

# Nova Notes

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



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INSERT: Nova East 2007

Front page photo: Blair MacDonald  
Leo triplet - M65, M66 and NGC3628  
Canon EOS 350D, Meade SN8 8" f4 scope  
Exposure (13 x 5 minute exposures)  
(more details page 5)



## From the editor

*Quinn Smith*

First things first. My apologies for this edition being a month late. Work and travel schedules just got in the way. As for the next edition, because I would like to include the report from this year's Nova East, it will be ready for the end of September. Then I'll be back on a two month track again for the rest of the year (hopefully!).

During my travels in England and Europe, I have had very little opportunity to see much of the night sky. If you think the weather in Nova Scotia was bad in June, you should have seen it in the Midlands in England! The only "stars" I saw were on the Isle of Man, and they were riding motorcycles around at death defying speeds (the IOM TT races). But that's another story.

I have included a flyer for the upcoming Nova East (August 17th—19th) and we can only hope that the weather is as good as the last two years. This will be my third NE, and for those of you that have not had the chance to attend before, it's a great time.

Thanks, as always, to all the contributors to this edition, and may I wish you all—clear skies.

## Meeting Announcements

Meetings begin at 8:00 p.m.

Meetings are held every third Friday of the month, except for the months of July and August.

Meetings take place in room 176, Loyola Building (#3 on map) at Saint Mary's University.

All members—but especially new ones—are invited to come to the meetings 20 – 30 minutes early to participate in our new informal “Meet and Greet”. It’s a chance to ask questions about astronomy, the RASC, memberships, or to just say hello.

Executive meetings begin at 7:00 p.m., and members are welcome to attend.

## Next Meeting Dates:

(There are no meetings in July and August)

September 21, 2007

- Regular meeting

Our regular meeting with either a guest speaker, or short talks from centre members.

October 19, 2007

- Regular meeting

Our regular meeting with either a guest speaker, or short talks from centre members.

November 16, 2007

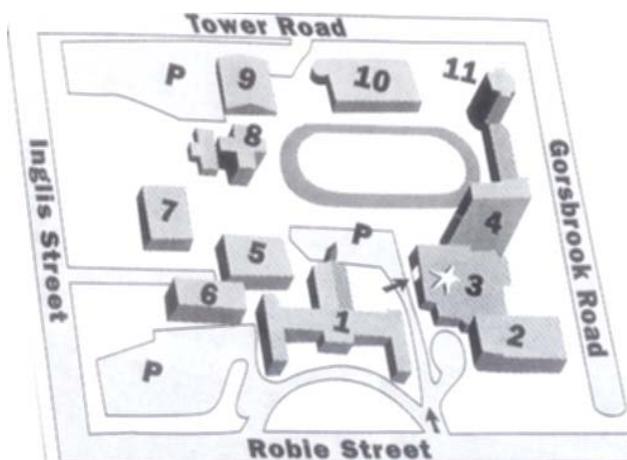
- Regular meeting

Our regular meeting with either a guest speaker, or short talks from centre members.

[The content of all meetings is subject to change]

## Meeting Location:

1. McNally
2. Sobey Building
- 3. Loyola Academic Complex**
4. Loyola Residence
5. Patrick Power Library
6. Science Building
7. Burke Building
8. Bookstore
9. Alumni Arena
10. The Tower
11. Rice
- P Parking



## Halifax RASC Executive, 2007:

Honorary President	Dr. Roy Bishop	902 542 3992
President	Paul Evans	902 827 5977
1st vice-president	Gary Weber	
2nd vice-president	Alex LeCreux	404-5480
Secretary	Wes Howie	835-3966
Treasurer	Pat Kelly	798-3329
Nova Notes Editor	Quinn Smith	852 3894
National Rep.	Pat Kelly	798-3329
Librarian	Gilles Arsenault	864 6654
Observing Chairman	Tony McGrath	463-4018
Councilor	Paul Heath	457 0610
Councilor	Jim Dorey	464-8781
Councilor	— ? —	



## St Croix Observatory - use of equipment

### Open letter from Tony McGrath - Observing Chair

A recent entry in the SCO log refers to observing with the Centre's 17.5 and 10 inch telescopes. The interesting thing about this entry is that the Centre does not own a 10 inch telescope! The 10 inch telescope formerly stored in the warm room is the personal property of one of our members. When the owner of the telescope next visited SCO he found that his telescope had been moved about, the tube had not been capped properly, and the eyepiece, which was installed in the focuser, was missing.

While the unauthorized use of this telescope was an honest mistake, we can all benefit from the experience by taking a moment to consider a couple of things. I offer the following for consideration;

1. One of the benefits of membership is that folks can store personal equipment at SCO. While any member who stores personal equipment at SCO does so at their own risk, it is a reasonable expectation that any equipment stored there will be regarded by other members as private property, and not used without the consent of the owner.

