

Nova Notes



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

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Front page photo: Michael Boschat

Crescent Moon over Fairview container port, Halifax on May 25th 2009 at 8.18 p.m. AST.

Canon 350D with lens set at 55 mm, 10 seconds, f/5.6 @ ISO 400



From the editor

Quinn Smith

It is with great sadness that I must report on the death of long time member Clint Shannon. His contribution to the Centre, friendship to so many, and love of astronomy was respected and admired throughout the RASC (memoriam page 3).

Over the last few months I have spent a fair amount of time on the road. In April, I was on the West Coast, and had several astronomical experiences. The first was just north of Portland (OR) where I stood 5 miles from the remains of Mount St. Helens. I thought I was fully aware of the effect of the eruption, but I was not prepared for the sheer magnitude of the event that occurred nearly 30 years ago. Maybe not an astronomy event but certainly astronomic in magnitude. It is amazing how fast nature is reclaiming the devastation, trees and plants are everywhere, but the devastation is still evident.

The next week I found myself in L.A. and visited the famous Hooker (100" telescope that is!). Although due to a lack of funds, the 'scope is not being used, it remains in operational condition. It was truly amazing to stand so close to the instrument that Hubble used to (initially) discover the size of our galaxy, and then to fully understand our place in the Universe. Who would have thought that a 101" diameter (not 100" as it happens) piece of glass would lead the way to the discovery of other galaxies, the expansion of the Universe and eventually the "Big Bang". Quite a piece of glass! And by the way, if you have never seen the Hooker telescope, it's built like a battleship. Literally a battleship - rivets, mercury bearings and all!

Finally I would like to congratulate Michael Boschat whose photo (above) was featured on "The Daily Planet" (Discovery Channel). Way to go Michael!

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, when there are no meetings.

Meetings take place in room SB260, Sobey Building (#2 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., usually in room SB152, and all members are welcome to attend.

Meeting room SB 260
No meetings July and August

September 18th, 2009 - **Speakers night**
Blair McDonald will discuss his adventures in astro-
photography.

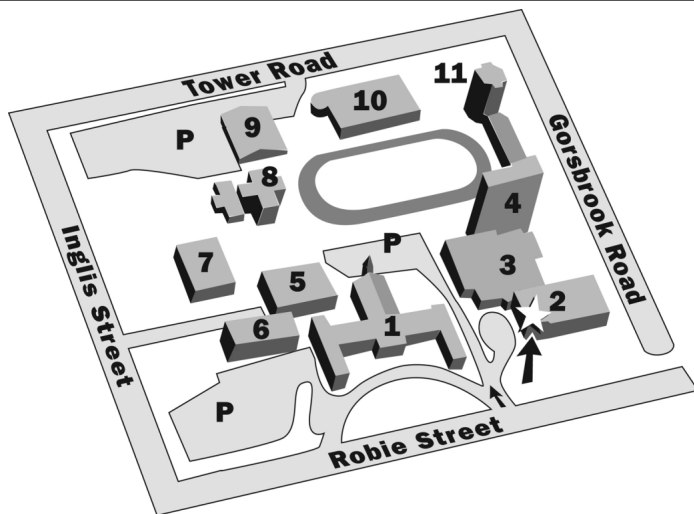
October 16th, 2009 - **Meeting night**
Pat Kelly will present the popular game show “Who
wants to be a gazer?”

November 20th, 2009 - **Speakers night**
Roy Bishop will discuss “Navigating by the Stars”.

[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, 2009:

Honorary President	Dr. Roy Bishop	902 542 3992
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Councilor	Paul Heath	457 0610
Councilor	Sean Dzafovic	430 9062



Clint Shannon 1923 - 2009

In Memoriam

Dave Lane June 14th 2009

It is with great personal sadness that I must report the death from lung cancer of our long time member, past-president and my personal friend, Clint Shannon. You can learn more about Clint's contributions to the Centre in the April edition of Nova Notes which covered the National Service Medal that he received at the February meeting.

Paul Heath Steadfast Star

There is a star, not dim,
not bright,
A steadfast star that guides the night.

There is a star that holds its course,
While others circle all the night,
A steadfast star that shows the way.

There is a star that tells a tale,
With bears and dragons,
A steadfast star that leads the way.

There is a star that lends a hand,
With jokes and smiles,
A steadfast star that shows you can.

There is a star with wonder filled,
Who spreads to all his joy,
A steadfast star, who will not fall.

