December 2009

# Regulus

RASC Kingston Centre

The Crab Nebula (M1), as imaged by Brian McGaffney at L'Amable, Ontario (100km south of Algonquin Park, elevation 1400 feet, sky darkness 20.2 mag/arcsec$^2$). This LLHaRGB image was taken with an 18" f/9 Ceravolo astrograph and an Apogee U32 camera (8128x8128 4u pixels) at 2.2 arcsec/pixel and cooled to -65C. Total exposure time was six hours.

## December 11th Meeting & Dinner

**Susan Gagnon**

THIS IS JUST A REMINDER about the December 11 meeting when 2nd Lieutenant Raymond Francis, former member of the European Space Agency will speak to us about Space Programs beyond North America. If you wish to attend the traditional pre meeting dinner with the invited speaker please send your name along to the exec list or the chat list or my email at sdgagnon@kos.net. I have found a new restaurant to try and it is downtown. The Queen's Inn is on Brock St. across from the Post Office. I have reviewed the menu and they carry standard pub fare with some green things available. Prices are reasonable. I will reserve in my name so I will need numbers. I will be looking for feedback on this location after the dinner. Later at the meeting there will be light refreshments as we celebrate the end of IYA and look forward to 2010.★

## In this issue:



## Upcoming Meetings

### Friday, December 11, 2009

**Regular Meeting** 7:30-9:30 p.m.
**A Perspective of Space Programs Beyond North America**
Raymond Francis, former member of the European Space Agency

### Friday, January 8, 2010

**Meeting** 7:30-9:30 p.m.

### Friday, February 12, 2010

**Regular Meeting** 7:30-9:30 p.m.
**The Antikythira Mechanism**
Dr. Daryn Lehoux, Queen's University Department of Classics

### Friday, March 12, 2010

**Regular Meeting** 7:30-9:30 p.m.

Meetings are held at 7:30 p.m. at Stirling Hall Theatre "A" on Bader Lane at Queen's University in Kingston, Ontario. Our meetings are co-sponsored by the Queen's Physics Department and include astronomy lectures open to the public.★

## KAON Public Observing

**Saturday, December 12** 7:30 p.m.

**Saturday, January 9** 7:30 p.m.

**Saturday, March 13** 7:30 p.m.

KAON (Kingston Astronomy Outreach Network) sessions are held at Queen's Observatory on the 4th floor of Ellis Hall.★


**More info at kingston.rasc.ca**

## KAON Report: November 14

**Susan Gagnon**

THERE WERE 52 VISITORS to the Observatory last night and **Stephane Courteau** gave a very good talk about North American observatories that he has worked at. Lots of great photos and a bit of history of the emergence of giant scopes—even a photo of the young Stephane, 16 or 17, of his first local observatory experience near Lévis, Québec ending the slide show with a recent return visit to that scope, a photo including locals instrumental in encouraging amateur astronomy there over the years.

We gave away a Galileo scope as a door prize and that was very popular. We will give away another one at the December KAON and then have two left for next year.

This brings us to 903 visitors with one session to go in 2009. Let's hope for clear skies for December when we will have cake! Cake and sky! Imagine! Thanks to **Brian Hunter** and **Steve Hart** who came out and to **Hank Bartlett** for the handouts.★


The Little Dumbbell Nebula (M76), imaged by Brian McGaffney; 10-hours of exposure.

## RASC-KC Board of Directors

| | |
|---|---|
| **President:** | Susan Gagnon |
| **Vice President:** | *vacant* |
| **Secretary:** | Steve Hart |
| **Treasurer:** | *vacant* |
| **Librarian:** | David Maguire |
| **Editor:** | Walter MacDonald |
| **National Council Rep:** | Brian Hunter |

## 2008-09 Committee Chairs/Coordinators

| | |
|---|---|
| **Astronomy Day:** | *vacant* |
| **Amateur Telescope Makers:** | *vacant* |
| **Awards:** | Kevin Kell |
| **Banquet:** | *vacant* |
| **Education:** | *vacant* |
| **Equipment Loan:** | Kevin Kell |
| **Fall 'N' Stars:** | *vacant* |
| **KAON:** | Susan Gagnon |
| **OAFTN Instructors:** | *vacant* |
| **Observing:** | *vacant* |
| **Publicity:** | *vacant* |
| **Relay for Life:** | *vacant* |
| **Responsible Lighting:** | *vacant* |
| **Webmaster:** | Walter MacDonald |

## Regulus Needs You!

Items of interest from members—full articles, or even just a couple of paragraphs are always welcome. Items are gratefully accepted on each and every day of the year! Send items to:

walter2 (at) starlightccd (dot) com

or:

Walter MacDonald
PO Box 142
Winchester ON K0C 2K0

**The Fine Print:**

Members of the Kingston Centre receive *Regulus* as a benefit of membership. Non-commercial **advertisements** are free to members of the Centre. Paid commercial advertising is also welcome and should be in electronic format.



**RASC Kingston Centre**
PO Box 1793
Kingston ON K7L 5J6

**E-mail:**
kingston@rasc.ca

**Infoline:**
613-377-6029

**Website:**
kingston.rasc.ca

# Notes from the President

**Susan Gagnon**

### *November Notes*

THERE WERE A FEW CHANGES made at the November meeting. As some of you already know, I am your new president and am very pleased to have the chance to serve the Centre in this capacity. We also have a new National Council Representative in **Brian Hunter**. This is a position that has been covered in an *ad hoc* manner for the last few meetings and we are happy to have Brian bringing a new perspective and enthusiasm to the position. We look forward to his report as he was barely elected when he sat in on his first meeting. We also have a new Auditor, **Doug Angle**. We failed to find a Vice President or Treasurer. These are also only two-year terms and both need to be filled. I will wait for some folks to come forward and then we will organize an exec meeting in the new year. I look forward to 2010 and our refreshed executive board!