2. If you are not certain that the equipment you intend to use is RASC owned, then don't use it. At the present time, the only RASC owned equipment at SCO are the Thurlow binoculars, the 444 mm Dob and two eyepiece sets. The 150 mm Dob which is owned by the Centre is presently off site for maintenance.

3. If you are a regular observer at SCO and notice some one using or planning to use equipment that is not RASC owned, you should diplomatically point out that the equipment does

not belong to the centre and ask if they have permission from the owner.

4. When using borrowed equipment, treat it with respect. You have a responsibility to leave the equipment as you found it. If for some reason the equipment is damaged, notify the owner immediately. In the case of RASC owned equipment notify the observing chair or any member of the executive.

5. You should be competent in the use of equipment which you intend to borrow. In the case of the Thurlow binoculars, refer to the web site for specific information. In the case of the 444 mm Dob, you should be familiar with basic telescope operation and preferably have received a briefing from an experienced member.

6. Under no circumstances are guests at SCO to be allowed to borrow or operate RASC equipment. Members are responsible for their guests, and while guests are certainly welcome, the equipment being used is always to be under the care and control of a member.

7. I would suggest that any personal equipment that is stored at St Croix, should be marked as such. This should prevent any further unauthorized use of personal equipment.

Finally I would ask that any users of SCO keep an eye out for the missing eyepiece. It was likely left somewhere in the roll off, warm room, storage shed or perhaps outside. If something should turn up, please let me know.

Thanks in advance for your co-operation.

Regards

Tony McGrath  
Observing Chair

**H**ALIFAX  
CENTRE

Nova Notes The Newsletter of the Halifax Centre of the RASC

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Newsletter editor: Quinn Smith

Nova Notes is published bi-monthly in February, April, June, August, October and December. The opinions expressed herein are not necessarily those of the Halifax Centre. Articles on any aspect of Astronomy will be considered for publication.

**Deadline for the next edition is Sept 20th 2007.**

If you are a member who downloads the latest issue of Nova Notes from our website, then you may be interested in taking your name off of the mailing list for the printed version. If so, please E mail me at the above address, with the subject line "Remove from mailing list", and you will no longer be mailed a paper copy.

## Monthly Meeting Report

May 11th 2007  
Pat d'Entremont

The Halifax RASC's May 2007 meeting was held at Saint Mary's University on May 11, 2007. Our President Paul Evans could not be present, so Gary Weber chaired the meeting in his absence and did an admirable job I must say.

First order was to introduce the Executive, then ask for visitors to make themselves known by a show of hands. Since we had a few visitors, Gary pointed out the benefits of membership: Observer's Handbook, Sky News, Nova Notes newsletter, email list, book borrowing privileges, loaner telescopes, use of observatory, etc. etc.

### Astronomy Day

Gary then told us about the great turnouts we had for the recent Astronomy Day events at Kesham Goodman Library and Cole Harbour Place. At Cole Harbour Place, Nova Scotia Power even came and turned off the lights and issued a press release that helped draw a crowd.

### Light Pollution Abatement Committee

Due to renewed interest in light pollution abatement, it was decided to revive the Light Pollution Abatement Committee, headed by Paul Heath. The question was asked if anyone in the room was interested in participating, and four hands went up right away. (Anyone else interested in participating in the committee is asked to contact Paul at [pheath@eastlink.ca](mailto:pheath@eastlink.ca).)

### The Abbey Ridge Observatory:

#### A Robotic Research Observatory

Our main talk was by Dave Lane, who spoke about his observatory and projects he has underway. The observatory was built in two months of weekends in the spring of 2003. Dave has kept adding to it ever since. It is ideally located far enough from the city to have reasonably dark skies and good clearances; in fact the view of the western horizon is within half a degree of zero. Dave was also blessed with having lots of bedrock, something that is not usually desirable on one's property. But in Dave's case, being able to anchor a two-foot square cement block right on the bedrock gives perfect stability to his telescope pier.

For anyone who's actually seen it, the observatory is nothing short of spectacular: a Celestron 11-inch Schmidt Cassegrain optical tube on a Losmandy "Titan" computerized German-type equatorial mount, equipped with an SBIG CCD camera, all housed in a remote-controlled 10-foot dome. Also within this dome is a computer running all the software necessary to operate the mount, the dome, the cameras, etc. Much of this software was written by Dave himself. The computer is connected to the Internet, which means that Dave can access his equipment from literally anywhere in the world.

Dave's early challenges seemed to be cold-related. He told me

one time he didn't dare turn off the computer the first winter for fear of it freezing. Now he tells us he has a light bulb hooked up to a thermostat to keep his computer from freezing. Another adverse effect of the cold was contraction of the metal optical tube as the night wore on causing the scope to get out of focus. Dave solved that one by implementing auto-focus software.