A steadfast STAR , now missed by all.

John and Kathy Nangreaves

We didn't know Clint very long or very well, but his warm and friendly personality and eagerness to help shone through even more so than his long list of achievements. He will be missed not only as a wealth of resources, but also as a friendly smile and a pillar of several communities.

Dave Chapman

A great loss to our Centre. I will always remember the presentation of his Service Award and his speechless



Clint Shannon at the May 2009 meeting of the Halifax Centre.

Photo: Blair McDonald

reaction to the honour. Many thanks to those whose actions made that event possible. I also recall the kindness he showed to my daughter Alison when she accompanied me to several Nova East weekends, and how he always would ask about her since those days.

Michael Boschat

I have no words....just sadness today....he was a great person to know and talk to and will be extremely missed. But, now he is at rest among the stars that he loved.

Larry Bogan

Clint, with his friendly, gravelly voice

will indeed be missed. He and I enjoyed two things in common, astronomy and aviation. Sad that the end came so quickly.

John Liddard

I first met Clint at Nova East 2006. One only needed a single conversation with Clint to recognize the amazing contributions he made to life overall. An amazing individual, Clint will be missed.

A small sampling of the many messages of respect and condolences by members of our Centre.

We have lost a true friend.

April 17th Meeting Report

Chris Young

The April meeting was chaired by our President Andrea Misner in our usual room at Saint Mary's University. There were about 32 members and guests present.

Andrea welcomed those in attendance and dealt with a little IYA business before introducing the speakers for the night.

John Liddard spoke about a project he is working on for the IYA committee. The IYA committee has had some assistance developing posters to promote astronomy to the general public. Working with some public relations contacts a series of draft posters has been created and was presented showing the work in progress. These posters consisted of astronomical images with a subtle text worked into the image. Examples of the wording included "Astronomy is Cool, Wear a Jacket" and "Why Live in the World When you can live in the Universe?".

John described some of the ideas discussed in using these images on buses, billboards, theatre pre-show trailers. The IYA Committee is exploring these ideas and many others. Funding, of course, presents the usual challenges.

The first speaker was Mark Dryden, who discussed his 25" Obsession telescope.

Mark Dryden has been interested in astronomy since he was 7 years old and had a bad case of aperture fever which he appears to have satisfied with a 25" f/5 Dobsonian telescope made by Obsession Telescopes.

Mark wanted the largest aperture telescope he could handle by himself. The 25" model appears to be the optimum for him as the 30" is 50% heavier and 6" wider. Watching his telescope being brought into the lecture hall through the door confirms that this size is just manageable. The 25" aperture provides 10

times the light gathering of an 8" telescope and can provide another 3 magnitudes of visibility down to 17 in excellent seeing. Mark's experience is that with the high quality mirror and f/5 focal length the telescope doesn't require a coma corrector. The lowest recommended magnification is 90x with a 7 mm exit pupil.

This telescope can be handled and set up by one person. A pair of wheelbarrow handles secure to the sides of the maple ply rocker box making it straightforward to move the 150 lb base of the telescope from the trailer to site.

The overall size and weight do make for some challenges. Without the wheelbarrow arrangement it would take 2 people to manage the rocker box with mirror at 150 lb. A trailer or SUV with ramps is a necessity for transport. The viewing height of the eyepiece is 10 ft above the ground so an 8 ft ladder is a necessary accessory. The size also draws attention and visitors and Mark has been generous in sharing the views at SCO and public events.

Setup time for this telescope takes 20 minutes, plus an additional 20 minutes for the Servo-Cat Go-To & Argo Navis digital setting circles. This is quicker than one might expect for such a large telescope. A 12 volt power supply drives the electronics and motors. The servo motors, which will slew the scope at 5 degrees per second, are quite strong and Mark cautions that they could push over the ladder if you weren't careful.

Mark has recently upgraded the fan on the mirror cell to 120 CFM and has 2 fans blowing across the mirror. Mark became a strong believer in fans follow-



How many astronomers does it take to assemble a 25" obsession telescope? (Blair McDonald)

ing a demonstration of their benefits by Gary Weber at a previous meeting.

The telescope comes with a Galaxy mirror supported on an 18 point mirror cell consisting of 6 triangular plates each with 3 felt pads and a single pivot point. Galaxy coat their own mirrors having a 96% reflectivity on the primary and 98% on the secondary. The 3.5" diagonal reduces the aperture by 14% and the diffraction spikes are minimal.

