Regulus

The Newsletter of the RASC Kingston Centre 2000 January-February

2000- Cosmically Significant or Just Another Number?

Astronomical Wonders
by Kim Hay

This year the Kingston Centre, and its many elves donated time, decorations and gifts under the tree to help decorate an

*OK, not really *our* tree but no one sent in any photos!*

astronomical tree "Astronomical Wonders", in Kingston's yearly event, "The Festival of Trees." Our tree number was #141 and it was a box draw. Those putting in their names had a chance to win the tree which was decorated with gold named stars, Messier Balls, Framed pictures of astronomical historical people, glow in the dark stars, a hubble telescope, the shuttle and the planets. Under the tree were the gifts of a BOG, 2000 Observers Handbook, Sky News, calendars and 3 books of Terrence Dickinson's all autographed by the author, which was laid out on a Solar System blanket which was sown by Mrs. Bartlett (Hank's Mom), thank you.

The proceeds from this event went to a good cause which was to our local hospitals. I would like to thank all the elves, Hank Bartlett, Laura Gagné, Susan Gagnon, Susan Philips, Tessa Clarke, Kevin Kell, The Kingston Centre, and Kim Hay. This was a fun event though the exciting and busy times, it felt good to give to help others. I hope this can become an annual event.

Awards

Winners of Awards this year 1999 at the Kingston Centre's Awards Dinner held on November 27,1999

A.Vibert Douglas Award:
Tom Dean & Laura Gagné

Special Thank You Awards:
Susan Gagnon, Hank Bartlett, Kevin Kell, Dave Pianosi, Don Mastrianni, Kendra Angle Mark Kaye

Note from the President:

Doug Angle

This marks the end of my first year as President of the Kingston Center. I must say it has been a hectic one too. We have had a lot of activities and projects, all of which were outstanding successes. Also, we continue to grow as a center, and have a substantial cash surplus as well. I want to thank everyone who has contributed to these successes.

A special thanks to our two Douglas Award winners, Dr. Tom Dean, and Mrs. Laura Gagné.

As we look forward to the next year, the executive is considering what direction to take the Center. What activities, programs and purchases should we be thinking about and planning for? You can help by voicing your opinions to me or any member of the executive. Contact information for the executive is published in every issue of Regulus. I would especially like to hear from our out-of-town members. What do you like and dislike about the Kingston Center? What benefits do you see you get from being a member, and how can we do better at it? Please call, write, send smoke signals, whatever, just let us know your ideas.

Douglas Award Citations:

The Douglas Award is presented for achievement or contribution, either to the Kingston Center or the society at large. This year the award was given to two people on the basis of their contributions to the Kingston Center.

Dr. Tom Dean has been an active participant in 1999 and past years. In 1998 he was chair of both the observing and ATM committees. He negotiated the acquisition of the 24" mirror blank, and has contributed to the organization, design and grinding. He has also helped with the Youth Group, as well as organizing the Public and members-only observing sessions. The public sessions in particular are well attended, and have resulted in several new members to the center. For Tom' efforts in many areas, and his contribution to the growth of the Center, we present this award.

Mrs. Laura Gagne is Vice-President, chair of the education committee, and past co-chair of the youth group. She is editor of the Students Guide to Careers in Space, and Expanding Their Universe - The Ontario Teachers Companion To Grade 9 Astronomy. Laura has also participated in many observing sessions, mirror grinding, and other Kingston Center activities. As a result of her efforts, the Kingston Center produced a seminar for Secondary School teachers to introduce them to Astronomy. For Laura's many and varied efforts, her contribution to the growth in membership and finances, we present her with this award.

Asteroid Named after Leo and Denise!

The rocky asteroid in the constellation Leo is now called Ensab, after Leo Enright and his wife Denise Sabatini. The asteroid is one to two kilometres wide. The asteroid was discovered by his good friend, David Levy, and Carolyn Shoemaker in 1993.

Levy and Carolyn Shoemaker discovered it in 1993 and the union named it after Enright and his wife as "an outstanding couple in amateur astronomy in Canada."