This light-bulb-thermostat is but one of the many practical things that Dave has set up. Also included are a grocery-store barcode scanner to keep the dome oriented properly, windshield wiper motors to open and close the dome's door, a cloud sensor that will cause the dome to close if adverse weather conditions exist, and home-built software for just about everything. (He's got to find a use for a hockey puck somewhere, don't you think?)

Dave is really happy with the cloud sensor, which was built in Canada by a company called Boltwood Systems. The way it works is it compares the temperature of the sky to the ground level temperature. If the difference is less than 25 degrees, then it is cloudy. If less than 10 degrees, then it is *really* cloudy and will shut the dome. Dave has it set up so it will do this independent of his software systems.

The observatory can run automatically, based on scripts that Dave writes using his own scripting language, which he calls the Abbey Ridge Auto Pilot. He talked a lot about a project named "Differential Photometry of Variable Stars" that he is doing in conjunction with Dave Turner of SMU and a student named Daniel Majaess. Dave's equipment provides the SMU team with the data required to put together light curves for Cepheid variable stars. He points out that he derives more pleasure from "doing science" than he would by producing "pretty pictures". Some of the work he is doing in conjunction with SMU is not being done anywhere else. Dave has spent the first few years on supernova hunts but seems to be shifting into other areas of interest, like variable stars. One never ceases to be amazed by what Dave can accomplish, just for fun.

**I can just imagine some of the conversations Dave must have had in places like Canadian Tire. Maybe something like the following exchange:**

"I'd like a windshield wiper motor please."

- "Sure, what make and model?"

"Oh, it doesn't really matter... Just give me one that's not too expensive"

- "Well, you have to tell me what it's going into."

"An Astronomy Dome."

- "I've never heard of it. Is it a foreign make?"

"Never mind, just give me a half dozen hockey pucks."

## What's Up

By the time you read this, all the What's Up events will have passed. One interesting thing, I thought, was the prospect of viewing Saturn in daylight because it could be easily located close to the moon on May 22. I've actually seen both Jupiter and Saturn this way in times past. The rings of Saturn are easily seen through a telescope even in broad daylight, as are the main equatorial bands of Jupiter. I've not however, been able to see any of their moons.

## Tenth Anniversary of St. Croix Observatory

SCO is celebrating its tenth year, and a party will be organ-

ized in honour of ten years since the official opening. This will be some time in June and will be announced via the email list. In fact, it's going to be a work party, which will eventually turn into a barbeque.

## Treats and a Cloudy Night

The evening wound up in its usual manner, with treats and good conversation. The next meeting will be Friday, June 15. On my way out I glanced up and saw that the sky was cloudy. Then I jumped in my car and noticed a few raindrops on the windshield. I thought about the Boltwood cloud sensor and figured that, no doubt, Dave's dome was closed.

## Memberships

Pat Kelly

Hi everyone:

At the last meeting I said that I would check the Centre membership numbers. Here are the totals for about the last year and a half. We have gone down a bit over that time. The drop in November is normal as there are still a large percentage of memberships that are carryovers from the time when memberships always started in the fall, it takes a while for some of the people to respond to the renewal notices.

2006 Jan.	171
2006 Feb.	171
2006 Mar.	169
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Comment from Quinn:

Thank you to everyone who has opted out of receiving Nova Notes by mail.

We now have 25 members who have opted out, at a saving of nearly \$2 per issue. Because of these 25 members, the Centre will save over \$250 in printing and mailing costs over the course of a year.

If anyone else would like to un-subscribe please contact the editor at :

[novanoteseditor@rasc.ca](mailto:novanoteseditor@rasc.ca)

## Front page photo:

Blair MacDonald  
M65, M66 and NGC3628

RASC (Halifax Centre) St. Croix Observatory  
April 11th 2007  
Canon EOS 350D, Meade SN8 8" f4 telescope  
Exposure 1 hour 5 minutes (13 x 5 minute exposures)

Processing: - Thirteen 5 minute images dark, bias, flat corrected and stacked using Deep Sky Stacker-Stacker  
- Image stretched and masked layer approach used to maintain detail in bright areas  
- Noise reduction using Paint Shop Pro  
- Final sharpen using Focus Magic (a Photoshop and Paint Shop Pro plug in)

## Public Observing—April 21st 2007

### Notes from the Keshen-Goodman and the Cole Harbour libraries

#### Thanks from Ron Mills

I have been very busy trying to get a paper finished for a deadline and, I'm sorry to say that I should have taken a moment earlier, on behalf of the Sidewalk Group, to thank all those that came out to our two locations on Saturday. Cole Harbour didn't have nearly as many as I thought it might but, we were all busy, pretty much all night.