There are a number of options available including the Go-To set up, Kendrick dew guard system for the secondary mirrors and a choice of Telrad, 50 mm finder or 80 mm Antares finder. Mark uses the Telrad which he can see from the ground to aim. A filter slide has also been added which has an integral heater!

How does it perform? Well Mark has had a number of Galileo moments noting especially the dust lanes in the Sombrero galaxy, M4 (spectacular!), and the

M57 nebula to name but a few of the faint “fuzzies” this telescope brings well into view.

Intrigued by Mark’s scope I took a look at the Obsession web site: [www. obsessiontelescopes.com](http://www.obsessiontelescopes.com) and noticed they have a free product DVD they would be pleased to send you – sounds tempting!

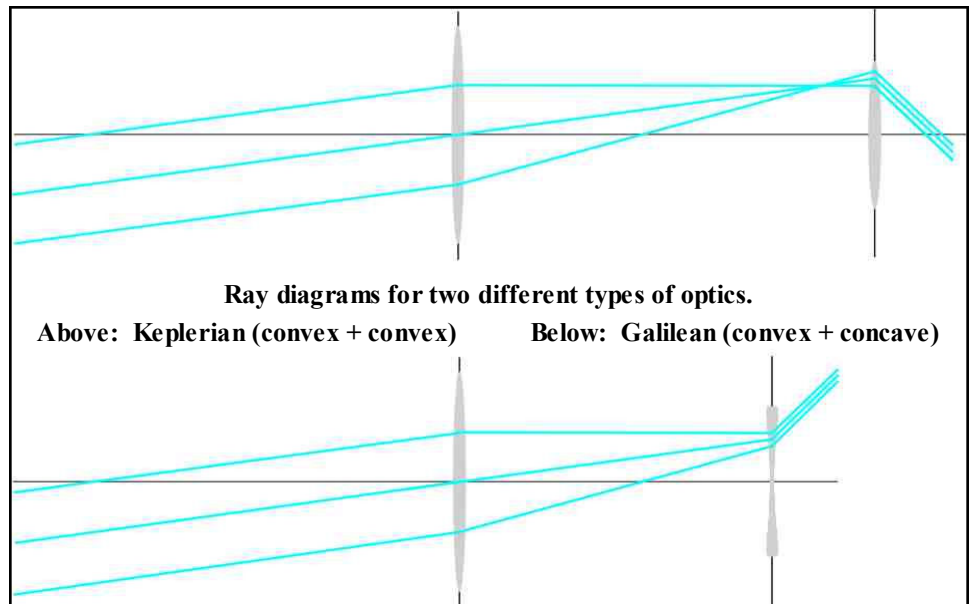
The second speaker for the evening was Dave Chapman, who spoke on the optics of the Galilean telescope.

Dave Chapman is very involved with IYA and the 400th anniversary of Galileo’s astronomical use of the telescope. He realized, however, that he didn’t fully understand the optics of Galileo’s telescope. Dave set about learning how it worked in comparison to the Keplerian design we are familiar with. Oddly enough it is not discussed in the Handbook!

Most of us are familiar with a positive (convex-convex) lens which will bring parallel rays to a focus, or bring diverging rays from a point source into parallel. A negative (concave-concave) lens will make parallel rays diverge, or bring converging rays to parallel. Dave illustrated the light paths through the lens with simple ray diagrams.

The principle difference between a Galilean telescope and a Keplerian is that a negative lens is used for an eyepiece rather than a positive lens that we are familiar with. In a normal (to us) Keplerian telescope a positive objective lens converges parallel rays through a focus point ahead of the eyepiece and then the positive eyepiece lens brings the now diverging rays parallel before entering the eye.

In the Galilean arrangement the negative eyepiece lens is located ahead of the focus point of the objective and it brings the converging rays to parallel. The Galilean telescope is shorter than a Keplerian as the eyepiece is closer to the objective. Another difference of the



Galilean arrangement is that off-axis ray tubes do not pass through a single exit pupil behind the eyepiece. This results in the viewer having to move their eye around the lens to see the full available image.

In comparing a Keplerian and Galilean telescope the principle differences are that the image is inverted and has a wider field of view in the Keplerian, while the Galilean provides an erect image with a peep hole effect and a narrower field of view.