"By coincidence, this asteroid was one of 11 discovered in the early to mid-1990s by David Levy and Carolyn Shoemaker and also by sheer coincidence it was discovered on our fifth wedding anniversary, on July 23, 1993, at Mount Palomar."

More details from Leo
Thank you very much from both of us for the congratulatory e-mail. The news about ENSAB was a very pleasant surprise for us.

Here is some information about ENSAB:
1) It is Minor Planet # 9070. There are over 16650 known minor planets or asteroids. Many have names as well as their number designation. Before the number designation is given a "temporary designation" is given.

2) Before the permanent designation was given to 9070 ENSAB, it was "Minor Planet 1993 OZ2". The year is the year of discovery. The "O" indicates that it was discovered in the second half of the month of July. (An "A" would indicate discovery between Jan. 1 and 15 inclusive; a "B"

would indicate discovery between Jan. 16 and 31` inclusive; and so on with all letters used for any year except the letters "I" which could be confusing, and "Z" which is not needed. The "Z2" indicates which discovery it was during the time period. The first 25 discoveries in the latter half of July, for example are designated OA, OB, OC, etc up to OZ, with "the letter "I" not used. The second 25 are OA1, OB1, OC1, etc. up to OZ1. The third 25 are called OA2, OB2, OC2 etc up to OZ2. These numbers are to be written as subscripts, if possible. ENSAB was the 75th asteroid discovered in the time period mentioned.

There were quite a number of search programs under way at the time. It was actually discovered on July23, 1993. The orbital elements were announced in Minor Planet Circular 32189.

3) As you know it is very faint. Pluto is at about Magnitude 14. ENSAB is at about Mag. 19.7!!! That is far far far beyond most amateur telescopes. Paul Boltwood would certainly be able to image it with the CCD camera that he has on his telescope; he has done much fainter. Other amateurs with CCD equipment might be able to do the same.

4) There have been 62 observations since the discovery.

5) Here is an ephemeris for 0 hours UT on the dates 10 days apart and in 2000.0 coordinates. The second column is R.A.; the third is Dec. and the fourth is visual magnitude.

Date	RA	Dec	Mag
Dec. 11	9h 27.26m	+17 30.4	19.9
Dec. 21	9 25.19	+18 37.6	19.8
Dec. 31	9 20.68	+19 57.4	19.7
2000			
Mar. 20	8 24.37	+28 24.5	20.4

As you can see it is in Leo not far from the western border of that constellation and moving in a north-westerly direction roughly toward the region of Castor and Pollux. I do not have information about its approximate size. One can only make a rough guess. Hope this is of some help.

OBSERVING DELTA SCUTI STARS

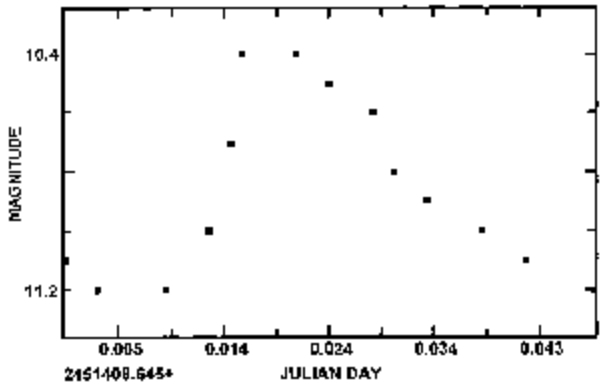
by Ray Berg, Crown Point, Indiana
<xxxxx@xxxxxxxx.xxx>