The highlights of the night for me were finally seeing Mark's new Big Whopper in the flesh, news that Gary had made a pitch regarding light pollution to the reporter at hand, touching base with Paul regarding keeping the LPA ball rolling, and with Clint who is always enjoyable to speak with. All in all, a fun night, 1st Astro Day in 3 years we didn't get rained out. Good effort, everyone, for bringing our centre to the public and enriching their lives with the firmament! A good first timer for CHP, we can work the few bugs out that popped up later.

It is also great to hear that things at KG went well too, though I lament the fact that I didn't get the sign out last week, as it increases our numbers by a factor of 500 - 600%. I had it fixed up and ready to go with new posters and text but, it was just so horribly windy I was worried about the liability of the thing taking off in the wind and flying into some mini-van packed with kids that Mom was taking to Wal-Mart

Whatever the case, success, by any measure! Pat yourselves on the back, you tiny heroes!

From the editor

I too would like to thank Ron Mills and everyone who helped out at the two observing sites.

The chance to bring astronomy to the general public is (I believe anyway) one of the most important things that the Halifax Centre can do to promote astronomy.

For the last few years we have been blessed with fairly good weather, strong participation from the membership, support from the libraries and most important a good response from the public.

For me, the chance to help out with public observing, both at the libraries and at Nova East, brings great pleasure, satisfaction and reward.

#### Cole Harbour; Gary Weber

You gotta love it when a plan comes together. I was in my car at 10:00 and was surprised to hear 96.5 FM making an announcement about astronomy events occurring at two different library locations AND that Nova Scotia Power was going to douse the lights in the parking lot of Cole Harbour Place.

4:00 found a few people setting up in the parking lot at CHP. By 6:30 we had seven small scopes set up and Mark Dryden was setting up his Obsession. Just the presence of all the scopes in the parking lot generated a lot of drive by queries (most people didn't know what that thing was that Mark was fussing with) and most people were surprised and pleased to know what we were doing there. Being that we're at the low point of the 11 year solar cycle, the sun has been absolutely featureless for eighteen consecutive days (incidentally, the previous record was 37 days in the fall of 1996). Nevertheless, there were a few people taking the odd peek at the sun and chatting, but most people just asked when they should come back.

At about 7:45, we had a visit from a microphone toting fellow from CBC Radio. Although he tried to be dispassionate about his participation, I knew we had him hooked when he looked at the moon in Paul Evan's reflector and blurted "Awesome!". He was interviewing a few people after they had viewed Saturn in my four inch refractor and I asked him if he wanted a look. He peered into the scope and said "Wow, now I know why they seem so excited". He subsequently interviewed a lot of people...many astronomers, lots of people attending & viewing and the lineman from NSP that appeared about 8:10 to ensure the lights didn't come on. By 8:25 or so the people started coming in droves. At one point it seemed there were about six people deep at most of the scopes.



Setting up at Cole Harbour

(photo—Gary Weber)

For about 90 minutes it was very busy and lots of people were cycling through the scopes, viewing different objects and everyone was very appreciative of what they could see. Shortly after 10:00 it was like someone flipped a switch and over a matter of 15 minutes, most of the people all disappeared. People were so busy at their scopes that it was difficult to determine how many people were there over the course of the evening, but the consensus seemed to place the number at 70 to 80 - a respectable turnout. By 11:00 the scopes were either packed up or in the process of being put away.

All the comments were very positive and we had many opportunities to plug the RASC, hand out some flyers and talk about astronomy and light pollution. Many people from the afternoon had returned with children in tow and I was surprised at how many very young children were OOOOing and AAAHHHing at the telescopes. Some came around twice just to have another look. Even some of the "Cool Set", the teenagers hanging out at CHP, came by and were impressed. Although it was a bit windy, and after standing out in the wind, it got a bit cool, the weather certainly cooperated with clear skies.

Here is the list of people who were at CHP

Chris Pettipas - 90mm Refractor (I think)  
Paul Evans - 200 mm reflector  
Gary Weber - 102 mm refractor  
Steve Tancock - 90 mm Mak (I think)  
Ron Mills - 150 mm refractor  
Clint Shannon - 70 mm refractor  
Alex LeCreux - 200 mm SCT  
Mark Dryden - 635 mm reflector

Kudos to Ron Mills, the Halifax Public Library and all the members of the RASC that came out. It was a great event and we all had fun.

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## **Keshen—Goodman; Gilles Arsenault**

The day at Keshen Goodman Library was indeed very slow. The total public attendance during the day was about 15 people. At night that number surged to about 80. A young boy in a wheel chair stopped by at one point during the afternoon to check out the scopes and take a look at the moon.

The highlight of the evening for me was just when Saturn was becoming visible. I was just getting it centered in my scope when a gentleman asked what I was looking at. The image was very nice and I told him to take a look. He asked if it was some sort of image that I had placed there. I have heard about this happening when showing the public Saturn, but it was the first time it's happened to me.