### *January 2010 Meeting*

Please note that the January will be a member's night and I need to know who wishes to participate. I will be on the list with some photos of modifications to the SGO this past fall. Also please come with your ideas on what you would like to see along the lines of meeting content or anything else that you would like to bring up.

### *KAON 2010*

In March the Centre will provide a speaker for the KAON session at Queen's so if this appeals to you let me know. This will be part of the much talked about scaled back participation and so far we are committed to minimum of January, March, Astronomy Day, October and December pending review of our volunteer base. We will probably need a second speaker for either October or December.

### *Thanks to Kim & Kevin*

I would like to take the opportunity to thank our outgoing Executive members who are taking a well deserved break. **Kim Hay** and **Kevin Kell** have been tireless volunteers for the Centre for as long as I have been a member and well before that. Taking a break from executive office is very important for active volunteers as it gives them a chance to pursue other activities that they have had to sideline due to hours spent on Centre events and projects. I suspect that there will be a lot more observatory hours logged at their house and plenty of NGCs tracked down in 2010. Thanks to you both for all of the exec hours devoted to IYA and all that went before it. Put your feet up and recharge! ★

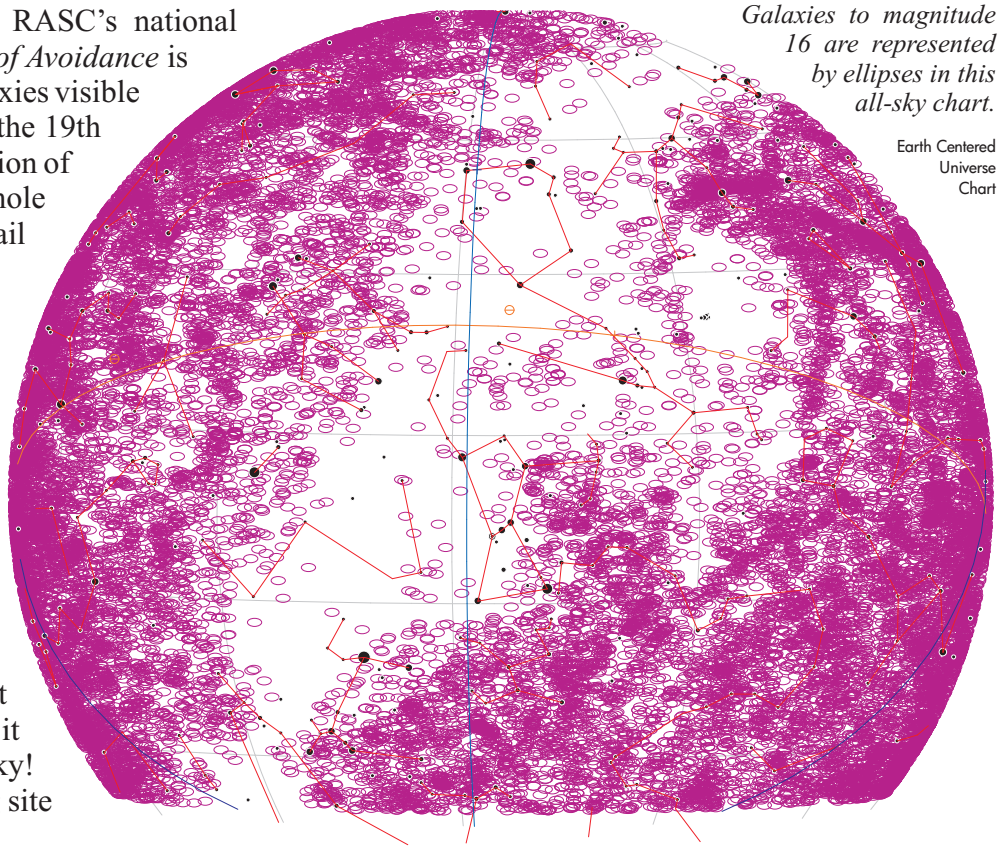
*Susan is Kingston Centre's new President-for-Life!* ☺

# The Zone of Avoidance

**Walter MacDonald**

NO, IT'S NOT THE AREA where the RASC's national council meetings are held! The *Zone of Avoidance* is an area of the sky that has very few galaxies visible in it. It wasn't until the latter part of the 19th century that this feature of the distribution of galaxies was noted. By this time the whole sky had been surveyed in sufficient detail that a sky map could show this.

This zone occurs because the material (gas, dust, stars) that makes up our home galaxy (The Milky Way) blocks our view of objects behind it. In recent decades astronomers have been able to partially "lift the veil" by looking at infrared and radio wavelengths which allow us to see through the Milky Way. The most interesting discovery made in this way is the galaxy Maffei 1. This is the closest giant elliptical galaxy to us; if it were not obscured by the Milky Way, it would be the brightest galaxy in the sky! If only we could travel to an observing site on the other side of our galaxy...



