



# Regulus



The Newsletter of the RASC Kingston Centre

2002 January - February

## 1961-2001 - 40 Years of Astronomy in Kingston

### *Submissions from Members*

#### **2001 A.V. Douglas Award Winner: Susan Gagnon**

This year's recipient of our centre's highest award has much in common with our founder, for whom the award is named. Showing selfless dedication to the centre and its well-being, this person has been actively involved in centre activities since joining us. Having served on the GA organizing committee in 1997, our winner then went on to serve as National Council Representative, Secretary, Astronomy Day Coordinator, and has also taken part in many public events, usually as part of the committee that organized them. She has also been the organizer of the annual banquet. In short, whatever activity our centre is involved in, Susan Gagnon is there ready to make things happen. She is our ray of sunshine and the energy that moves us. Thank you Susan, for making our centre the finest in the RASC.



2001 Awards Banquet- Susan Gagnon and her short acceptance speech!

#### **The Leonids on November 18, 2001 by Richard W. Schmude, Jr.**

Members of the Association of Lunar and Planetary Observers (ALPO) have been monitored several meteor showers for over a decade and at least one paper has appeared in the professional literature as a direct result of ALPO data. This brief article will describe my observations of the Leonids and it is hoped that this article may inspire others to carry out systematic meteor observations. On the morning of November 18, I observed the Leonids for 2.50 hours and was able to count 607 Leonids, a half-dozen other meteors and two fireballs. (A fireball is a meteor with a magnitude of  $-4$ ). I had a fairly good observing site and my limiting magnitude was  $+5.3$ . The only problem with my site was some residual haze (or smoke) from a nearby forest fire. There was also a glow to the northwest on the horizon, which had not been seen in previous nights. My observing site is located at  $+33.12^{\circ}\text{N}$  and  $+84.11^{\circ}\text{W}$  and is at an elevation of 650 feet or 200 meters.

Table 1 lists my observations. The first column lists the Universal Time increment. (Universal time is the time standard used by astronomers around the world). The second column lists the number of Leonids observed in the 15-minute interval listed in the first column. The third and fourth columns list the number of Taurids and other meteors observed during the time interval. The fifth column lists the faintest star that I could see in the direction that I was looking at; my eyes are not the best and I have never seen stars fainter than about  $+5.7$ . The altitude of the radiant (the part of the skies where the Leonids meteors appear to be coming from) is listed in the sixth column and the last column lists the Zenith Hourly Rate (ZHR) of Leonids. The ZHR represents the number of meteors that would be visible for a limiting magnitude of  $+6.5$  and when the radiant is at the zenith. The zenith is the point directly over your head. If the ZHR exceeds 1000 then there is a meteor **storm** instead of a meteor **shower**. As can be seen in Table 1, the ZHR exceeded 1000 for about an hour and so there was a Leonid meteor storm on Nov. 18. After talking with other Atlanta Astronomy Club members, the results in the table are about what was observed elsewhere.

The Association of Lunar and Planetary Observers are interested in systematic studies of meteor showers such as this. In order for your data to have scientific value; however, one must record the following information for the observing session:

- 1) The number of Leonids observed (Leonids are all meteors that appear to come from the constellation of Leo)
- 2) Record the exact time of the beginning and end of the observing session
- 3) Note the limiting magnitude; this is the faintest star that you can see in the direction that you are looking at; star magnitudes can be found in standard star atlases such as the AAVSO star atlas.
- 4) Percentage of the sky covered by clouds.
- 5) The longitude and latitude (to within a degree) of your observing site; this can be obtained from a map of the United States.
- 6) Your name and address.

Meteor data can be sent to Robert Lunsford at: [lunro.imo.usa@home.com](mailto:lunro.imo.usa@home.com) or it can be mailed to: Robert Lunsford, 161 Vance Street, Chula Vista, CA 91910.

Table 1: Observations of the Leonids made by Richard W. Schmude, Jr. from a location near Barnesville, GA on the morning of Nov. 18, 2001.

Time Interval (U.T.)	# Leonids	# Taurids	# Other meteors	Limiting Magnitude	Altitude (degrees)	ZHR
8:39-8:54	28	0	1	5.0	47.7	599
8:55-9:10	40	0	1	5.3	51.0	618
9:10-9:25	35*	0	2	5.3	54.1	519
9:25-9:40	39	0	0	5.3	57.2	557
9:40-9:55	49	1**	0	5.3	60.2	678
9:55-10:10	73	0	0	5.3	63.2	982
10:10-10:25	81	0	0	5.3	66.1	1064
10:25-10:40	96	0	0	5.3	68.9	1236
10:40-10:55	95	0	0	5.3	71.5	1203
10:55-11:10	71	1	0	5.0	73.9	1168

\*A fireball was observed at 9:17:45 U.T. The fireball was a Leonid, which briefly flared to around -8; the flare was so bright that it hurt my eyes a little. This event may have hurt my night vision during this time interval. This fireball left a cloud that was visible for 3-4 minutes.