I was also pleased to have two of my co-workers stop by with their kids. When I spoke to them on Monday they said they had a great time. I also had an observing partner with me this year, my son Alex. He helped me set up and worked his own scope for the day.

Many thanks to all that helped put this event together and those that were able to come out and help. Listed below is a list of the members and their scopes who were at the Keshen Goodman Library.

Quinn Smith - 8 inch SC and Binoculars  
Roy Bishop - 4 inch Refractor  
Blair Macdonald - 8 inch SN  
Bill Place - 5 inch Mak  
Gilles Arsenault - 8 inch Dob  
Alex Arsenault - 4.5 inch Newt

As well there was another gentleman by the name of Mark Campbell who had his new LX 90 8 inch SC out with us. He is not currently a member but will be joining us soon.



Visitors eyeing the scopes at the Keshen—Goodman library. No stars yet! (photo—Blair MacDonald)

## Monthly Meeting Report

April 20th 2007

Quinn Smith

(with extensive help from Dr. Roy Bishop)

The meeting introductions were given by our president, Paul Evans. Guests and new members were welcomed, and it was noted that 32 members were present, with 3 guests in attendance.

A brief discussion was held regarding the sidewalk public observing sessions at the Cole Harbour and Keshen-Goodman libraries. These sessions were planned for the next day, Saturday the 21st, and it looked as though ten members would be taking equipment to the events.

Dr. Roy Bishop, our Centre's Honorary President, then gave an entertaining talk entitled "Some Neat Things About Telescopes". Armed with his encyclopedic knowledge of all things astronomical, his sense of humor, and a laptop-based presentation, the group was entertained for the next hour. The talk consisted of short "vignettes" — stories, misconceptions, and just plain interesting facts about telescopes:

- 1 Most telescopes don't telescope. Roy showed a telescope that does! Despite the name, very few telescopes collapse in on themselves as did old sea captains' "spy glasses".
- 2 Historical facts about telescopes in the 17<sup>th</sup> to 20<sup>th</sup> centuries, involving Galileo, Kepler, Newton, Cassegrain, Hall, Herschel, Draper, von Liebig, Foucault, Ritchey and Chrétien, Schmidt, Strong, and Maksutov.
- 3 Roy discussed two ways to think about equatorial mounts. The Ptolemaic view is that the mount turns the telescope to follow the stars as they move across the sky. The Copernican view is that the mount allows the supporting pier or tripod to rotate with the Earth, without moving the telescope.
- 4 Roy then talked about the resolution of a telescope, explaining that it is determined by both the wavelength of light and the aperture of the telescope. Since our eyes are sensitive to a very limited range of wavelengths, visual resolution depends on aperture. At a wavelength of 500 nm an 80 mm aperture telescope (Roy cited Chris Beckett's refractor) will have a resolution of 1.3 arc seconds, while a 200mm telescope (Mike Gatto's reflector) will have a resolution of 0.52 arc seconds. Roy also explained that the detail revealed in a planetary image varies as the area of the telescope's objective lens or mirror. Thus the latter is a surrogate for the former. Aperture is important!
- 5 Roy explained that a visual telescope is a "no focal length beam shrinker". Like a window pane, parallel light enters and leaves a telescope; but, unlike a window pane, a telescope reduces the diameter of the light beam so that all of it can enter the eye pupil.
- 6 A telescope's eyepiece has three roles: (1) It magnifies the image formed by the objective; (2) It forms a small image of the telescope's objective on the eye pupil; (3) It forms a large image of the eye pupil on the objective. Looking at the front end of a telescope, an eye pupil, the size of the objective of the telescope, is there — the dreaded "Cyclopes" that all extra terrestrials are familiar with!
- 7 Roy went on to explain that the surface brightness of the diffraction disk of a star is proportional to the 4<sup>th</sup> power of the aperture. That is, doubling the aperture increases this brightness by 16 times. No wonder that aperture is important! (At this point Roy referred to Mark Dryden's 25-inch beast). In comparison, the surface brightness of an extended object (for example, a galaxy, nebula or planet) can be no greater than it is with the naked eye, and is actually less because of light losses in the telescope optics. Increasing the magnification makes the brightness even dimmer. However, although a telescope cannot increase the surface brightness of an extended object, the larger image makes it easier to see detail in the object.
- 8 A telescope is a time machine — in two ways. Firstly, Roy explained that because light takes time to travel, the information it carries arrives out-of-date, like mail via Canada Post. We see our feet as they were 5 nanoseconds ago, the Sun as it was 8 minutes ago, the Andromeda Galaxy as it was 2 million years ago. A telescope is effectively both a spaceship and a time machine. It carries us out in space, and back in time. Secondly, in order to form an image with light waves, the objective lens or mirror of a telescope must provide paths having the *same time* to reach the focus. That is why lenses are thicker in the middle, and mirrors in Newtonians are paraboloidal. Roy showed that Mike Gatto's 1/20-wave mirror satisfies the same-time criterion to a precision of two ten-thousandths of a trillionth of a second!
- 9 Roy discussed the smoothness of a typical telescope mirror. A good mirror is ground and polished to 1/20 of a wavelength of visible light. For a 200 mm aperture mirror, this represents a smoothness of 1 part in 8,000,000. If the Bedford Basin were as smooth as a telescope mirror, the maximum "bump" would be less than 0.5mm! That is neat.