*Galaxies to magnitude 16 are represented by ellipses in this all-sky chart.*

Earth Centered Universe Chart

# Laser Pointer Safety

**Kevin Kell**

*Green Laser Pointers (GLPs) made it into the news in early November with amateur astronomers specifically mentioned, and this immediately triggered a huge discussion on the RASC's national e-mail list (known as the "RASCals" list). The RASC is expected to release an official position/statement on this issue in the near future, but in the meantime Kevin's article will bring us us all up to speed on the responsible use of green (and other colour) laser pointers.*

GREEN LASERS ARE IN THE NEWS, due to the growing problem of lasers being pointed at aircraft in flight, causing temporary blindness in pilots. At critical times, such as takeoff and landing, this can be akin to shooting an air to ground missile at them.

This is not good. Consider this article an effort at due diligence to educate amateur astronomers in the safety side of using green lasers.

We use green laser pointers for public education and outreach and also amongst ourselves when trying to point out a particular feature of interest in the sky.

Previous to green lasers, you would hear out in the dark observing field: "ok. start at that star over there by three others and go left 4 stars and a little up and then starhop your way over 3 stars to the right." Even at the best of times, the star hopping technique requires some base knowledge of the sky, similar orientations, and often still failed.

Today, we can be among a group of 10 or 20 people, talk, point and instantly everyone is on the same feature.

EfstonScience in Toronto sells these and the price has dropped to $70. From the website:

> "The latest in laser research yields another technological breakthrough! Forget about the red lasers of yesteryear, this new green laser pointer is the smallest and most powerful yet!
>
> Significantly brighter (about 50 times) than a red laser pointer and much more noticeable to the human eye (the green wavelength of 532nm appears brightest to the eye), the uniform round beam yields superior quality at long distances compared to most elliptical red laser pointers. And unlike a red laser, the green beam can be seen in mid-air in dark conditions rather than just the pointer beam dot. This allows you and your audience to follow the direction of presentations, lectures, star constellations, clouds, sky pointing and signalling. All eyes and audiences will love you for it."

The downside is that they can be hazardous, both at close range and at long range.

Proper use is to aim it down at the ground while you are looking for the "on" stud. Once you have verified the momentary on switch, you can turn it off, raise it from the ground and point it in the general vicinity of the feature of interest and turn it on again.

Common sense rules:

- do not point it at any person
- do not sweep it through a crowd of people.
- never aim it at aircraft

That's pretty straightforward, no?

Two more warnings found on the Internet:

- Do not allow minors to use a pointer unsupervised. Laser pointers are not toys.
- Do not point a laser pointer at mirror-like surfaces. A reflected beam can act like a direct beam on the eye.

As a community we should be the most well educated users of these tools and educate others in there use and potential dangers. ★

# Imaging Update

**Hal Boden**

WHEN I WROTE a recent article on the integration of scopes and imaging devices (see page 9 of last month's *Regulus*), I was not aware of the Bushnell Imageview. This is a digital spotting scope that uses a 5.1 megapixel image capture which can be output to a flip-up 2.5-inch LCD screen. It can also take stills or video saved to an (up to 4GB) SD card and it has a USB port. Whilst meant only for viewing bright objects, it clearly shows that an easily portable system for astronomical observing is quite feasible using the appropriate chips.

The price of the Imageview is about the same as a mega-zoom camera. See bushnell.com for more information on this spotting scope imaging system. ★

**"...it behooves us who are amateurs to remember that most of the detail of procedure, equipment, reference literature, comes from those so gifted as to formulate these in orderly form for us to explore."**

**—Franklyn Shinn**

# National Council Meeting Report

Brian Hunter

THE NATIONAL COUNCIL MET by teleconference on November 21, 2009. Many of the motions were of a housekeeping nature and will not be discussed here (full minutes are available in the Members Area of rasc.ca). The following is a brief outline of the meeting.

1. The **2011 General Assembly** does not yet have a home.

2. **Walter Helm Fund**:
The Helm fund results from a donation to the RASC in the 1960's and has been used at the David Dunlap Observatory. It was more convenient for the fund to be administered by the University of Toronto and the administration was turned over to the University. However, with the sale of the DDO, the fund administration reverted to the RASC. This is not entirely simple because the use of the money changes if the DDO were to be 'destroyed'. Has the DDO been destroyed? No, but it is no longer a research facility. It is going to take a court ruling to sort this out. Trustees were appointed by the Executive Committee: Randy Atwood, Dave Lane, and Meyer Tchelebon (*ex-officio* as Treasurer). The appointments were open ended but, after an hour's debate, the National Council will review the terms at the second Council meeting of the 2011 General Assembly.

I do not understand why this issue was so controversial. Most of the time between now and the 2011 GA is going be taken up sorting out the legal issues and writing terms of reference. The only point being debated was whether to put a time limit on the process.

3. A proposal was supported to hire a **Portfolio Manager** to look after the Society's long-term investments. These investments now total about one million dollars.

4. A continuation of the CASCA/FAAQ/RASC **public outreach** effort beyond the 2009 IYA was supported.

5. A new **Public Speaker program** was endorsed. This program will replace the Centre Projects Granting Program and the Speaker Travel Assistance Program. The details are being worked out but the idea is that travel funds will be made available to Centres to bring in speakers (usually members of other Centres).