\*\* A slow moving fireball occurred at 9:47:45. The fireball was moving south and reached a magnitude of -4. At least one spark came off of this fireball. At first I thought that this object was a plane.

## Signage Project

by Kevin Kell

Start of the Project: 2001 December 8th

### Intro

This project does not start off with my standard tale of inspirational astro-dudes coming back from another great experience at the NYAA StarFest Star Party. Instead it comes from one too many public observing sessions where our signage got left behind because it was too unwieldy to take along.

We made a sandwich board style sign that stood 36" high and 24" wide some time ago for use at events where folks weren't quite sure who we might be (eg at public observing sessions in dark public parks in Kingston) :) It held a couple of signs and pouches containing some of our brochures.



Well, here is the new design, measuring in at 18" x 28", still large enough to carry 3 brochures and business cards, with the added bonus of a back side that can be used for larger handouts (8.5"x11") like "Getting Started in Astronomy" and "ISS Passes over Kingston this week". Kevin currently has possession of this artifact, as I (he/me?) partake in most public events.

The new design features: 1"x2" frame (the old one was 2"x2"), aircore plastic faces, a smaller footprint, two sides to fold together, held there by velcro so the sides don't flop around, string instead of chain to limit the spread, a battery powered red light source to illuminate one side, velcro sticking pouches that can be removed and replaced at will, and a carry handle.

If you are holding any public events, feel free to borrow the sign at any time. Brochures are available from our Publicity Chair, Kim Hay.

## RASC-KC Participation in our Community

By Kim Hay-Public Relations Chair

In January 2001, the Kingston Centre was invited to come and sit in on local tourism meetings held by the Land 'O' Lakes Tourism Bureau (<http://www.lol.on.ca/>) and the OMAFRA (Ontario Ministry of Agriculture, Food and

Rural Affairs). The Land 'O' Lakes takes in a region from Kingston, east to Brockville, north of Highway 7 and West over to Trenton.

Several members attended this meeting in Kaladar, Ontario that discussed how businesses and vendors could come together, and develop products and stimulate economic growth in the region. We presented ourselves, as being able to help businesses as part of a package that could boost awareness of Astronomy and Dark Skies. This would mean presentations and observing sessions with the Bed and Breakfast's in the area, as well as special events.

The meetings continued on in February, March and a most recent one in Bath held on December 11, 2001. The Land 'O' Lakes have been chosen by OMAFRA as a special pilot project. There have been 5 consultants hired to come in the area as a Resource Jump Team and help to tie business together for growth and marketing. We had the pleasure of meeting one of the Jump Team members, Robin Tapley of the Grandview Dark Skies Resort (<http://www.muskoka.com/tourism/grand/>). There will be a report form the Jump Team and a meeting in January 2002.

A small presentation was given to the membership at our meeting on December 14, explaining what has been going on, and the membership was asked if as a Centre would we be interested in being part of this great opportunity. The majority of the membership gave a **Yes** vote. So, I will be heading up this project and act on behalf of the RASC-Kingston Centre. If you have any questions, or would be willing to help in anyway, please feel free to contact me at 613-542-3974 or <[kimhay@kingston.net](mailto:kimhay@kingston.net)>

## Editor's Corner

by Kevin Kell

One of the new duties I've taken on recently (2001 October 15<sup>th</sup> to be exact) is that of RASC National organization webmaster at <http://www.rasc.ca/> After a lot of little cleaning up here and there, I'm expecting to lay out a new front page design come the first day of 2002. Comments and feedback are especially appreciated, as are ideas for useful content to Society members.

### Visit Mars today! (MLP)

Mon Nov 19th, 2001 at 08:05:52 PM EST

You can buy satellite images of the earth from Ikonos. You can even get your driving directions based on satellite images from mapquest.com, but can you look at any part of Mars you want?

Now you can.

<http://cmex-www.arc.nasa.gov/Atlas96/Atlas96.htm>



2001 Awards Banquet - Hank Bartlett and Mark Kaye

Thanks to the Viking Orbiter spacecraft, and the US Geological Survey in Flagstaff Arizona, you can now view satellite images of any part of Mars. The map is completely interactive and offers three levels of resolution with the greatest detail pictures covering an area the size of Wyoming. So, go forth and explore our sister planet.

