photos and keeping a wary eye open for meteorites (we didn't find any, only pretty rocks and stones) and for the well publicized Australian venomous snakes (we didn't see any of these either - whew!). After three hours of playing astrogeologists, the sun and the flies were getting to us and we retreated to the comfort of the airconditioned 4WD to pick our way back down the gravel road to reach the highway and return to civilization.

## SLIP SLIDING AWAY
### by Hank Bartlett, Kingston

That is exactly what I found myself doing for 14 cubs and their leaders. On the April 4 weekend the 1st Camden Cub Pack held one of their camp weekends. I was invited to help them earn their Astronomy badge, unfortunately we were clouded out. After over an hour of question and answer they boys took a break and I started slipping slides into the tray for our "virtual observing session".

The results of showing our new slide set (donated by you the members of the Kingston Centre) was just as projected (poor pun I know), GREAT! The kids were amazed at the sights and it took an hour to show 30 slides. Many were surprised that these objects could be photographed from the Kingston area, they kept asking "Where was this one taken?" I was worried about holding their attention for an hour without being able to get in some real observing, instead they were eager to listen and asked questions throughout the entire two and one half hours.

Obviously these sets will be of great value to our promoting and teaching astronomy to youth and parents alike, so dig into those slide trays and see what you can spare. Send your donations to-
RASC Slides, c/o Box 270 Newburgh On. K0K 2S0 Canada
or K. Kell Box 2033 Kingston, On K7L 5J8 Canada

Remember be it one slide or twenty all are welcome, if every member could send even one we would have over 150 slides!

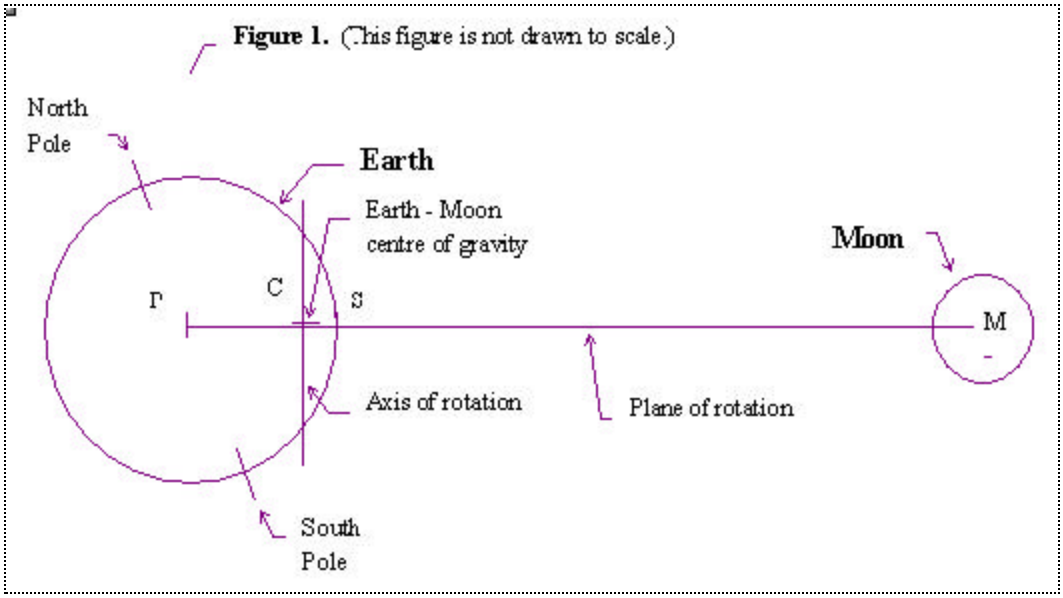
## A Note from **(Rev.) Mark M. Payne, O.S.B.** <xxx@xxxxlxxx.xxx>

WRT to the recent letter in the SkyNews about watching Venus during the day, we've had our students on the roof lately looking at Venus at 10:00 am through 8" Celestron and its finderscope. One great thing about this "cold Canadian air mass" . . . it has cleared out the local gunk and the air has been unusually clear. [Ed. As seen from New Jersey]