Dave suspects that most early telescopes were Galilean because they were used for terrestrial viewing either for military or commercial uses where an upright image would be preferred. It was likely that the local Duke in receiving this novel and valuable gift from Galileo (for which he received an increased salary and lifetime appointment) would have preferred the erect image to an inverted one, even though the Keplerian provides a wider field of view.

Dave noted that Galileo didn’t immediately use the telescope to look at the night sky but only did so some months later. Jupiter’s moons were actually observed in 1610 which allows us to celebrate another 400th anniversary next year.

Not content with an armchair understanding of the design, Dave put to-

gether 2 different Galilean eyepieces which can be easily assembled by anyone wishing to experience a Galilean telescope.

The first was assembled with a plastic negative lens scavenged from the eyepiece of Dollar Store binoculars. This lens was housed in a 35 mm film canister to make the eyepiece. A second Galilean eyepiece was made from a Barlow lens, which also contains a negative lens, stripping it down to its 1.25” tube. The eyepieces were carefully inserted further than usual into the focuser, positioning the lens slightly ahead of the focus point of the objective. These eyepieces were tested successfully in Dave’s Televue refractor which he had brought to the talk.

I tried out both the Dollar Store and Barlow eyepieces and the image was surprisingly good in both, with the peep-hole effect clearly visible as you moved your eye around behind the eyepiece.

This presentation was timely and clearly presented and the audience much appreciated Dave having shared his understanding of the Galilean telescope.

Dave has made the PowerPoint presentation available on the web at: public.me.com/chapmandave/GalileanTelescope.ppsx

May 15th Meeting Report

Quinn Smith

The May meeting was opened by our President Andrea Misner at 8 p.m. in our usual room at Saint Mary's University, SB 260. Andrea welcomed the 38 members and 7 guests to the meeting and gave a short outline of the benefits of membership in the RASC. Andrea then announced that due to professional and personal matters she would be moving to Winnipeg in the fall and would have to step down as President. A nominating committee has been struck to replace her in the fall. Andrea you will be missed.

Andrea then called on Quinn Smith who gave a brief outline on the past events and current plans for International Year of Astronomy (see page 3 for details). Roy Bishop then spoke on the upcoming Nova East Star Party (August 21st – 23rd). Detailed info on Nova East can be found on the enclosed NE Flyer and in the article in this edition (page 8).

Andrea then introduced Doug Pitcairn our guest speaker, who was speaking on "The search for another Home World: An examination of the possibilities of finding another Earth". Doug is a part time faculty member of Saint Mary's University and

is often heard, along with Dave Lane, answering questions on astronomy on the CBC phone-in show "Maritime Noon".

Doug began his talk with the rather interesting idea that simple life was possibly quite ubiquitous in the Universe but that complex life (animals) was very rare. His talk centered around the conditions that were required for life to have begun and then (equally important), what would be required to sustain it and allow it to evolve to complex organisms.

Doug explained that the general conditions for life to evolve would probably include the following:

- The presence of elements other than hydrogen and helium.
- A planet orbiting a stable star.
- The presence of liquid water (or possibly ammonia).
- Enough time of relative environmental stability for evolution to do its work

He explained that immediately after the "Big Bang" the only elements present were hydrogen and helium (with a little lithium). In order for other elements to be available, the Universe would need enough time for a generation of stars to form and explode. Many of these early stars were massive, as much as 100 times heavier than the Sun, and would have collapsed into supernova in a matter of a few millions of years.

These supernova explosions would have produced most of the known elements and would have "seeded" surrounding space with so called 'metals'. (In astronomy all elements other than hydrogen and helium are known as metals.)

After the first flurry of supernova explosions, galaxies would have formed with a second generation of stars from the now metal rich interstellar gas and dust. These stars were smaller (due to the metal contamination) and far more stable. At this point in time (some 5 billion years after the "Big Bang") the Universe had settled down to a point where life might be possible.