The **Regulus Award** was instituted in the Fall of 2001 and is awarded annually to the Centre Member who has the best article published in *Regulus* over the past year.

This years' winner was **Dave Pianosi** for his article on "ATM Telescope Transport Box" in the July 2001 issue. Dave could not attend the Banquet, so the award as mailed out to him.

## Messier Hunters

We have **12** members who have completed the list to date. (Names at

<http://members.kingston.net/rasc/messierclub.htm>)

Name	old status	recent additions	Current Totals
Tom Dean	36	0	36
Laura Gagne	65	0	65
Peggy Hurley	55	0	55
Kevin Kell	65	5	70
Kim Hay	17	0	17
<b>Vic Smida</b>	<b>110</b>	<b>0</b>	<b>110</b>
Fred Werthman	50	0	50
Hank Bartlett	0	0	0

Our last few **Public Observing Sessions** actually went ahead with good weather

**Tuesday November 20th** saw only members

**Tuesday December 18th** -to be reported next issue as this is after the 2002 Jan/Feb print deadline.

As of November 2001: Meetings have moved from 8:00pm to 7:30pm and from Mac-Corry Hall to Stirling Hall Theatre D

**What's New at the Kingston Centre Web Site**

- updated Donations, Help Wanted, Public Observing, Messier Hunters Club pages
- added lat/long/elevation chart on observing page
- added Kingston Cloud Forecast link
- added Cutoff lighting log for Kingston

**Web Site Passwords:**

The current members-only RASC-KC web site password will be changing in early January 2002, roughly about the time you receive the January/February 2002 issue of Regulus.

The National members-only RASC website password is not expected to change anytime soon as it's purpose is mainly to keep out web search engines.

Until then the current userids and passwords for these two members-only sites are listed at the bottom of page 10.

**Kingston Centre Membership Information**

We'd like to do a better job at thanking all of you who have seen fit to make financial donations to the centre. So as the new national monthly reports come in, we'll be adding your name to the web page

<http://members.kingston.net/rasc/donate.htm> and to the newsletter.

Those I (Kevin) know of for the last few months in 2001 (and I am trying to track down the information for the rest of the year as well, so if you have and don't see your name, it will be listed soon!):



2001 Awards Banquet -  
Laura Gagne and Ruth  
Hicks

Gerald Millar (Kingston, On),  
Joseph Pasek (Murietta, Ca,  
USA), Leo Enright (Sharbot  
Lake, On), Raymond Berg  
(Crown Point, Indiana, USA),  
William Blades (Valhalla, NY,  
USA), William Hanson  
(Menominee, MI, USA),  
Howard Yamasaki (Hawaii,  
USA)

**Thank you!**

Current Membership Total of the Kingston Centre (as of Nov 31, 2001): 150

**Treasurer's Corner**

by John Hurley

Treasurer's Report for year Ending Sept. 30, 2001

Royal Astronomical Society of Canada - Kingston Centre

**REVENUE**

Membership Fees - Regular	\$ 2214.00
- Basic Surcharge	684.00
- Special Surcharge	15.00
Life Member Grants	160.00
Donations	223.00
Fundraising	286.00
Educational Activities	1608.00
Interest & Dividends	14.00
Sale of Observer's Handbooks (net)	90.00
Sale of RASC Calendars (net)	767.00
Sale of BOG's (net)	20.00
Advertising	0.00
General Assembly - Including Travel Grants	0.00
Miscellaneous	1468.00
<b>TOTAL REVENUE :</b>	<b>\$ 7549.00</b>

**EXPENDITURES**

Fees Remitted to National Office	\$ 345.00
Library	0.00
Meetings	725.00
Newsletter	1305.00
Annual Dinner (net)	0.00
General Assembly - Including Travel Grants	0.00
Equipment & Supplies	2420.00
Office Administration	468.00
General Expenses & Audit	0.00
Educational Activities	2000.00
Insurance	0.00
Awards & Donations	89.00
Observatory	873.00
Miscellaneous	862.00
<b>TOTAL EXPENDITURES</b>	<b>\$ 9087.00</b>

<b>DEFICIT ON OPERATIONS</b>	<b>\$ 1538.00</b>
<b>BANK BALANCE FROM PRVIOUS YEAR</b>	<b>\$17110.00</b>
<b>BANK BALANCE END OF YEAR</b>	<b>\$ 15572.00</b>

(Editors Note: from my examination of the numbers, the entire deficit is completely accounted for by capital acquisitions which are not reported on in this Annual Report to National. Our educational inventory alone sits at \$890 (cost) and the observatory entry is our 24" telescope project at \$873 for a total of \$1763 and this does not even take into account the tent!)