- 10 Roy then calculated the number of photons within a telescope tube when observing. I for one thought there would be millions (billions?) But no. In a 1 metre-long, 200 mm-aperture telescope tube, a first-magnitude star produces only enough light to allow, on average, only one photon at a time to be within the telescope. For the vast majority of stars, most of the time there are no photons from a particular star in the telescope! Hard to believe but true!
- 11 Despite having no more than one photon from a typical star within a telescope at any instant, Roy pointed out that the distribution of light in the star's image is determined by an aperture-filling wave. In the case of a Newtonian telescope with a four-vane spider support for the secondary mirror, in some fashion each photon passes through all four quadrants of the

spider. Yet whole photons, not quartered photons arrive at the detector. Light is queerer than we can imagine!

- 12 Roy ended with several quotes about telescopes. The first quote was from Johannes Kepler: "O telescope, instrument of much knowledge, more precious than any scepter! Is not he who holds thee in his hand made king and lord of the works of God?" The last quote was from Greg Palman, a member of our Centre who lives in Maine: "Don't tell Dave [Lane] you heard it from me, but there is no substitute for object glass diameter."

The meeting concluded with a "What's Up" presented by Gary Weber, followed by munchies, drinks, and many questions to Roy (only one photon?).

## Monthly Meeting Report June 15th 2007 Alex LeCreux

Centre President Paul Evans opened the meeting with the customary welcome and benefits of membership pitch. As has also become common practice, Paul polled the audience for new members / visitors. Those identified were given a complimentary 2007 Observers Calendar. Executive introductions were made and the availability of items for purchase through the 2<sup>nd</sup> VP was noted.

Paul introduced Darryl Dewolfe of the Nova East 2007 committee who proceeded to provide an update of the event. He noted that the moon would be the 'theme' for the weekend with a variety of talks and presentations geared towards it. Darryl encouraged people to participate in any fashion they could, be it registering for the weekend, coming for a day or evening, or just stopping for a visit and offering some support.

Centre member Paul Heath was introduced to discuss his plan to develop a program for the scout/guide groups that would be geared towards assisting them in their quest to obtain an Astronomy badge. His idea is to develop a generic program/presentation, which would not only be used for that purpose but could be used in a variety of public outreach situations. Anyone currently involved, or wishing to become involved, in this worthwhile effort can contact him on the discussion list.

Paul Evans then introduced the guest speaker for the evening, Calum Ewing. Calum is the Museum Director of the Nova Scotia Museum of Natural History. He is also a fellow member of the RASC Halifax Centre.

Calum's talk for the evening was titled "Catching Beams of Light". The presentation was all about Aurora. Calum discussed all the details including what they are, what causes them, how to know when they will occur, as well as how to photograph them. He explained the various types of Aurora and what interactions cause the distinctive colours observed in them. There were

many photos presented to aid in the discussion. Some were Calum's own while several were credited to other Halifax Centre photographers. It was made clear that Aurora are fairly common in Nova Scotia and, with some knowledge of the various forecasting tools and some planning, one can be successful in observing them. A hand-out with a variety of helpful websites was made available. The talk was very informative and well received

As we currently are celebrating the 10<sup>th</sup> Anniversary of SCO, a slide show on it's development and construction was presented by Dave Lane followed by several more by Dr. Roy Bishop. It was evident that there was a huge amount of planning and effort by a dedicated group of individuals that enabled the SCO vision to become a reality. As well, with the bi-annual SCO work party providing routine maintenance, it remains in excellent condition.

The main meeting was brought to a close with refreshments, snacks and socializing by the membership and attendees.

## Product Review: Kestrel 4000 Personal Weather Tracker Craig Levine

Most amateur astronomers become, by default, fairly competent amateur meteorologists. We learn to gauge wind direction, sky transparency, cloud types, humidity, etc, to predict possible observing conditions. We then take a peek at the Clear Sky Clock and the Environment Canada website to confirm or confound our weather sense. As we write our observing reports, we take note of what time equipment got “dewed up”, when the temperature suddenly plummeted, how the cold and wind conspired to chip away at our faces, or how a storm blew in quickly and put a damp and frenzied end to an observing session.