6. The **Constitution Committee** has made a series of proposals which were all supported. They are going to simplify the by-laws and generate a policy document to permit changes to be made in the ways the Society operates without the complexity of by-law amendments. They are also developing a proper graduated disciplinary policy. At the moment the only way to discipline a member it to call a special meeting of the membership to expel the offending member! They also looking to develop a revised Family membership and they were warned about the possible financial implications for Centres if the Associate membership revenues are not properly shared.

7. Money ($2500) was advanced through the **Education Committee** to permit the RASC sponsor the 2011 National Science Fair in Peterborough.

8. The **Light Pollution Abatement Committee** has prepared revised guideline for Dark Sky Preserves and Urban Star Parks.

9. **Executive Director**:
The Executive Committee has made a proposal that the RASC should hire an Executive Director. There was an hour-long discussion of the issue. The suggestion is driven by the amount of time the Executive Committee members are devoting to the Society. This leads to two sub-issues: member burnout and key jobs not getting done.

There is considerable concern in the National Council about the cost of the proposal. Several Council members expressed specific concern over the effect on membership of a fee increase that the Executive Committee estimates at six dollars per year.

While I understand where the Executive Committee is coming from, I think the proposal is, at the very least, premature. The society is in good financial shape but it is also in a state of financial flux. The effect on the balance sheet of the last fee increase has not had time to get sorted out, the IYA and a grant from CASCA distort the current financial year, and the sale of the Dupont street property have changed the Society from being a landlord to a tenant. The decision to hire a Portfolio Manager will have an unknown but hopefully positive effect of the returns from the investments. Furthermore, the Executive Committee estimates a salary of $50K to $60K per year for an Executive Director. When I look at the job description, I think they are low by a factor of two! Their $6 fee increase goes through the roof.

In addition, it is clear to me that there is a disconnect between the Executive Committee and the general membership on the value of the National Office.

The Executive Committee is determined to include an Executive Director in the budget they bring to the March 2010 National Council meeting. I will not be able to attend the meeting in person but I shall attend by telephone.

Continues on page 10...

# November Observing Reports

Various Members

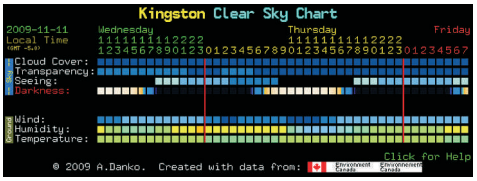
### *November 8/9*

**Kevin Fetter** *took a break from satellite imaging to observe an occultation of omicron Cancrii:* The moon was very bright, but I could make out the lunar limb; the sky was hazy, due to passing cloud. The star reappeared at 6:44:59 UTC (Nov 9). I also observed a geo sat called XM-2 (#26724) flare up for a while, making for a nice view. It reached the magnitude 7 range.

**Susan Gagnon:** I got out to the observatory for a little over an hour last night and although it was not the best sky, I enjoyed it verrrrrrry much. I was able to bag NGC 7006 and I do not know if it is on any observing list but it gave me a great bit of entertainment. rounded out the session with Andromeda and friends and M33, Jupiter, and Cygnus.

Don't miss this warm weather opportunity to do that winterizing before your fingers freeze. Sunday afternoon I made a couple of outrigger cozies to put out when there are freezing rain warnings. a lot of ice build up can keep the roof closed for days.

**Kevin** *replies*: It was nice to see a clear sky last night (though it was on the hazy side). It wasn't clear all night long, but had a longer clear sky than the night before.




### *November 10/11*

**Walter MacDonald**: Wow, get a load of that Clear Sky Clock! It's like we are in Arizona or something. I'm still not well enough to go outside for a visual session, so thank goodness for CCD! Dark frames are running now in preparation for another all-night imaging run.

Last night's run got off to a rough start when I discovered the telescope was lost. It took me half an hour to get Vega on the CCD. During my visit to the dome, I happened to notice it wasn't lining up perfectly with the scope. Of course—I had (once again this year) forgotten to turn off the daylight savings time flag in the dome software. After that it was smooth sailing, with the run starting at 18:34. At 04:32 the first "out of memory" message appeared and the run crashed three minutes later, and the computer woke me up. I restarted the run and it continued without incident until the end of astronomical twilight at 05:47. Tonight saw another new record set for number of variable stars imaged: 262.

Looking at the ACP log file, it looked like the memory error message was a Visual Basic thing. Reviewing the code, I discovered a possible cause in the subroutine that takes the images. I had modified this subroutine some time ago, creating a focuser object and a dome object. It turns out I forgot to destroy the dome object at the end of the subroutine. With the larger number of images being taken these nights, the extra dome objects eventually consumed the all of the available memory! This was happening after approximately 1000 images had been taken. D'oh!

Including astro twilight we now have nights over 12 hours in length, and they are getting longer all the time. You have to like that.

### *November 12/13*

**Kevin:** I was checking on another flashing geo sat, when I caught a different one flashing called Gstar 4. Gstar 4 was giving naked eye flashes, near the Orion Nebula, making for a nice view. Too bad it takes awhile for it to give a flash. I captured it on video in order to measure the time between flashes later.

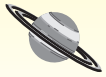
Now to watch the other one give flashes, as I have noticed faint flashes from it which should get brighter over time.

### *November 15*

**Walter**: I am pleased to report that Winchester Observatory was imaging four nights in a row last week. Having a robotic observatory has been a great thing as I recover from H1N1. 600 variables were imaged in the four nights including a whack of new (for me) SDSS variables. We were very lucky to be in the sweet spot, weather-wise: each morning I could see a low, solid bank of cloud spanning the southern horizon—the north edge of the northeaster that is drenching the US eastern seaboard.