One of the lures of variable star observing is that these stars are dynamic; they go through a change in brightness that over a period of time can become quite fascinating to follow. Many of them take a few months and even more than a year to complete their cycle of variation. For the impatient observer, two classes of variables that vary through a complete cycle in one evening include the short period *eclipsing binaries* and the rapidly varying cepheids called *RR Lyrae stars.* There are many examples of these available on any given evening which can be followed through their entire variation within a 3 to 4 hour time period. However, for really fast paced action, I like to include a couple of *Delta Scuti stars* in my visual observing program. Some of these rapidly pulsating cepheid type stars go through a complete cycle in 2 hours or less, which makes them quite interesting to watch. The down side is that the brightness change is also quite small. In most cases, the total range is only 0.2 magnitudes or even much less which a visual observer cannot really detect. But there are a very limited few with nearly a full magnitude change and these are the ones I choose. CY Aquarii is one of the fastest ones - it goes from a minimum brightness of magnitude 11.2 to a maximum of magnitude 10.4 and back down to minimum in just 88 minutes! You can literally see it change almost minute by minute in the eyepiece. Others, requiring a couple of hours of observation, include VZ Cancri (magnitude 8.3 to 7.5), VX Hydrae (magnitude 10.7 to 10.0) and RV Arietis (magnitude 12.2 to 11.2). If the observed magnitude changes are plotted against time to produce a light curve such as Figure 1, it will be noted that typically the rise from minimum is very rapid, with the time at maximum varying considerably, even becoming

constant for a short period, and finally a slow decline back to minimum.

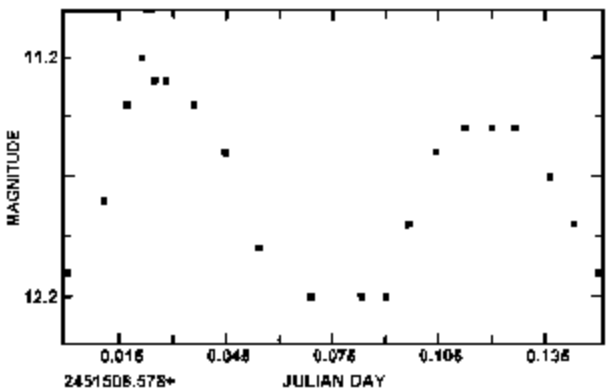
The period, brightness range and shape of the light curve may vary widely from cycle to cycle, depending on the star. An example of this is shown in the plotted light curve of two concurrent cycles of RV Arietis in Figure 2. This data, obtained visually with an 8-inch telescope on the

FIGURE 1 - ONE CYCLE OF CY AQR



evening of November 25, 1999, was taken every 5 to 10 minutes over a 216 minute time period for the 2 cycles. The first cycle is sharply "peaked" with a maximum of magnitude 11.2, while the following cycle is more "rounded" with a maximum of magnitude 11.5. I have also recently recorded 2 very weak maximums of magnitude 11.8. John Isles describes these variations of RV Arietis (but not *why* they occur) in his excellent book on variable stars* as follows: "The main cycle of 134 minutes is accompanied by secondary variations

FIGURE 2 - TWO CYCLES OF RV ARI



with a period of 104 minutes, giving rise to changes in the shape of the curve and the height of maxima in a "beat" period of about 8 hours; and there is a third oscillation present with a period of about 7 hours." Such complexity over short time periods makes RV Arietis one of my favourite stars.

* Isles J.E., Webb Society Deep-Sky Observer's Handbook, Volume 8, Variable Stars, Enslow Publishers, 1990.

YOG

by Hank Bartlett

The **Youth Observing Group** has had three meetings now. Given the time of year and people's busy schedules I am very pleased with the interest and turn out.

Clear weather for session two gave us the opportunity to get out and observe. As we are all learning what we expect from each other at this point it was not overly organized. The evening served as an opportunity for the youth to aquaint themselves with the telescopes and binoculars and of course the night sky. The area is light polluted but, the view of M57, M31 and a few other faint objects were still quite acceptable.

This week (Dec. 15) was clouded over so the evening was spent in virtual observing. Tim gave us a tour of Starry Night on the school computer and then the kids took a turn at it themselves. We visited the Jovian system, Saturn, and more. The evening was very interesting and the youths were very happy to have the opportunity to see the quality graphics and abilities of such software.

The next meeting will be on Jan. 5, 2000, 6:30pm - 8:00pm at Holy Cross School room 108. Subsequent meetings will be 1st and 3rd Wednesday of each month as long as the school is open. Call Hank at xxx-xxx-xxxx or <*xxxx@xxxx.xxxxxxxx.xxx*> for details. This is a

very relaxed group with no need for constant participation. If you have or know of youth who are interested please contact me.