And for item we sell Centre members on Centre produced material you get a 20% discount!

<b>Item</b>	<b>Regular price (member price)</b>
<b>Books</b>	
Expanding Their Universe Grade 9 (ETU)	\$15 (\$12)
Worlds to Discover Grade 6 (WTD)	\$15 (\$12)
Careers in Space (CiS)	\$5 (\$4)

**Misc**

RASC-KC pins	\$6 (\$4.80)
Slide Set #1 (40 slides)	\$75 (\$60)
Slide Set #2 (40 slides)	\$75 (\$60)
Slide Set #3 (20 slides)	\$35 (\$28)
Grade 9 Combo #1 (ETU9, Slide Set #1 or #2, CiS)	\$90 (\$70)
Grade 9 Combo #1 (ETU9, Slide Sets #1&#2, CiS)	\$160 (\$125)
Grade 6 Combo #1 (WTD, Slide Set #3, CiS)	\$50 (\$40)
RASC2002 Calendars	\$15
Beginners Observing Guides	\$15
Observers Handbook 2002	\$22
<b>Memberships</b>	
Regular 1 Year	\$49
Youth (under 21) 1 Year	\$27.50

Orders must be prepaid by cheque or by Institutional Purchase Order. You can email [rascexec@cliff.path.queensu.ca](mailto:rascexec@cliff.path.queensu.ca) or see our online catalog at <http://members.kingston.net/rasc/educate.htm> or mail the order to PO Box 1793 Kingston Ontario K7L 5J6 Canada

## Notes from the Secretary



2001 Awards Banquet - Terry Hicks and Leo Enright

seemed to work well.

Laura called the meeting to order and Doug began with the beginners observing tips and a list of prominent objects in the November sky, as well as a reminder of the Leonids peak next weekend November 18 early am. Next Paul introduced our guest speaker for the evening, **Dr. Barry Robertson**, who spoke on the recent excitement surrounding **SNO results** and what they say about neutrinos and particle physics. It was a very informative talk and it is easy to understand the stir that these results have caused. After a quick round of Q and A, a break was announced and members had a chance to carry on the discussion with Dr. Robertson.

### Minutes of the Regular Meeting: November 9th 2001

November 9 marked the 1<sup>st</sup> meeting in our new location, Stirling D lecture theatre. The meeting also began 30 minutes earlier, to allow the beginners observing tips and general welcome to take place without putting off the commencement of the guest speaker's presentation. This

During the break draw tickets and **Banquet** tickets were sold. After the break Laura thanked Doug and Susan for going to STAO and presenting the wares of the Education Committee again this year. Hank carried out the draws, Tessa won the wine commemorating our move to Stirling, and Dave Maguire won the 50/50. John then carried on with the Annual reports with the submission of the **Treasurers report.**

Over all the Centre is in good shape. Peggy seconded acceptance and the **Motion was carried.** Peggy then gave a report on the **National Council** meeting held in October. **NGC certificates** awarded included Jan Wisniewski, and there was a round of applause. Other items of interest were formalizing the process for awarding **Special Project Grants, Astronomy Day 2002 will be April 2.** The constitution committee will continue to work on a proposal covering the **decoupling of fees**, if a satisfactory proposal can be presented at the next Council meeting, a vote could take place in Montreal at this year's GA. Susan's Secretary report was brief with little coming the mail and **November 20** as the last date to get your money in for Banquet tickets. **Vice P.** Paul announced that the December 14, meeting would be a members night. Kevin, **Editor** gave the deadline of December 14 noon for the Jan 2002 newsletter, and the last newsletter and the CD-ROM yearbook were mailed out and most people should have one. The next **public observing** session will be November 20<sup>th</sup>. Doug said that parts for the 25inch are still going out, but things are a bit slow right now in the **ATM** department. Jan will host the next **CCD** meeting November 17<sup>th</sup>. Susan and Doug gave brief **STAO** reports. Doug said that the schools are now looking for CD's rather than the slide sets. Some teachers are have problems getting slide projectors. Laura is working on getting at a revision of the grade 9 book. Leo asked if he could get back issues of Regulus for 1999 and Kevin will look into this. Hank reminded members that there are plenty of great slide sets in the loan library and people can take them home to see what there is and enjoy them. The meeting wound up with a CCD movie that Jan made of Comet Linear, very cool. Despite the early start the meeting went into overtime again..... but we are working on it. Adjourned to Harvey's at 22:30 (or later).