There were a few equipment problems this week. The telescope was lost at the beginning of the night on Tuesday night, but I managed to get it synched to the sky after half an hour. At the end of the night, the scope did not park properly, so of course it was lost again at the start of Wednesday night's session. After half an hour of effort I still could not get the scope oriented (even after looking through the finderscope, which obviously is not collimated with the main scope). So it was that I had to remove the camera and actually LOOK through the telescope! What a concept. Of course, this meant that I had to do new flat frames at dawn, but at least I was able to get the imaging run going. After

**Kevin Fetter's Satellite videos:**



*XM2*: http://www.kfetter.com/satvideo/geoflare/XM-2flare.wmv
*B-SAT B1*: http://www.kfetter.com/satvideo/flashing-geosat/25312.wmv
*Gstar 4*: http://www.kfetter.com/satvideo/flashing-geosat/20946.wmv
*Italsat 2*: http://www.kfetter.com/satvideo/flashing-geosat/24208.wmv

this it was pretty smooth sailing. The scope parked properly from this point onwards and did not get lost again.

The only other snafu was on Saturday morning when the computer experienced a USB lockup with the camera. I slept through the warning, but happily I just happened to wake up about half an hour later and discovered the situation. The computer should really have been rebooted before commencing Friday night's session (perhaps this contributed to the USB lockup?), but I thought it was going to cloud over before midnight so I didn't bother. As it turned out, it remained clear (once again) all night! So there is another lesson learned. The code fix I made in my imaging script seems to have solved the "out of memory" errors that were occurring early this week as there have been none since.

Speaking of equipment problems, SLOOH has had some kind of mount failure on their Canary Islands telescope, so no missions were being run there this week. No missions seemed to be running in Chile or Australia either, so I didn't get any SLOOH observing in this week.

Winchester Observatory's *Live Session* page was run Thursday and Friday nights, by popular demand from the crowd in the AAVSO chat room. Source code for the *Live Session* page has been sent to Bareket Observatory in Isreal (their website is bareket-astro.com/en.htm) and to the AAVSO, both of which expressed interest in building their own *Live Session* pages. I look forward to being able to observe vicariously through some of their telescopes in the future! The AAVSO in particular is amassing quite an impressive globe-girdling network of telescopes (AAVSONET) for variable star work (see aavso.org/news/aavsonet.shtml).

The view at dawn on the morning of Friday the 13th was quite beautiful: Venus, the waning crescent moon (with Earthshine!), Saturn, and Mars were arrayed across the sky. Despite a few minor equipment glitches, it was an outstanding week of imaging in Winchester. This was all the more sweet because I was not well enough to go outside and observe visually. Of course, I now have a massive backlog of photometry to do, but that is a good thing.

**Mark Kaye:** The weather channel keeps talking about clear skies and so does everyone else, yet here in Georgetown, it has been cloudy. Cloudy all day, cloudy every day when I get up, a bit of Sun during the day and then more clouds. I do not know whom to believe...


***November 15/16***

**Kevin Kell:** I went out this morning around 05:10 and took some 64sec (f/2.6) exposures on the Canon PowerShot A540. This one is of Leo, showing Regulus, Mars, and M44. I took several other shots as well and only as I was about to head in, with car headlights coming down the road, did I see ONE Leonid, streaking down near Orion, about a 25° path, mag 0 or –1 and very quick, <1 sec. This is about 25 minutes outside in total. No images of it of course...I had moved away from Orion to image Cassiopeia and Perseus.

This other shot is of Orion and the Hyades with Aldebaran. Something is funny though: what's the bright star on the far right? Sirius! Somehow the camera messed up and the left side of the frame got transposed over to the right side! Shades of old film cameras, losing their sprocket


registration!

***November 16/17***

**Hank Bartlett:** OK, just to show that someone is reading your e-mail and that I am still alive, "That is a Sirius problem!"

**Kevin K** *replies*: Glad to hear you still up and around even with the chronic *punailment*. We were up again this morning (Tuesday, Nov. 17), at 04:00 this time and didn't catch any for quite a while...the first half hour? Then a few came by...I saw two Leonids and Kim bagged four or more? More images on the camera but none of meteors.

**Susan:** I also got out this a.m.; great excuse to have cookies for breakfast! I saw three fairly bright ones but that was about it.

**Walter:** I had another 12-hour imaging run last night, and it was incident free! Even the FTP connection held steadily for transmitting updates to the *Live Session* page all night. When the session ended at dawn, the scope was on the 4th last target of the plan: Comet C/2007 Q3 (Siding Spring). This comet is 10th magnitude and currently near the variable star AL Com. It is 38° in altitude at the start of astronomical twilight. For you dawn visual observers, I suggest it is worth a look!

The *Clear Sky Clock* is looking glorious right now. Nothing but transparent skies and improving seeing ahead. (The seeing last night was poor, just as the CSC forecasted it.) Based on the current weather

Continues on page 9...