Many observers, including myself, also become enamored of gadgets. Gadgets for getting a precise measurement of geographic location, gadgets for controlling telescopes, gadgets that incorporate telephones with .mp3 players and pocket computers, and so on. In my continuing quest for useful gadgets, I’ve come across a meteorological instrument that has much utility for amateur astronomers. It’s made by Nielson-Kellerman and it’s called the Kestrel 4000 Personal Weather Tracker.



The unit is about the size of a cell phone, has 8 buttons on the front, a

screen, an impeller (to measure wind speed), and protected external temperature and humidity sensors. Briefly, the unit will measure

- Current, Maximum and Average Wind Speeds
- Air, Water & Snow Temperature
- Wind-Chill
- Relative Humidity
- Dew point
- Heat Stress Index
- Barometric Pressure
- Altitude
- Density Altitude
- Wet Bulb Temperature

What made me go with the 4000 is that this particular model will store up to 2000 lines of data for later retrieval and download to a computer as a comma-delimited file. The information is time stamped, so if in your observing notes you note that “...after midnight the temperature quickly fell and the main lens rapidly got coated in dew...” you can pinpoint the time and environmental conditions. Even with the screen and the unit apparently off, it will collect observations at intervals that you can define: every 2 seconds to once every 12 hours. There’s also a “snapshot” button that lets you take a reading on-demand.

There are three user-defined screens that display three measurements each. For astronomy, I have one screen that shows temperature, dew point, and barometric pressure. I have the other screens set up for cold and warm weather hiking and biking. All individual measurements have their own separate screen as well. Each of those has three views: current reading; minimum/average/maximum; and graphed. In graphed mode, if you press the middle button, it will display a cursor bar that you can move along the graph to get the time-stamped reading at each data collection interval.

With the optional computer interface, you can also connect the unit to a PC and display real-time measurements with 3rd party software. The company that I bought mine from included such software. The cradle for the PC inter-

face also comes with a post that allows the unit to be mounted on any camera tripod. The unit comes with a soft pouch, but there is currently an offer that includes a sturdy case that protects the unit while leaving the external sensors exposed, and it includes a wrist strap and belt loop.

The applications for astronomy are plenty. Knowing the dew point and the barometric pressure trend are of obvious importance. Having an idea of the wind-chill is good to know, particularly if the wind is blowing off the lake and you are undecided if it’s worth it to stay out a bit longer to catch an elusive faint-fuzzy. My temperature/wind-chill limit is about  $-22^{\circ}$  and dropping each year! You could also set it up at an observing site over an extended period (if sufficiently hidden) to collect environmental observations over a time interval for later retrieval. The batteries will last well over 400+ days in solely data-collection mode.

The final thing that tipped the balance that made me go with this particular unit is that it has a “night-vision” (NV) mode. That is, the screen’s backlight is much fainter than the standard model, and it has a faint reddish tinge to it. The NV model is targeted in marketing materials to primarily military and aviation audiences, though the literature also lists astronomy as one of many areas of application. The NV models come only in olive-drab. They are tough, and come with a “Certificate of Conformance” to indicate for government military purchase that it meets criteria for ability to withstand use under adverse environmental conditions.

The Kestrel 4000 NV can be purchased for US\$249, and the USB PC interface for US\$69.99. Be prepared for the usual UPS brokerage charge and sales tax if purchased from the USA. You can save the GST charge if it’s purchased through your business. It can be purchased in Canada for a higher price, but with the exchange rate and UPS charges, there’s very little difference.

The manufacturer’s product information can be found at <http://www.nkhome.com/ww/4000.html>.

## Cosmic Debris

### Odds & sods from the world of Astronomy, and Cosmology

#### Things that go bump in the night .....

May 7, 2007      NASA Release: 07-102

The brightest stellar explosion ever recorded may be a long-sought new type of supernova, according to observations by NASA's Chandra X-ray Observatory and ground-based optical telescopes. This discovery indicates that violent explosions of extremely massive stars were relatively common in the early universe, and that a similar explosion may be ready to go off in our own galaxy.

"This was a truly monstrous explosion, a hundred times more energetic than a typical supernova," said Nathan Smith of the University of California at Berkeley, who led a team of astronomers from California and the University of Texas in Austin. "That means the star that exploded might have been as massive as a star can get, about 150 times that of our sun. We've never seen that before."

Astronomers think many of the first generation of stars were this massive, and this new supernova may thus provide a rare glimpse of how the first stars died. It is unprecedented, however, to find such a massive star and witness its death. The discovery of the supernova, known as SN 2006gy, provides evidence that the death of such massive stars is fundamentally different from theoretical predictions.

"Of all exploding stars ever observed, this was the king," said Alex Filippenko, leader of the ground-based observations at the Lick Observatory at Mt. Hamilton, Calif., and the Keck Observatory in Mauna Kea, Hawaii. "We were astonished to see how bright it got, and how long it lasted."