### Minutes of the Regular Meeting: December 14th 2001

With Laura delayed by weather, Paul called the meeting to order at 19:47. The **VP** report was short and sweet, a general call for speakers and speaker ideas. It turns out that David Levy was double booked for May and that event is now off. John's **Treasurer's** report was mainly a request for people who had not renewed to do so and if you were unsure of your date or had lost your form, contact John.

Our **Librarian** David presented 3 new books he had acquired for the Centre plus an assortment of others for loan. You can also contact David and request specific

books that he can bring to a meeting for you. Susan's **Secretary** report was that there was not much to report, on the usual correspondence but she did have people to thank for all of the help with the Awards Banquet, those who assisted in officiating and all of the prize donors and prize purchasers. Peggy, **National Council Rep.** encouraged a dialogue on the decoupling issue and a quick show of hands that indicated a general lack of interest in decoupling, a lot of work for no real gain. The waters will be tested again next meeting so that Peggy knows how the centre wants her to vote. Jan announced that the next **CCD** meeting would be December 15, at his house. There were no reports from **Editor, ATM or Observing.** Kim reported as **Land O Lakes tourism contact** that the December 11 meeting was very worth while. The purpose of the JUMP team seems to be to report back early in the new year and let the group know what direction to head in as far as getting grants, marketing etc. is concerned. A brief discussion about how much the centre could expect to participate followed. Kim also made contact with a representative of the Grandview resort and received an invitation to come up and see the place. Laura arrived and gave out a round of Presidential thank you-s that she was unable to deliver at the banquet. After a short break there were draws, wine and 50/50 and a bonus from the banquet. Brief talks then began starting with Bill Broderick and some efforts to combat pseudo science and the promotion of critical thought and respect for the scientific method. Laura presented an overview of Aristotle's Philosophy and the fruits of his careful observations of nature, resulting in much theorizing. Jan showed us 5 movies of Comet Linear that he had made over that last 5 months, very cool. Steve Manders updated us on his theories on how instabilities in the Sun's core have influenced ice age cycles. Steve thought that the SNO results may help him out but it was not to be. Susan presented a calendar of events to be reviewed in the new year, and next month there will be a recommendation for the selection of Astronomy Day. The Meeting was then adjourned 22:20.

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### CCD Group News

The first two power supplies are still in the process of collecting sufficient parts, to be assembled over the xmas holidays.

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### Education Group News

STAO (Science Teachers Association of Ontario) 2001 was pretty quiet, with a few orders coming in. There appears to be more and more data projectors appearing to replace 35mm slide projectors and we are looking into "electronic-fying" our education materials.

## REGULUS AND FRIENDS

### by David Orenstein (RASC Toronto)

Based on some of the mathematical techniques I included in my talk on Astronomy Education to the Kingston Centre last November, here's what can be found out about Regulus (Alpha Leonis) and its friends Denebola (Beta Leonis) and Algieba (Gamma Leonis).

Table I is the data on these stars from page \_\_\_ of the "Bright Star" table from the 2001 OBSERVER'S HANDBOOK. As you can see Algieba is a double. Algieba is almost due north of Regulus and Denebola is to the East. But what is their precise separation both in distance and apparent angle?

The celestial coordinates (r, alpha, delta) of the table can be converted to rectilinear coordinates (x,y,z):

$$\begin{aligned}x &= r \cos(\delta) \cos(\alpha) \\y &= r \cos(\delta) \sin(\alpha) \\z &= r \sin(\delta)\end{aligned}$$

I'll do the detailed calculations for Regulus and just report them for Algieba and Denebola.

$$\begin{aligned}xR &= rR \cos(\delta R) \cos(\alpha R) \\&= 77 \text{ ly} \cos(+11 \text{ degrees } 58') \cos(15 \cdot (10 \text{h } 8.5 \text{m})) \\&= 77 \text{ ly} \cos(11.977 \text{ degrees}) \cos(152.125 \text{ degrees}) \\&= 77 \text{ ly} (0.97823) (-0.8840) \\&= -66.583 \text{ ly} = -66.6\end{aligned}$$

$$\begin{aligned}yR &= rR \cos(\delta R) \sin(\alpha R) \\&= 77 \text{ ly} \cos(11.977 \text{ degrees}) \sin(152.125 \text{ degrees}) \\&= 77 \text{ ly} (0.97823) (0.46734) \\&= 35.2 \text{ ly}\end{aligned}$$

$$\begin{aligned}zR &= rR \sin(\delta R) \\&= 77 \text{ ly} \sin(11.977 \text{ degrees}) \\&= 77 \text{ ly} (0.20752) \\&= 16.0 \text{ ly}\end{aligned}$$

Checking, does  $rR = \text{SQRT}(xR^2 + yR^2 + zR^2)$  ?

$$LS = rR = 77 \text{ ly}$$

$$\begin{aligned}RS &= \text{SQRT}(xR^2 + yR^2 + zR^2) \text{ ly} \\&= \text{SQRT}((-66.583)^2 + (35.217)^2 + (15.979)^2) \text{ ly} \\&= \text{SQRT}(5928.861419) \text{ ly} \\&= 76.999 \text{ ly}\end{aligned}$$

This is exact agreement given the original data.