## A PROBABLE CAUSE OF CRUSTAL SHIFTS ON THE EARTH: A COMET APPROACHING THE CENTRE OF MASS OF THE EARTH - MOON GRAVITATIONAL SYSTEM.
By: **Donald Tim Seitz Sr.** April 13, 1998

The discovery of Comet Shoemaker - Levy 9 and subsequent observations of its impact on Jupiter in July 1994 made us aware of the very real possibility of comet - planet collisions. Before it struck, it was shattered into 20 fragments during an earlier pass through Jupiter's strong gravitational field. It finally collided as a series of fragments. [1] Because of Jupiter's great mass in relation to the mass of its moons and comet, the comet's path could be correctly mathematically prescribed as a one body problem. [2] Since the size of any known comet is not large enough to significantly move the centre of mass of the Earth and Moon, it could not correctly be treated here as an actual case of *"The three body problem….. the most celebrated of all dynamical problems…a good mathematical problem."*, that was addressed by mathematician, David Hilbert, in 1900. [3] Historically, the three body problem came about from trying to mathematically prescribe the motion of the Moon about the Earth under the influence of the Sun's gravitation. The mass of any comet, thus far observed, is not of the order of magnitudes of the masses of the Earth or Moon let alone the Sun.






The possibility of a comet colliding with the Earth poses a different type of problem than that of Jupiter because the Earth and Moon act as a two body mass system. James Clerk Maxwell's equations are used to address the issue of motion about a centre of mass for a two body system. See figure 1 below. Motion about the centre of mass *C* is determined by the equations: [illegible] the distance between the Earth's centre *P* and the Moon's centre *M*. The distance *r* varies, [illegible] at apogee and [illegible] at perigee in the Moon's orbit. The distance [illegible] where *C* is the centre of mass for the Earth and Moon system, [illegible] is the point mass of the Earth, and [illegible] is the point mass of the moon.[4] The mean radius of the Earth [illegible].[5] The distance *CS* locates the centre of mass for the Earth and Moon system below the Earth's surface. The distance *CS* is found by the equation [illegible]. This distance varies; *CS* ≈ *1339 km* at apogee and *CS* ≈ *1951 km* at perigee of the Moon's orbit.

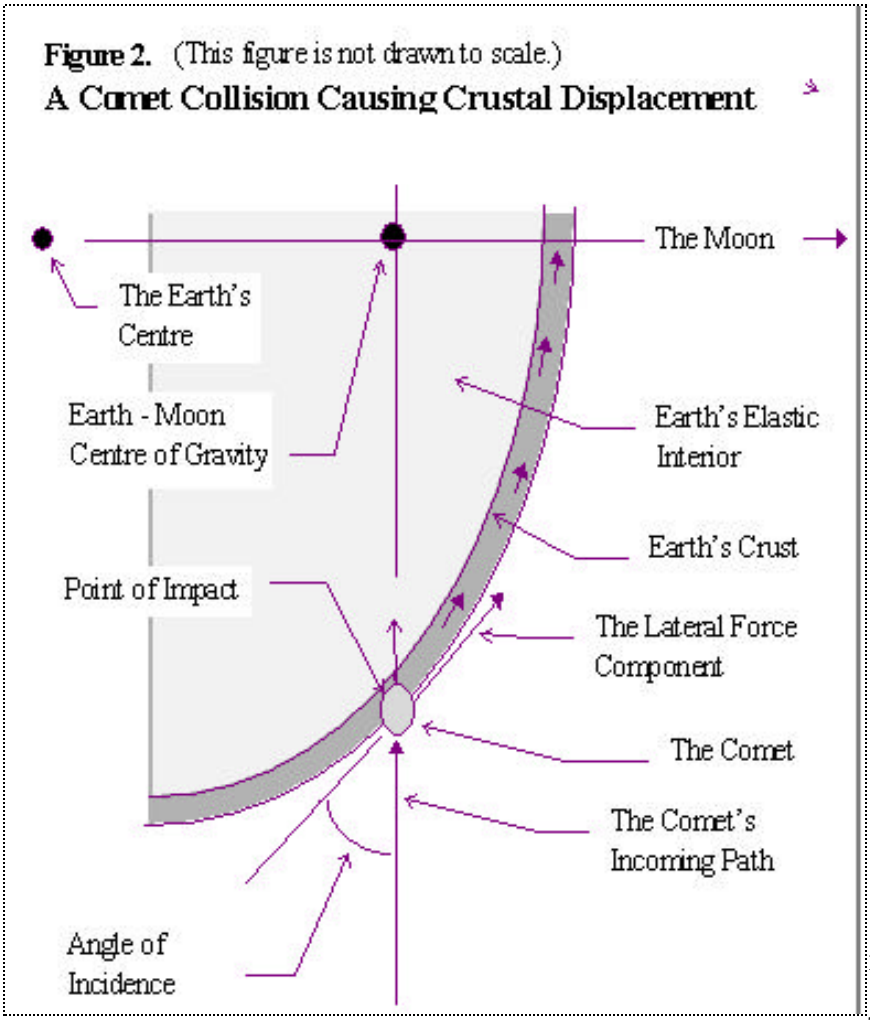
The ecliptic is the plane of revolution of the planets about the sun. In 1997, the orbit of comet Hale-Bopp crossed through the plane of the ecliptic at a high angle. A comet on a collision course with Earth would be attracted to the Earth - Moon centre of mass and move toward it. A colliding comet in or near the same plane as the orbit of comet Hale Bopp would strike the Earth at an oblique angle.