EXPANDING THEIR UNIVERSE
helping Ontario teachers with astronomy
by Laura Gagné

This year Kingston Centre took on an enormous project with the hope that we could make a difference in our community. As most of you may know, the new science curriculum for Ontario high schools includes a major astronomy component in grade nine. Many high school teachers have no training in astronomy and were less than enthusiastic to have such a foreign subject introduced into their curriculum without the proper training they needed. We all know that waiting for the government to come to the rescue is a waste of valuable time, so Kingston Centre decided to tackle the issue ourselves.

In the spring of 1999 the new textbooks were offered to the high school science teachers in order for them to make a choice. I managed to secure a copy in order to find out what material was to be covered. Apart from a number of errors in the information presented in the textbooks, I was amazed at how much detail the children were going to be taught. My personal reaction to the curriculum expectations outline was "You have got to be kidding...". I thought that it would be wonderful if the students could learn all about the origin of the universe, the lives and deaths of stars, how planets form, Canada's role in space, physical laws and all the other interesting things I learned about at University....and all in grade nine! Perhaps the expectations were a little high, especially since grade nine science is compulsory and there is no distinction between general and advanced levels. I realized pretty quickly that there was great potential here for kids to be turned off from astronomy forever unless someone did something to help the teachers. I decided to write a book.

As the book was being typed, I asked the members of Kingston Centre if they thought they would like to help me to produce a one-day seminar to give the teachers some background information. As usual with this centre, I had plenty of volunteers with a wide variety of specific areas of interest. I asked our President, Doug Angle, to do a workshop about telescopes since some schools own telescopes, but may not know how to use them. I also asked Tom Dean to produce a workshop about how to use Starry Night, the computer program that most schools purchased as recommended by the government. These gentlemen wrote summaries of their lecture notes which were included in the book. Other contributions to the book came from various experts: Kim Hay wrote about meteor observing, Leo Enright provided information about keeping a log book, David Levy gave us information about comet hunting, Don Mastrianni wrote a brief history of astronauts, and Fred Werthman provided us with beautiful diagrams and illustrations. Kevin Kell put it all together in the form it now takes: a three-ring binder full of reproducible pages of information, games and activities designed for ease of use by teachers. Copies are available from the Kingston Centre for $15 (foreign orders contact us for details.).

The seminar was held for the afternoon and evening of November 3rd, 1999 in a local high school. We had planned an observing session for which several members turned out with telescopes. Unfortunately it rained and snowed and everything else you can imagine that would prevent us from going outside. There are 21 activities in the book we produced, 5 of which we performed in the seminar. It was very successful and the teachers wanted to spend the rest of the day doing more activities. John Hurley made a comet, Peggy Hurley made pinhole cameras, Kim Hay decoded a message from an alien civilization, Hank Bartlett plotted stars from a photograph onto an H-R diagram and speculated about the existence of planets around some of them, and Doug Angle took everyone on a journey through time to

explore the changing phases of the moon. Also helping to answer questions and demonstrate telescopes were Paul Bowman, Susan Gagnon, Don Mastrianni, Fred Werthman, Tim Seitz and Kevin Kell.

The teachers who came to the seminar were very grateful for our help. They said that they felt more comfortable with astronomy than they did before and were very appreciative of the materials we provided and our offer to help them in the future. We will be providing an "Astronomer in the School" outreach program for those who request it, as well as holding special observing sessions at a local park aimed at the high school students who are studying astronomy. I think our centre has been able to make a big difference in our own community, and I am sure that any centre could do this. As you can see above, there were not many people on the education committee working on this project, and yet it worked. There are just a few steps to take initially and the rest will fall into place.

First we decided what we would be able to offer. We drafted an initial agenda to let them know which topics we could cover for them. We then contacted the head of the science department at the school where my friend works as a teacher. She asked the head of all of the heads of science in Kingston to put us on the agenda of the next meeting. We went to their meeting and made our offer, telling them how much it would cost them per person attending. Doug made the arrangements for the date and the place while I wrote up the seminar agenda and found speakers. Of course, if your centre wishes to do the same thing, you can get the books from Kingston Centre, which are already tailored to suit the new grade 9 Ontario high school curriculum.