Similarly, for Denebola:

$$(xD, yD, zD) = (-34.8, 1.64, 9.05) \text{ ly}$$

For Algieba:

$$(x_A, y_A, z_A) = (-107.4, 50.0, 42.8) \text{ly}$$

We now know the distances from the Sun to Regulus and its friends. Now we can calculate the distance between them, using an extension of the Pythagorean Theorem to three space.

$$\begin{aligned} \text{RD} &= \text{Regulus-Denebola Distance} \\ &= \text{SQRT} [ (\text{delta } x)^2 + (\text{delta } y)^2 + (\text{delta } z)^2 ] \\ &= \text{SQRT} [ (x_D - x_R)^2 + (y_D - y_R)^2 + (z_D - z_R)^2 ] \\ &= \text{SQRT} [ (-34.8 - (-66.6))^2 + (1.64 - 35.2)^2 + (9.05 - 16.0)^2 ] \\ &= \text{SQRT} [ 31.8^2 + (-33.56)^2 + (-6.95)^2 ] \\ &= \text{SQRT} [ 1011.24 + 1126.2736 + 48.3025 ] \\ &= \text{SQRT} [ 2185.8161 ] \\ &= 46.753 \\ &= 46.8 \text{ ly} \end{aligned}$$

Similarly, RA = 51.0 ly and DA = 93.5 ly.

The four stars, including the Sun, are now the vertices of an irregular triangle. Each face is a triangle with sides of known length. We now have enough information to determine the angles on each face. There are four faces each with three interior angles for a total of twelve.

For example  $\angle \text{RSD}$  is the angle between Regulus and Denebola in our sky. Using the Cosine Law:

$$\begin{aligned} \angle \text{RSD} &= \arccos [ (\text{SD}^2 + \text{SR}^2 - \text{RD}^2) / (2 * \text{SD} * \text{SR}) ] \\ &= \arccos [ ((36 \text{ ly})^2 + (77 \text{ ly})^2 - (46.8)^2) / (2 * 36 * 77) \text{ly}^2 ] \\ &= \arccos [ (1296 + 5929 - 2190.24) / 5544 ] \\ &= \arccos [ 5034.76 / 5544 ] \\ &= \arccos [ 0.90813 ] \\ &= 24.751 \text{ deg} = 24.7 \text{ deg} \end{aligned}$$

Similarly  $\angle \text{RDS}$  is 136.5 deg. That's the angle between Regulus and the Sun when viewed from Denebola.

Because the angles of a plane triangle total 180 deg, it's now trivial to calculate the remaining angle of the Regulus-Sun-Denebola Triangle,  $\angle \text{SRD}$ . It's the angular separation of the Sun and Denebola in the skies of Regulus.

$$\begin{aligned} \angle \text{SRD} &= 180 \text{ deg} - (\angle \text{RSD} + \angle \text{RDS}) \\ &= 180 \text{ deg} - (24.7 + 136.5) \text{ deg} \\ &= 180 \text{ deg} - 161.2 \text{ deg} \\ &= 18.8 \text{ deg} \end{aligned}$$

Calculating the remaining nine angles of the tetrahedron is your homework assignment. Yes, it will be on the exam.

Next issue we'll look at how bright the four stars look to

each other, time and editor permitting.

Table I Regulus and Friends in OH 2001

Name	Bayer alpha (h m)	delta (deg ')	D(ly)
Regulus	alpha Leo A	10 08.5	+11 58 77
Algieba	gamma Leo A	10 20.1	+19 51 126
	B		126
Denebola	beta Leo	11 49.2	+14 34 36

Pedagogical Note:

The mathematical skills used here are used in the Ontario Grade 10 Math Course where trigonometry is introduced, including the Sine Law and the Cosine Law for solving general triangles. Distance in XYZ 3-space is an extension of distance in XY 2-space learned in Grade 9.