The center of mass for the Earth - Moon gravitational system is always much nearer the Earth's surface than the Earth's centre. See Figure 2. below. If an incoming comet were near the same estimated size as comet Hale - Bopp and moving with the same velocity, the force of its collision would act laterally on the Earth's crust. This could cause the crust to slide over the molten interior of the Earth. The Earth's crust floats over an interior molten mass about 36 miles down.[6] The interior is elastic and contains about 99% of Earth's mass. The vector component of force tangential to the Earth's surface would cause a significant lateral movement of the Earth's crust. If the comet collided so that the lateral force acted in a North - South direction, the Earth's North and South poles would be moved from their present positions.

This event may already have happened at some time in Earth's prehistory. It may already have happened many times. There are many anomalies in geologic history that could be better understood if a plausible explanation for the Earth's shifting crust could be found.

Thomas Kuhn says "*Discovery commences with the awareness of anomaly, i.e., with the recognition that nature has somehow violated the paradigm-induced expectations that govern normal science.*"[7]

In the forward to Charles H. Hapgood's book, *Earth's Shifting Crust*, Albert Einstein says*; "A great many empirical data indicate that at each point on the Earth's surface that has been carefully studied, many climatic changes have taken place,*




*apparently quite suddenly. This according to Hapgood, is explicable if the virtually rigid outer crust of the Earth undergoes, from time to time, extensive displacement over the viscous, plastic, possibly fluid inner layers. Such displacements may take place as a consequence of comparatively slight forces exerted on the crust…."* [8]

Neither Charles Hapgood nor Albert Einstein lived long enough to have the opportunity to witness and reflect on the comet events of the 1990's. Perhaps the answer to their shared notion of how the Earth underwent sudden climatic changes lies out there in the Oort cloud with the comets and not inside the stars.

According to David Levy, the paths of most potentially Earth threatening asteroids are already known and none of them are as large in mass or as threatening as some of the larger known comets. We could calculate any impact years in advance. Comets can swoop in on us with no more than a few weeks notice and this could happen at any time. [9]

## Bibliography:

1. Levy, David H. *The Quest For Comets* 1995. NY NY: Avon Books p. 238.
2. Branley, Franklyn M, *JUPITER King of the Gods, Giant of the Planets* 1981. NY NY. Dutton Books p.79-80.
3. Barrow-Green, June. *Poincare and the Three Body Problem*, 1997. Providence RI: American Mathematical Society, Section 2.1 p.7.
4. Clerk Maxwell, James. *Matter and Motion*. 1991. NY NY. Dover, Art. 130, p.106
5. Glover, Thomas J. *Pocket Reference* 1996. Littleton, CO. Sequoia Publishing, p. 216-217.
6. Hapgood, Charles H. *Earth's Shifting Crust*, 1958. NY NY: Pantheon Books. p.186.
7. Kuhn, Thomas S. 1962, 1970. *The Structure of Scientific Revolutions 2nd edition*. Chicago: University of Chicago press. p.52
8. Hapgood, Charles H. *Earth's Shifting Crust*, 1958. NY NY: Pantheon Books. P. 1-2.
9. Levy, David H. *The Quest For Comets* 1995. NY NY: Avon Books p. 218.