Overall, it was fun and it feels good knowing that we, as amateur astronomers, were able to help. It is our mission statement after all. I am glad that I was able to be a part of this project. I am also proud to be associated with such a fine group of people as the RASC, and especially Kingston Centre.

Kingston Centre RASC Secretary's Annual Report 1999

by Kim Hay

Partners in Astronomy, a partnership between professionals and amateurs, a theme that carried throughout the year, not only at the 1999 General Assembly, which was co-hosted by the RASC, ASP and the AAVSO, but was also quite evident at the Kingston Centre in 1999.

Though Mother Nature tried her best to keep many from showing up at meetings or observing sessions, the weather did not dampen the spirits, as those who were there enjoyed the company of fellow astronomers.

Our meetings this year took us on a trip from new cosmic discoveries by Professor Richard Henrikson, to Ancient Egyptian Archeoastronomy by Denise Sabatini. Both of these talks showed us the past in astronomical events, that helped to shape the present universe, and the universe that us unfolding each day before our eyes, as the telescopes and technologies advance.

January had Peter Ceravolo fly into Kingston ahead of storm to show us the Trials and Tribulations of filming "Comet Oddessy". A marvel in its own right, with brilliant collaboration from fellow amateurs, created a movie that we can all enjoy and see the beauty of a comet from head to tail.

As new Star atlas's arrived on the bookshelves, Leo Enright intrigued us with his comparison of the Millenium star atlas to many atlases already on the market, and those, which are out of, print. To choose an atlas is a personal decision, but Leo's knowledge on the subject makes the task even harder. Whether you went from a book of a star atlas, or a computer program, Michael Watson, showed us how Red Shift 2 & 3 compared with

Earth Centred Universe, and how these programs should be one of every astronomers tools.

As the year continued on, it was evident that the Ontario School Board was about to change the face of science in every school, from grade 6, 9 and 11, with the new teachings of Astronomy in science. Though most of the teachers teaching science may not have had experience in astronomy, Dr. John Percy of the University of Toronto showed us, that we as amateurs can make a difference, both with teachers and with the students. This meeting was a stepping stone for one member at the Kingston Centre. Laura GagnÚ to initiate a Teachers Seminar, which included a helpful binder with lots of tips along with the help of Centre members, was held on November 3. It was to give information to the teachers, and help them to understand the areas that may have been fuzzy.

Throughout the year, the youth group and public observing sessions were quite a hit. Though the youth group took a break in the summer months, it will be starting up again this fall. Lots of summer activities were evident this summer, with Telescopes for Telethon, a project that was hosted by our honorary President, David Levy and his wife Wendee. This project was to raise funds for Muscular Dystrophy though astronomy. Our Centre participated at a public observing session in June, and raised funds that will remain in Canada for the Canadian Chapter of the Muscular Dystrophy Association.

With thanks to Don Mastrianni, our June meeting along with our July public observing session, which was on the night of the 30th anniversary that man first stepped on the moon, (July 20,1999) had a display of Apollo paraphernalia and NASA information for the members and public to view and experience, the thrill of touching another heavenly body away from Earth.

To reinforce the feeling of lifting off and seeing the Earth as a magnificent body, was Julie Payette, who gave a public talk on October 28 at Grant Hall, sponsored by Queen's. Her experience on flying in STS-92 mission and now her work with the International Space Station has shown, how we all can become part of the growing universe.

And the year is not over yet. We still have many things planned for the Kingston Centre. We will be entering in the Festival of the Trees, for the first time. Our tree will be known as "Astronomical Wonders". This goes to a good cause, by the donation of the tree by Canadian Tire, and the decorating by our Centre Members; it is auctioned off to help our Hospitals. The Awards Banquet is on November 27, and our final meeting before the Christmas Holidays on December 10. Though the year is coming to a close, in astronomy there is always a new discovery, what shall we see in 2000.