# Blast From the Past: The Pleiades

J. Ellard Gore

THE PLEIADES FORM perhaps the most remarkable group of stars in the heavens, and are probably familiar to most people, even to those whose knowledge of the constellations is limited to a few of the brighter stars. The cluster is a very remarkable and beautiful one, and forms a striking object in a clear sky. There is no other group in the heavens similar to it in the brightness and closeness of the component stars. It seems to have attracted attention since the earliest ages. Job says :—

*"Canst thou bind the sweet influences of Pleiades, or loose the bands of Orion ? "*

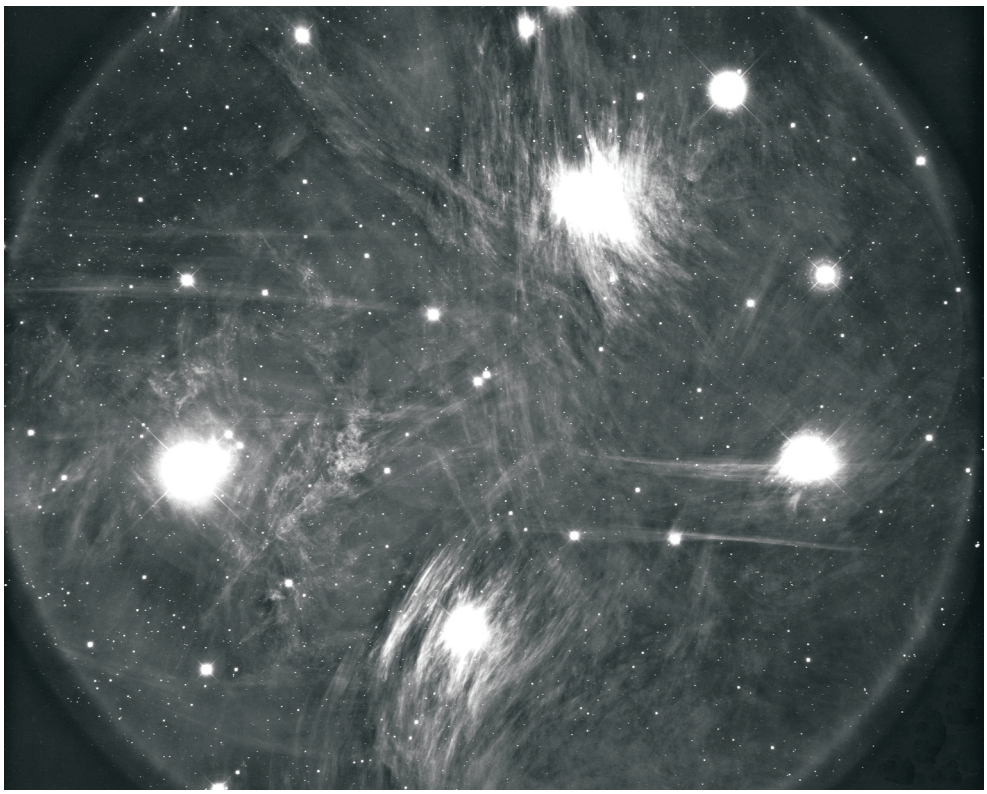
Hesiod, writing nearly 1,000 years before Christ, speaks of the Pleiades in words thus translated by Cooke :—

*"There is a time when forty days they lie,*
*And forty nights, conceal'd from human eye,*
*But in the course of the revolving year,*
*When the swain sharps the scythe, again appear."*

This passage refers to the disappearance of the group in the sun's rays in summer, and their reappearance in the evening sky in the east at harvest time. Hesiod also speaks of them as the Seven Sisters, and in Cicero's Aratus they are represented as female heads bearing the names Merope, Alcyone, Celreno, Electra, Taygeta, Asterope, and Maia, names by which they are still known to astronomers. The origin of the name Pleiades is somewhat doubtful. Some think that it is derived from the Greek word pleion, to sail ; others from the word pleios, full, a name perhaps suggested by the appearance of the cluster. Although seven stars are referred to by Hipparchus and Aratus, Homer speaks of only six, and this is the number now visible to average eyesight. A larger number has, however, been seen with the naked eye by those gifted with exceptionally keen vision. Möstlin, Kepler's tutor, is said to have seen 14 without optical assistance, and he actually measured and recorded the position of 11 with wonderful accuracy without the aid of a telescope. In recent years Miss Airy, daughter of the late Astronomer Royal, has seen 12, Carrington and Denning 14, but to most eyes, probably, 6 only are visible with any certainty. There is a tradition that although 7 stars were originally visible, one disappeared at the taking of Troy. . .

About 30 more range from the 6th to the 9th magnitude, and this is about the number visible with a good opera glass or binocular. Galileo counted 36 stars with his small telescope, but with modern instruments the number is largely increased. Some years since M. Wolf, the distinguished French astronomer, published a chart of the Pleiades showing about 500 stars, constructed from his own observations. Photography has further added to the number of stars in this wonderful group. On a photograph taken at the Paris Observatory in 1887, with an exposure of three hours, no less than 2326 stars can be distinctly counted on a space of about three square degrees. The faintest stars on this photograph are supposed to be of the 17th magnitude. Now as Alcyone, the brightest star of the group, is of the 3rd magnitude, we have a difference of 14 magnitudes between the brightest and the faintest. . .