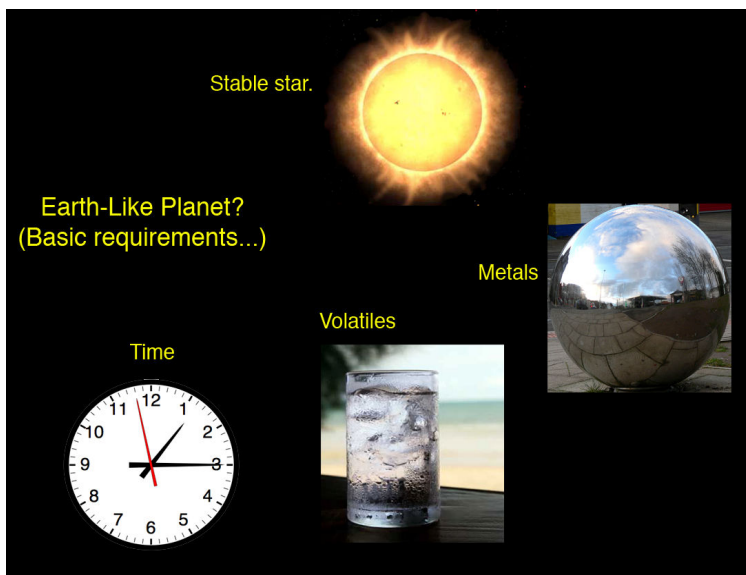
Our home galaxy is probably a second generation galaxy with a fairly high concentration of metals (approximately 1%). It is fairly stable (not a lot of supernova blasting radiation into the surrounding area) and is currently not colliding with any other large galaxies. It was in this era that our solar system formed some 5 billion years ago.

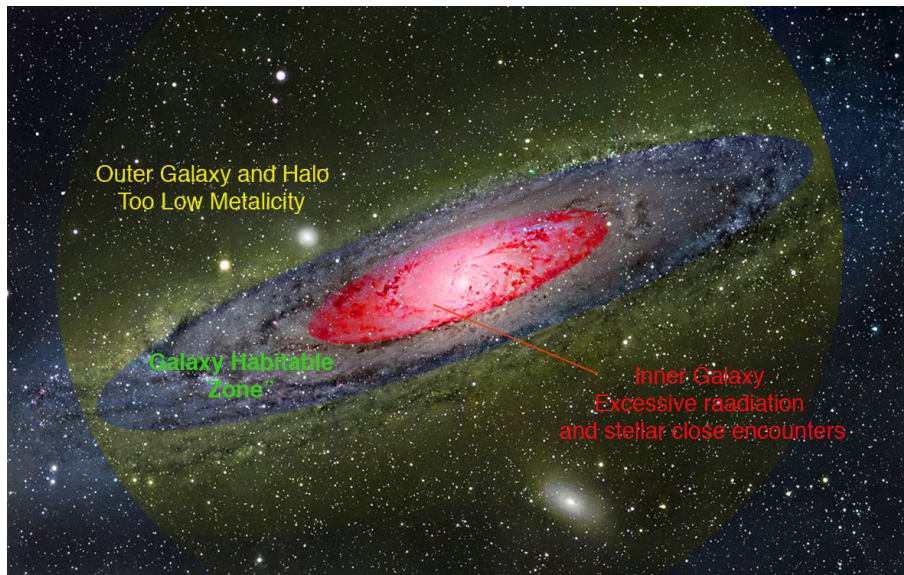
For a star / planet system to support life, it probably has to be located approximately half way between the centre of a galaxy and the outside edge. In the centre there will be too many stars having too many interactions (too much radiation), and there is too little metal at the outer edges of the galaxy to form metal rich systems.

Doug went on to describe how the Sun formed from the intergalactic metal rich debris of gas and dust created by at least two generations of supernova. As the gas and dust slowly gravitationally collapsed a proto star formed at the center surrounded by a swirling disc of gas and dust. As the central star ignited into nuclear fusion the radiation pressure would have blown away most of the gas from the inner solar system leaving a very metal rich area of dust to aggregate into fairly small rocky planets (Mercury, Venus, Earth and Mars). The remaining solar system gas would have tended to accumulate further out and the large gas giant planets would have formed.

Doug pointed out that this all sounds fairly reasonable, but there are several features that make the Earth rather unique, and particularly suitable for complex life to have formed.

The early solar system was a very violent place with multiple massive colli-





Earth that has helped complex life evolve; plate tectonics.

The Earth has a hot, molten core due to the heat generated by radioactive decay. This allows the major parts of the Earth's crust to "float" on the molten center. Strangely enough this has the effect of stabilising the surface temperature of the Earth, due to a process known as the CO₂ - silicate cycle. This has kept most of the Earth's water liquid most of the time, even though the output of the Sun has changed by 30% in the last 4 billion years.