Biographical Note:

David Orenstein <[david.orenstein@utoronto.ca](mailto:david.orenstein@utoronto.ca)> is a member of the Toronto Centre who loves visiting Kingston and winning wine in the Kingston Centre's raffles. He teaches mathematics at Danforth CTI, in downtown Toronto, where mathematical astronomy is on the course of study. He is a member of the RASC's national Public Educational Committee.

## Observing Group Meetings

These are regular meets at the home of members who volunteer their locations and homes to us on or near a new moon. Contact Tom Dean if you are interested in hosting a session.

**November:** cancelled

**December:** TBA

**January 2002:** TBA

**February 2002:** TBA



2001 Awards Banquet - Jan Wisniewski being presented with the "don't clean your ccd chip with your shirttail award" - a can of air.

Day, etc).

## Equipment Loan Program:

- \* The scopes are available to members in good standing and the standard borrowing time is one month.
- \* At present there is no charge for borrowing.
- \* A short checkout is required on the scopes before you haul them away.
- \* If you have a scope during a public event, the Observing Chair may require you to bring it to the event (eg, public observing session, Astronomy

\* You are liable for the equipment and will be required to sign it out and have it operational.

- ☆ 25cm (10") f5.5 "Douglas" Dobsonian
- ☆ 20cm (8") f7 "FitzGerald" Dobsonian
- ☆ 20cm (8") f4.5 "Barney" Dobsonian
- ☆ 11cm (4.5") f4.3 "Bushnell" Voyager
- ☆ 11cm (4.5") f7.9 "Orbitor 3500" Equatorial
- ☆ 5 barndoor tracking platforms
- ☆ Collimating Tool
- ☆ Binocular Set #1 B&L7x50
- ☆ Binocular Set #2 B&L10x50
- ☆ Binocular Set #3 Bushnell 7x50
- ☆ Binoculars Set #4 Stem 7x50
- ☆ 19mm Televue Panoptic Eyepiece
- ☆ Filter Set - ND13, 4 colour, O3 nebula - all 1.25"
- ☆ Kodak Ektagraphic 35mm slide projector
- ☆ hundreds of 35mm slides in a dozen sets

Effective November 2001: Meetings have moved from 8:00pm to 7:30pm and from Mac-Corry Hall to Stirling Hall Theatre D

## RASC Kingston Centre Meetings

The Kingston Centre RASC meets once a month on the **2nd Friday of each month at 7:30 pm (19:30) in Stirling Hall** Theatre D 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**.



2001 Awards Banquet - Paul Winkler checking out his door prize.



2001 Awards Banquet - Di Bartlett checking out her door prize.

## 2002 Officers and Executive Council

PO Box 1793, Kingston, On K7L 5J6  
 Infoline & answering machine 613-542-3974  
 Email: [<rascexec@cliff.path.queensu.ca>](mailto:rascexec@cliff.path.queensu.ca)

We also have an email chat list "rascchat". Send your email address to Kevin Kell to be added to the RASCCHAT list.

**President:** Laura Gagne

613-xxx-xxxx <xx>

**Vice President:** Paul Winkler

613-xxx-xxxx <xx>

**Secretary:** Susan Gagnon

613-xxx-xxxx <xx>

**Treasurer:** John Hurley

613-xxx-xxxx <xx>

**Librarian:** David Maguire

613-xxx-xxxx <xx>

**Editor:** Kevin Kell

613-xxx-xxxx <xx>

**National Council Rep:** Peggy Hurley

613-xxx-xxxx <xx>

## 2001 Committee Chairs (2002 to be appointed)

ATM Group Chair: Doug Angle

Astronomy Day Chair: Don Mastriani

Awards Chair: Dave Pianosi

CCD Group Chair: Jan Wisniewski

Education Group Chair: Laura Gagne

FallNStars2002: Kevin Kell

Light Pollution Abatement Chair: Kim Hay

Membership Chair: Kim Hay

Observing Chair: Tom Dean

Publicity Chair: Kim Hay

Social Activities: Susan Gagnon

Youth Group: vacant

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

**Newsletter Submission Info:** The deadline is the 3<sup>rd</sup> 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 cdrom or 3.5" PC floppy disk

## Help Wanted

Interested in helping out the Centre?

Don't have a lot of time to be Observing Coordinator? ATM Chair? Youth Group Chair? Astronomy Day Chair?

Then maybe the following is of



RASC-KC 40<sup>th</sup> anniversary display

interest to you, a list of relatively small projects that you can throw your creative energies at while contributing to the Centre!