In the year 1859 the well-known astronomer Tempel, announced his discovery of a faint nebulosity extending in a southerly direction from Merope, the nearest bright star, to Alcyone. This interesting discovery was partially confirmed by other astronomers, but from its visibility to some observers with small telescopes, and the failure of others to detect it with much larger instruments, the variability of its light was strongly suspected. The question remained in doubt for many



"M45, a portion of the Pleiades open star cluster in the constellation Taurus, at a distance of some 410 light-years. The glow around the stars is interstellar dust which shines by reflected starlight. The entire group is contained within a span of 20 light-years, and is believed to be 20 million years old. KPNO 4-meter Mayall telescope, 1975." **Image and caption: NOAO/AURA/NSF**

years, but has now been finally set at rest by photography, which shows not only a mass of nebulous light surrounding Merope, but other nebulous spots involving Alcyone, Maia, and Electra. Indeed, a photograph taken by Mr. Roberts in December, 1889, shows that all the brighter stars of the group are more or less surrounded by nebulosity. In the Paris photograph a remarkable narrow nebulous ray runs nearly east and west from the Maia nebula, north of Alcyone, and apparently connects some small stars of the 8th to the 11th magnitude. The nebula surrounding Maia is of a somewhat spiral form. The existence of this nebula was not even suspected until it was revealed by photography. It was afterwards seen with the great 30-inch refractor of the Russian Observatory at Pulkowa. Had, however, its existence been unknown, it would probably have escaped detection even with this large telescope, as it is one thing to see a faint object known to exist and another to discover it independently. Maia is surrounded by several faint stars of the 12th to the 14th magnitude, and the Russian observers believe that one of these is variable in light, as it was distinctly seen on February 5th, 1886, when its magnitude was carefully determined with reference to the neighbouring stars, but on February 24 of the same year it could not be seen with a telescope of 15 inches aperture. Some of the other stars of the group seem to be connected by nebulous rays with the principal nebulous centres, and in looking at this wonderful Paris chart it seems impossible to avoid the conclusion that the stars and nebulous masses are actually mixed up together, and not merely placed accidentally in the same direction in space.

At the conclusion of the reading of Mr. Gore's paper, a photograph of the group was thrown upon the screen. This picture was one of Mrs. Proctor's collection, and served admirably to illustrate the description given by Mr. Gore.

*Ellard Gore of Bristol, England was a Corresponding Member of the Astronomical and Physical Society of Toronto. His paper (from which these excepts were taken) was read at the meeting held on 1891 November 16 and published in the* Transactions *for 1891.*★

## ...Observing Reports

...continued from page 7.

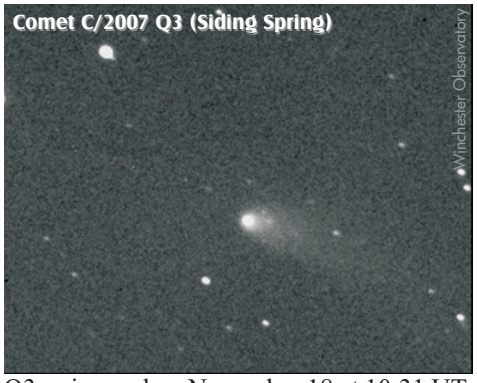
forecast it looks like we might get three nights in a row this week. I am hoping to get out a couple of times tonight and tomorrow night for some visual observing as well. I would definitely like to see 2007 Q3 visually. I'll be tweaking my plan to squeeze in a few extra objects tonight as well (including more frames of the comet). Tomorrow night I will be able to do my boatload of Mira stars once again, so my photometry backlog of 600 stars will likely double this week!

***November 17/18***

**Kevin K:** 3rd morning in a row for me... some kind of new record! Only for about 30-45 minutes or so but a much better turnout of Leonids. I wasn't recording observations as I was imaging with the camera but I saw at least a dozen between 04:30 and 05:15, spread out all over the sky, coming out of Leo.

**Kevin F:** Last night, I watched the Italsat 2 geo sat give another nice show. At around 7:45 pm, the flashes were magnitude 4 are brighter. It only flashes brightly for a few minutes. It takes under 3 minutes to give a flash, I like to observe flashing geo sat's, that don't take a long time between flashes.

**Susan:** No 'ids for me this am but I bagged a couple of open clusters in




Q3 as imaged on November 18 at 10:31 UT. Exposure 8x30s, Johnson V filter, 3"/pixel.

Lacerta. Highest points for working the constellation itself! It is not easy.

**Walter:** Despite not feeling well, I was able to start the observatory last night. At 3 a.m. I got up to go the Ottawa airport (I went along so I could drive the car back) and returned at dawn. Unfortunately, the out of memory errors returned at 3:41, about 20 minutes after I left. D'oh! So the last two hours of the night were lost, but at least the system was smart enough to park the scope. That was too bad because 250 stars had already been imaged by that point and I could easily have broken my record (I think it may be possible to do 300 stars in one night ultimately). Diving into the code once again, I discovered that my outburst detection subroutine creates three objects, but only destroys one! That is fixed now. (You would think the system would destroy those objects automatically upon exiting the subroutine, but no!) Hopefully that will fix the problem for good.

The sky was a little hazy in the wee hours, but still quite usable. At dawn it was neat to see Sirius low in the southwest and Venus low in the southeast, two brilliant beacons bookending my southern sky.

**Susan:** NGC 7006 (the DSS image is very good in verifying this object) 7243, 7209, 891 (very faint at my house, that dark lane is probably what makes it possible. I was looking east a bit and my light pollution is worse in that direction). 752, 1023, 7662 (I

Continues on page 10...