ATM Report

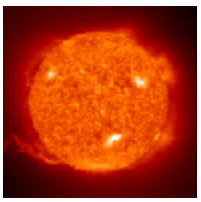
by Kendra Angle

The 24” mirror is finished grinding and is moving to the polishing stage. It should take about 20 hours to polish. We decided at the meeting on 10 December to polish by hand but look into modifying the machine. We also decided to buy the diagonal and build the tube and a portable mount.

I need people skilled in metalworking or woodworking as well as unskilled helpers. Everyone’s help is wanted. Here are areas I need help in: anyone who is interested in helping and has experience in any of the following spray or brush painting, reading and following drawings, screw together pieces, filling holes, sand by machine or hand, rout corners, drill holes with a drill press, use a table saw, tap holes, cuts metal with a hack saw, welds, file metal or knows about electronics Please let me know. If you have skills not mentioned that may be helpful, please let me know too. I would prefer by phone at 376-3908 or e-mail at Kendra Angle <angle@istar.ca>

Rotation of the Sun

by Hein van Asperen



It is well known that the rotation speed of the sun is different for the various altitudes. I could not find detailed information about the rotation speed and decided to extract it from the extensive data I have collected when designing maps for the sun in successive rotations.

There are some problems. First, when looking for sunspots, I project the sun-image on a screen, with a 60mm diameter circle and a rectangle grid spaced 10mm. From this projection I copy the spot in my observing file which has an identical circle with grid. I found this method quite accurate but small errors will occur. Secondly the spots are not fixed on the sun's surface but are known to move.

For this study I used spots which were single (eg type S or X in McIntosh sunspot Group Classification) and which I would have observed for at least six times.

In order to complete the sun-spot map I must first calculate the longitude of the spot and this is the information I use to calculate the synodic speed of the spot. The time of observation is the date, plus the hour expressed in days.

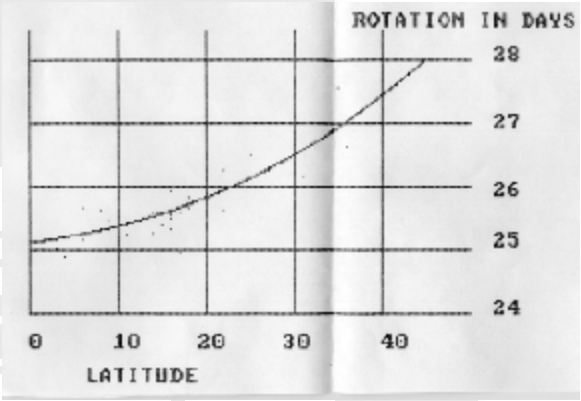
The graph Longitude = f (time) should be a straight line but due to the above mentioned errors this is seldom the case. With a statistical program I find the best fitting slope and the standard deviation for this particular set of information. The slope is the angle of rotation in one day as viewed from the earth.

This is done for a large number of sets of information, each with the corresponding latitude value. The initial graph (rotation in days) = f (latitude) showed some irregularities which were caused by the above errors. Most times the standard deviation was very large. These errors were quite obvious. Eliminating these values I ended with 30 values for the northern hemisphere of the sun. These 30 values were used in a regression analysis program. A second degree curve fitted the values best. The best fit equation is:

SA=13.3437233 - 0.009353*L - 0.0005220*L^2

where SA= Synodic Angle in one day and L=Latitude

Because the earth also moves around the sun I have to correct this angle with the angle that the earth moves in one day (360/365.25 degrees). The sidereal angle is the sum of these two values. The sidereal rotation speed of the sun equals 360/(sidereal angle).



In the attached graph the individual observations and the best fitting graph are shown.
I did not have sufficient data from the southern hemisphere of the sun but a few points available give the impression that the rotation pattern is symmetrical.

Membership Changes

✤Jim Purser: old email
New email:
✤Jim Towgood, Summerland BC V0H 1Z0

Welcome New Members!

☺ Dean North,, Kingston On
☺ Mrs. Gayle Rewbotham,, Waterdown, ON
☺ Donald M. Lever,
☺ Thomas Massey, Kingston, ON
☺ Kingston Collegiate & Vocational Institute

Science Department, Matt Saunders, 235 Frontenac Street, Kingston, ON
☺ Regiopolis-Notre Dame Catholic High School Science Department, Jim Complak, Kingston, ON
☺ Stephen Hart and Ian Wilson, Graeme Wilson, who were voted and welcomed into the Kingston Centre. The current membership (if everyone has renewed) will stand at 193.