With the slow accumulation of free oxygen in the atmosphere (thanks to those bacteria), only a few cataclysmic impacts (thanks to Jupiter) and a fairly stable surface temperature (thanks to the CO₂ - silicate cycle) complex life eventually exploded on the Earth. But it took over 3 billion years of relative stability for complex life to form.

It is that long term stability that makes the Earth quite unique. Life has probably started in many places in the Universe (and possibly within our Solar System) but most of it has either died out or, has never evolved into complex life. The Earth might well be a very special place.

Doug suggested further reading of "Rare Earth" by Peter Ward and Donald Brownlee for those interested in more information on the subject.

Doug answered many questions, and the audience was only silenced when Andrea pointed out that we had almost run out of time. After all, as advanced life, we needed our munchies!

sions. Our Moon (large compared to most planetary moons) probably formed from an impact of a Mars sized object with the Earth some 5 billion years ago. Slowly impacts lessened as the solar system was cleaned out of large debris. But the Earth contained very little water. That was made further out in the solar system and brought to the Earth by impacts of just the right amount of icy comets (too many - a flooded planet, too few - a dry barren planet).

So now we have a planet at just the right size to hold an atmosphere (no oxygen yet), just the right amount of water, orbiting a stable star at just the right distance (at the right temperature for liquid water) without too many impacts (thanks to Jupiter and Saturn clearing out most of the remaining large stray objects). Life was possible. And that's exactly what happened in a very short period of time. It would seem as soon as the Earth could support life, life appeared either spontane-

ously on the surface, or from being seeded from impacts of life containing (small) meteorites. Either way it would seem that where life can begin, it will. There are probably thousands (millions?) of suitable planets in our galaxy with these conditions, which is why it is possible that life is ubiquitous in our galaxy, and in the Universe in general.

However we are talking about very basic life here, mainly bacteria, and single celled life. For complex life to form, more stringent conditions would be required, and these are probably much more difficult to find.

The Earth has a very varied climate caused by it's 23.5° tilt (probably caused by the impact that created the Moon), a short day (for the same reason) and large tides (thanks to the Moon). It is thought that all these, possibly rare, properties have helped with the creation of complex life. There is another very important feature of the

HALIFAX CENTRE

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Nova Notes is published in February, April, July, 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 August 23rd 2009.

Nova East History / Update

Roy Bishop

The Nova Scotia Astronomical Society was formed in 1951. It became the Halifax Centre of the RASC in 1955, but was inactive during the late 1960s. Thanks to the initiative of Barry Matthews (who now lives in Ottawa, and is the Chair of the RASC History Committee) the Halifax Centre was re-activated on September 18th 1970, and is now approaching its 40th year of continuous activity.

The first annual star party arranged by the Halifax Centre, christened Camping Observing Weekend (COW), took place on July 22-24th 1977 at Blomidon Provincial Park, which had just opened four years previously. Included in the program was a hike to Cape Split and a visit to see 340-million-year-old fossils at Horton Bluff. A year later COW #2 also was held at Blomidon (with a visit to nearby Black Hole), but two years of Fundy fog at night led to a search for clearer skies.

For the next three years (1979-1981) COW was held at Kejimikujik National Park. Then, on the invitation of the Honorary President of the Halifax Centre, Dr. William Holden, in 1982, '83 and

'84 COW was held on the field beside Dr. Holden's Trout Lake Observatory near Albany, Annapolis County.

With Dr. Holden's death two weeks after the 1984 COW, in 1985 the star party returned to Keji. The next year, on the invitation of a Centre member the 1986 COW (the 10th and last) was held at West Point, PEI.

It was then decided to move the star party to a central geographical location in the Maritimes, Fundy National Park in New Brunswick, and the name of the event was changed to Nova East. Fundy Park was the site of thirteen Nova Easts, held usually on a weekend in August, from 1987 through 1999. One (in 1994) was held on the Thanksgiving weekend in October, and one (in 1995) was held in late July.

By 1999 some disadvantages with the Fundy site had become apparent: occasional fog, a long drive for the majority of Centre members, and additional lights within Fundy Park. In 2000 the observing weekend moved back to Nova Scotia, to Smileys Provincial Park near Windsor, not far from the Halifax Centre's new St. Croix Observatory which had opened in 1997.

Nova East 2009 will be the 33rd annual star party sponsored by the Halifax Centre, the 23rd Nova East, and the 10th

Nova East to be held at Smileys Park. With the move back to Nova Scotia, Minas Astronomy Group (founded in Wolfville in 1994) joined the Halifax Centre in supporting Nova East. For a few years Truro's Nova Central Astronomy Club also contributed, but that group is no longer active.