The Chandra observation allowed the team to rule out the most likely alternative explanation for the supernova: that a white dwarf star with a mass only slightly higher than the sun exploded into a dense, hydrogen-rich environment. In that event, SN 2006gy should have been 1,000 times brighter in X-rays than what Chandra detected.

"This provides strong evidence that SN 2006gy was, in fact, the death of an extremely massive star," said Dave Pooley of the University of California at Berkeley, who led the Chandra observations.

The star that produced SN 2006gy apparently expelled a large amount of mass prior to exploding. This large mass loss is similar to that seen from Eta Carinae, a massive star in our galaxy, raising suspicion that Eta Carinae may be poised to

explode as a supernova. Although SN 2006gy is intrinsically the brightest supernova ever, it is in the galaxy NGC 1260, some 240 million light years away. However, Eta Carinae is only about 7,500 light years away in our own Milky Way galaxy.

"We don't know for sure if Eta Carinae will explode soon, but we had better keep a close eye on it just in case," said Mario Livio of the Space Telescope Science Institute in Baltimore, who was not involved in the research. "Eta Carinae's explosion could be the best star-show in the history of modern civilization."

Supernovas usually occur when massive stars exhaust their fuel and collapse under their own gravity. In the case of SN 2006gy, astronomers think that a very different effect may have triggered the explosion. Under some conditions, the core of a massive star produces so much gamma ray radiation that some of the energy from the radiation converts into particle and anti-particle pairs. The resulting drop in energy causes the star to collapse under its own huge gravity.

After this violent collapse, runaway thermonuclear reactions ensue and the star explodes, spewing the remains into space. The SN 2006gy data suggest that spectacular supernovas from the first stars - rather than completely collapsing to a black hole as theorized - may be more common than previously believed.

"In terms of the effect on the early universe, there's a huge difference between these two possibilities," said Smith. "One pollutes the galaxy with large quantities of newly made elements and the other locks them up forever in a black hole."

The results from Smith and his colleagues will appear in *The Astrophysical Journal*. NASA's Marshall Space Flight Center, Huntsville, Ala., manages the Chandra program for the agency's Science Mission Directorate. The Smithsonian Astrophysical Observatory controls science and flight operations from the Chandra X-ray Center in Cambridge, Mass. Additional information and images are available at:

<http://chandra.nasa.gov>

From the editor:

Short articles for "Cosmic Debris" are welcome (encouraged I should say).

They can be book reviews, items of interest, equipment reviews, web sites, or just general rambling related to Astronomy / Cosmology.

If articles are taken from an existing publication, please give a reference to such.



## St. Croix Observatory

**Observing Chair: Tony McGrath 463-4018**

Part of your membership in the Halifax RASC includes access to our observatory, located in the community of St. Croix, NS. The site has grown over the last few years to include a roll-off roof observatory with electrical outlets, a warm-room and washroom facilities. Enjoy dark pristine skies far away from city lights, and the company of like minded observers searching out those faint fuzzies in the night.

### Members' Night:

Every weekend closest to the new Moon there is a Members' Night at St. Croix. The purpose of members' night is to attract members from the Centre to share an evening of observing with other members. It's also a great night for beginners to try out different scopes and see the sky under dark conditions. For more information or transportation arrangements, please contact the Observing Chair.

### Future dates for Members' Nights:

13th July 2007  
10th August 2007  
17th September 2007  
12th October 2007

These dates are all Fridays. If this is a meeting night, or cloudy, the alternate date will be the following Saturday.

### Directions from Halifax:

- 1) Take Hwy 102 (the Bi-Hi) to Exit 4 (Sackville).
2. Take Hwy 101 to Exit 4 (St. Croix).
3. At the end of the off ramp, turn left.
4. Drive about 1.5 km until you cross the St. Croix River Bridge. You'll see a power dam on your left.
5. Drive about 0.2 km past the bridge and take the first left (Salmon Hole Dam Road).
6. Drive about 1 km until the pavement ends.
7. Drive another 1 km on the dirt road to the site.
8. You will recognize the site by the 3 small white buildings on the left.

### Become a St. Croix Key Holder:

For a modest key fee, members in good standing for more than a year who have been briefed on observatory can gain access to the St. Croix facility. For more information on becoming a key holder, contact the Observing Chair.

### Rules for using the SCO equipment:

There are several pieces of astronomical equipment that are available for members (and guests) to use, including a 17.5" dob and a magnificent pair of tripod mounted 100mm binoculars.

If you are unfamiliar with the use of these pieces of equipment, please ask for assistance—any knowledgeable member would be more than willing to help you out. Please share the equipment with other members, and treat the equipment, the facilities and the site with respect. .... Enjoy