Our condolences to the family and friends of one of our US members, Rev Anderson Bakewell of Sante Fe, New Mexico, on October 13th, 1999 He was 86.

Editor's Corner

by Kevin Kell

Another New Year and yet another Newsletter redesign. Not too much of a change, mainly just moving from one wordprocessor (Corel Wordperfect 7) to another (Corel Wordperfect 8) and touching up the newsletter template.

Membership continues to grow. My personal goal is 200 and another National Council Rep.

With regard to the Expanding Their Universe Project. A subpart of this was creating slide sets to complement the manual and the curriculum. In the end we made 12 copies of 2 sets of 40 slides(that's approx 1000 slides!), individually labelled them, and stuffed them into slide pages. Along with that went several pages of documentation. And we sold them all!

2000 - For those following the debate about the when the "M" word actually is, you have come to realize that even amongst our own, opinions are quite varied. The most sensible of those in the debates (in my humble opinion) are those that shrug it off and plan to party in both years.

As we end 1999 we have seen two very sad failures at Mars and as I write this, one very successful repair of the Hubble Space Telescope.

RASC Kingston Centre Meetings

The Kingston Centre RASC meets once a month on the 2nd Friday of each month at 8:00 pm (20:00) in Mackintosh-Corry Hall, Room B-201 on Queen's University Campus **unless noted otherwise.** We have adopted a policy of moving any meeting that is held on a holiday weekend to the **WEEK BEFORE**.

Event Horizon 2000

! Friday January 14th Regular meeting. Regulus newsletter available. Guest Speaker Dr. Judith Irwin (Queen's University) about her time on sabbatical in India

! Friday February 11th Regular meeting. Guest Speaker: Walter MacDonald (Kingston Centre) "A CCD Imaging Primer: Imaging Made Easy and Fun" This CCD Primer will discuss CCD imaging for the beginner, using a minimum of equipment and effort.

! Friday March 10th Regular Meeting. Regulus Newsletter available. Guest Speaker: Roger Hill (Hamilton Centre) - How to build an observatory for $500

! Friday April 14th Regular Meeting. Guest Speaker: Randy Attwood (National President) on the Apollo Program

2000 Officers and Executive Council
PO Box 1793, Kingston, On K7L 5J6
Infoline & asnwering machine xxx-xxx-xxxx

President: Doug Angle
Vice President: Laura Gagne
Secretary: Susan Gagnon
Treasurer: John Hurley
Librarian: Don Mastrianni
Editor: Kevin Kell
National Council Rep: Susan Gagnon

Standing Committee Chairs:
Observing Group: Tom Dean

ATM Group: Kendra Angle
Youth Group: Hank Bartlett
Astronomy Day: Don Mastrianni
Publicity: Kim Hay
Awards: Dave Pianosi

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

* The password to the secure section has changed effective Friday January 14th
The userid remains ***rasckingston***
The new password is ***regulak2000***
remember these are case-sensitive!
* Some audio clips from the 1997 GA Dunning Hall event are now online (warning! They are large!)
* Astronomy Day 2000 info
* Search engine capability for our web site
* Meeting minutes and annual reports

Observing Group Meeting

Saturday January 15, 2000 Saturday at 7:00 pm.
Dave and Aimee Pianosi

Heading west from Kingston on Hwy 2 just a km or so past Westbrook is a road called Clark Rd.

February TBA

The Newsletter of the Kingston Centre of the Royal Astronomical Society of Canada

Newsletter Submission Info: The deadline is the 3rd Friday before regular meetings in odd numbered months. The preferred method is E-MAIL, then disk, lastly paper.
E-mail: <***kell@cliff.path.queensu.ca***>
Fax: 1-613-533-2907 (with cover page to Kevin Kell)
Post: Box 2033 Kingston Ontario K7L5J8 Canada
ascii or most major word processors (Corel WP8 for windows preferred) via E-mail or 3.5" DOS floppy disk