# Book Review: Re-Inventing Gravity

**Hal Boden**

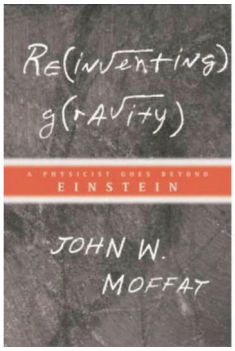
I HAVE RECENTLY READ two books on cosmology which offer a different point of view to the conventional one. The latter:

- Gives no explanation of how the 'bang' started from the singularity.
- Cannot explain the missing antimatter. (See 'The mystery of the missing antimatter.')
- Black holes might contravene the second law of thermodynamics according to some.
- Requires dark matter for which there is presently no evidence.

John W Moffat has proposed a solution to these problems with his Modified Gravity Theory. His theory:

- Covers all motion in the universe without invoking dark matter. Predicts the Tully Fisher law of galaxy rotation.
- Fits the precision acoustic power spectrum of the Cosmic Microwave Background.
- Is consistent with the luminosity-distance relationship of Type Ia supernovae.
- Correctly reproduces the matter power spectrum of galaxy distributions.

It does all this by postulating a new force which starts acting at galaxy sized distances. This new force is open to experimental testing which is in progress. The theory is symmetrical about zero with time going in opposite directions. Moffat does




not discuss this but this opens up the possibility that antimatter might be formed in the 'negative' time domain and not ours. There are no singularities in the theory so there are no problems of black holes or starts to the universe. *Re-Inventing Gravity* is well written and is free of complex mathematical physics, although references are available for those who want more detail.★

RASC·Kingston Centre

# ...Nat. Council Report

...continued from page 5.

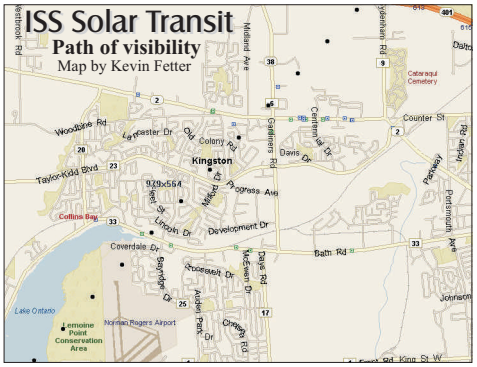
10. A serious problem has arisen of the use of **Green Laser Pointers** and Education and Public Outreach events. Transport Canada has decided that these devices are 'Astronomy Pointers' and WE are to be regulated. The Dorval Office has introduced a scheme whereby a user must apply for a one-time permit to use a Green Laser every time he or she wishes to point a laser at the stars. A committee has been struck to try to develop a policy that will define responsible use and lead to a lees onerous interaction with Transport Canada.★

# ...Observing Reports

...continued from page 9.

tracked it down as though it were a new target but once in the eyepiece it looked very familiar, so blue!)

In November I have had six observing sessions, one day a.m. and p.m. I really cannot remember the last time that happened. And it is only the 21st!

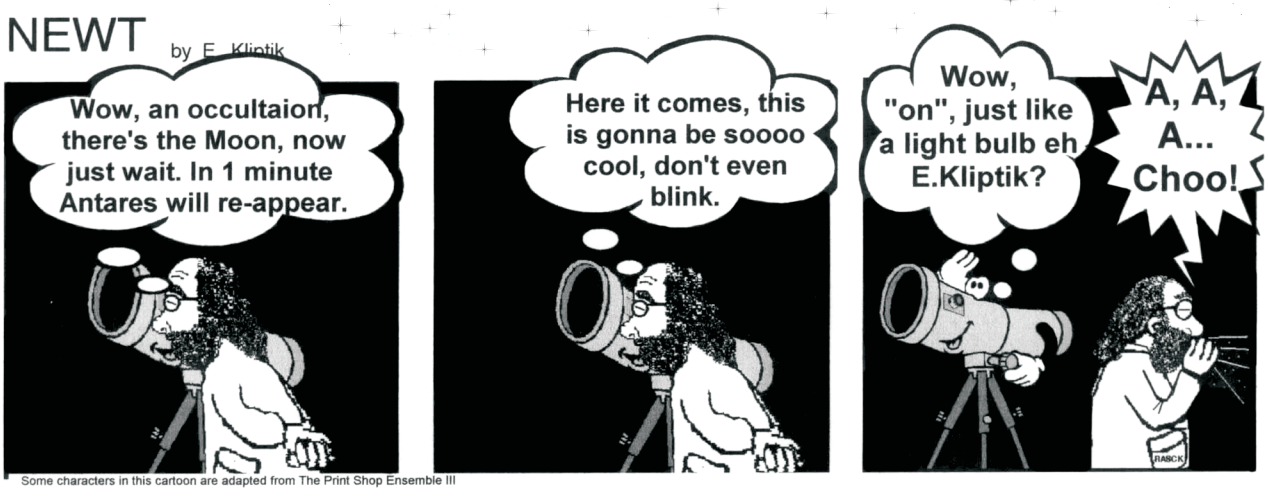



***November 28: ISS Solar Transit***

**Kevin F**: In case it's clear, anyone wants to go and observe the transit. At around 14:57 UTC, on Nov 28, the ISS is predicted to zip across the sun.

**Susan**: Thank you Kevin! The weather did cooperate and I was lucky enough to see the pass. Man is that fast. There was just enough time to verify that it was not a plane or bird. It was great.

**Kevin F**: That's why I say, don't blink It is a fast event—just like watching a lunar occultation.★




Some characters in this cartoon are adapted from The Print Shop Ensemble III