# Survey

I as editor rarely get feedback about the newsletter and the same can be said for the Centre Executive regarding the running of the Centre. National ran a survey some 5 years or so back and we thought it would be a good plan to try one ourselves. Space demands that I could not put the survey on 2 back-to-back pages, sorry :)

Please fill in as much as you would like and return it to: Kevin Kell PO Box 2033 Kingston Ontario K7L 5J8 Canada We'll compile results and publish them next issue.

You can also get the questions of the Centre Web site (print it off and mail it in). Or even just email it in answers alone to *kell@cliff.path.queensu.ca*
**Most answers are Yes/No**
**or a=great b=ok c=bearable d=yuck!**

**A. Technical Stuff**
1. Do you own binoculars ☆Yes ☆No ☆Size:_____
2. Do you own a telescope ☆Yes ☆No
3. What kind? ☆Refractor ☆Reflector
4. Size? ☆<=10cm ☆10-25cm ☆25cm+
5. The Centre is having the ATM group build us 2-20cm scopes for beginners to use, a 37cm+ for advanced users and we have an existing 25cm for intermediate users.
Sound like a good plan? ☆A ☆B ☆C ☆D
6. The ATM group is planning on putting together kits for Barn Door Trackers (manual & powered). Interested in buying one? ☆A ☆B ☆C ☆D

**B. Computer stuff**
1. Do you have email access? ☆Yes ☆No
2. Do you have web access? ☆Yes ☆No
3. Have you visited http://www1.kingston.net/~rasc
☆Yes ☆No
4. Would you consider attending Virtual Meetings of the Centre? (Most likely through an IRC based chat session)
☆Yes ☆No
5. Do you know what I'm talking about (IRC=Internet Relay Chat)? ☆checksumOK ☆Huh?

**C. National Issues:**
1. How do you like the bundling of SkyNews to the RASC membership? ☆A ☆B ☆C ☆D
2. How do you like the promotional "souvenir" items that are available from the National Office?☆A ☆B ☆C ☆D
If so can you think of something you would like that they do not sell? _____
4. What do you think of the new Journal Format ?
☆A ☆B ☆C ☆D
5. How do you like General Assembly's?☆A ☆B ☆C ☆D
6. Are you going to the Victoria GA? ☆Yes ☆No
If no, why not?

**D. Your Interests**
We will publish your interests in a future newsletter to help hook you up with other Centre members who share your interest.
1. Have you ever made your own telescope?☆Yes ☆No
2. Are you interested in doing it?☆Yes ☆No
3. What type of astronomy are you interested in? (Circle)
A. Deep Sky B. Solar C. Armchair D. Variable Star E. Radio
F. Meteor G. Planetary H. Other_____

4. Is there a local astronomy group (that is NOT the Kingston Centre) near you?☆Yes ☆No

**E. Your opinions**
1. Turn the Annual End-of-Year Dinner into an Annual End-of-Year Sit-down Banquet?☆Yes ☆No
2. What do you think of a Once-a-Year Regulus supplement for members to publish papers, works of astronomy related fiction, etc?☆A ☆B ☆C ☆D
3. Our biggest costs for the newsletter is the postage. Would you like to see a monthly newsletter? ☆A ☆B ☆C ☆D
How about a bi-monthly web-based only to alternate with the paper version?☆A ☆B ☆C ☆D
4. What do you think of the concept of a Membership Manual for the Centre? ☆A ☆B ☆C ☆D
5. What do you want to see from the Centre? (In terms of services, activities, etc)

6. All other comments, opinions, etc.