## Help Wanted Projects

☆ **Display boards** based on the design of the 3 previous displays (RASC-KC 40 years, ATM, LPA) for Astronomy Day 2001)

- Holleford Crater, Canadian Observatories, Meteor Observing, Solar Observing, Lunar Observing, CCD imaging, Sundials and any other educational topic you can think of.

The intent here is that once we can get enough polished displays up and running, we can arrange to set them up in public without the need for human supervision (since that is what we are so chronically short of these days), possibly in some of our public libraries, or schools.

☆ **Barn Door Type IV Tracker** We'd like to build 10 of these (5 for loan, 5 for sale) advanced manual driven camera trackers (two arm for higher tracking accuracy). We'll provide the drawings, you cut and finish (varathane) the wood.

☆ **Newsletter Article indexing** - similar in concept to the 1996-2001 index published in the Regulus 2001 Nov./Dec



RASC-KC Light Pollution display

Issue, but for all previous issues.

☆ **Screen savers** of astronomy to help promote the centre (would be able to download from our web site)

☆ **MS Powerpoint or Corel Presentations** electronic presentations of astronomy lectures/seminars/ etc.

## ☆ Plans for a public Sundial -

We are trying to develop a "Tourist Day Trip" package that would include information on astronomically related items to stop and visit in the Kingston Area.

So far we have:

- Holleford Crater
- Miller Hall Geology Museum (Holleford crater)
- Ellis Hall Observatory
- Stirling Hall Astronomy displays

-Kingston Sundials (Centennial Park is the only one we have found to date). The sundial concept is multipurpose. We would like to build a solid stone or metal sundial at our future observatory site, and at the same time approach the city or other organizations that may want a large sundial in a city park, or parking lot or wherever. So first, we need the mathematical plans and layout for our latitude, somewhat scalable depending on the locations involved.

Are there any more astronomically related sights that a public tourist might be interested in, within the Greater Kingston Area? If you can think of any and/or are willing to help, contact Kim Hay!



## Kingston Kosmic & Event Kalendar 2002

Prepared by Kim Hay

For more detailed information, please refer to the RASC 2002 Calendar, and the RASC 2002 Observers Handbook. Available from your local promotions committee or from National Office,

<http://www.rasc.ca/>

Month and Date	Event
Friday December 21	Winter Solstice –shortest day of the year starts at 2:23 am est.
Saturday December 22	Ursid Meteor Peak
Saturday December 22	1 <sup>st</sup> Quarter Moon
Sunday December 30	Full Moon Penumbral Lunar Eclipse
Tuesday January 1	Happy New Year, 2002
Thursday January 3	Quadrantid Meteor Peak 1 pm. EST
Saturday January 5	3 <sup>rd</sup> Quarter Moon
Friday January 11	RASC-KC Regular Meeting Stirling Hall - D, Queen's University 7:30 pm.
Sunday January 13	New Moon
Saturday January 19	CCD Imaging Group- Host Jan Wisniewski
Monday January 21	1 <sup>st</sup> Quarter Moon
Saturday January 26	Jupiter 3°W. of Moon best seen in east of N.America
Thursday January 31	Zodiacal Light visible in west after evening twilight for the next 2 weeks
Sunday February 3	3 <sup>rd</sup> Quarter Moon
Friday February 8	RASC –KC Regular Meeting Stirling Hall-D, Queen's University 7:30 pm.
Sunday February 10	Juno at Opposition , Mercury 5° North of Moon
Monday February 11	–Winter Star Party, Florida Keys <a href="http://www.scas.org/">http://www.scas.org/</a> Feb 11-16
Tuesday February 12	New Moon
Wednesday February 13	Farthest Lunar Apogee in 2002 8:00 pm
Saturday February 16	CCD Imaging Group- Host Jan Wisniewski
Tuesday February 19	RASC-KC Public Observing Session- Murney Tower 6:30-7:30 pm
Wednesday February 20	1 <sup>st</sup> Quarter Moon, Moon occults Saturn visible in most USA, East in Canada 7:00 pm
Friday February 22	Jupiter 0.6° S. of Moon best seen in North part of N.America
Wednesday February 27	Largest Full Moon of 2002, Closest Lunar Perigee of 2002 at 3:00 pm.
Saturday March 2	Zodiacal Light visible in west after evening twilight next 2 weeks
Tuesday March 5	3 <sup>rd</sup> Quarter Moon
Friday March 8	RASC –KC Regular Meeting Stirling Hall-D, Queen's University 7:30 pm.

Effective 2002 January 11<sup>th</sup> WebSite Passwords for Member-only Secure areas:

RASC-Kingston: user: xxxxxxxx pass: xxxxxxxxxx

RASC-National: user: xxx Pass: xxxxxxxxxx