Nova East 2009 will take place on the weekend of August 21, 22 and 23. See the website <<http://halifax.rasc.ca/ne/>> for details, including the schedule, registration, camping, and T-shirt orders.

The theme this year is the International Year of Astronomy, marking the 400th anniversary of the first use of a telescope for astronomy by Galileo. Highlights include the keynote address by Dr. David Turner of St. Mary's University, a view of what may be the best tidal bore of 2009, and several talks, two of which describe aspects of Galileo's astronomical observations.

Another highlight being planned is a direct radio link to the International Space Station for a question and answer session with Canadian astronaut Dr. Robert Thirsk as the ISS passes over Nova East on August 22; but whether it will occur will not be known for certain until a few days before Nova East.

(Photos: Roy Bishop)



Nova East '05 guest speaker John Dobson with Mary-Lou (left) and Andrea Misner.



Nova East '07 guest speaker Terrance Dickinson with Clint Shannon (left) and Roy Bishop (right).

June 19th Meeting Report

Chris Young

Our President Andrea Misner, chaired the meeting and forewarned the membership of an upcoming recruiting drive for the Halifax Centre. Andrea stated that this would be her last monthly meeting in Nova Scotia as she is moving out West. We are losing our Centre President! Andrea expressed her thanks to the Centre members for all the time and information that they have shared with her, and for enriching her knowledge of astronomy.

It was with great sadness that the passing of Centre member Clint Shannon was announced (see page 3).

Blair and Roy advised that registration for Nova East is currently at 22 registrants and 18 sites taken. If you want a T-shirt, get your order in quickly! (flyer enclosed)!

Roy presented several books on sundials to the library. These were a donation from the estate of Dr Harry S. Morton OBE, a resident of the Valley.

Wayne Harris provided an update on the amateur radio link to the orbiting Space Station, planned for Nova East. Recent shuttle launch delays may prevent the link-up, however should schedules work out we will have 9 1/2 minutes at Nova East to speak, via a radio link, with Bob Thirsk - a Canadian astronaut on board the Space Station. We can ask prepared questions, and with Wayne's assistance we will have the technology. We'll be updated on the Halifax e-mail list.

The speaker for the evening, Professor Bob Hawkes, was introduced. His topic for the evening: "Observing Meteors: The Top Three Lists"

Professor Hawkes, a teacher and researcher at Mount Allison University, is intrigued with the origins and nature of meteors. His interest has taken him to exotic locations such as the Gobi and Negev deserts and he serves on the Space Exploration Advisory Committee

to the Canadian Space Agency. Professor Hawkes is largely responsible for establishing the twin "Gemini" observatories at Mt. Allison University which became operational in 2008 and are used in meteor research.

Bob brought along some meteor fragments for the members to see and gave a very informative presentation based on short "Top 3" lists which Bob then expanded on. Meteor study appears to be in its early days, however the subject, and the research going on, is fascinating. Each of the points raised is worthy of a Google search on those cloudy nights. The following are the principal "Lists" from Bob's talk: (text within brackets are Chris's additions!)

3 Interesting Things about Meteors:

1. A meteor the size of a pea produces a brilliant meteoroid.
2. Meteors move at the speed of 11 to 74 km/s - which appears to be the speed limit within our solar system. (rare, faster objects come from outside the Solar System).
3. At least 10,000 tons of meteoritic material falls on the earth every year (noted in the Handbook!)

3 Things You Should Know:

1. The radiant point is the point which a meteor shower seems to come from.
2. The ZHR, Zenith Hourly Rate, is the number of meteors a perfect observer would see (at 6.5 limiting magnitude) in an hour, if the radiant was at the zenith.
3. Meteors produce light when they heat to vaporization and the vaporized atoms collide with atmospheric atoms. The light production of a meteor gets greater as the atmosphere gets denser, then dims down as the mass burns away.

Where do meteors come from?

1. From asteroids within the solar system (most are near the ecliptic).
2. From comets which are from further out.
3. Other places such as the Moon and Mars (due to impacts)
4. From outside the solar system.

Top 3 Canadian Success Stories in the Last Year:

1. The Fireball over the Saskatchewan / Alberta border + the Buzzard Coulee meteorite field. Ellen Milley of Halifax, a graduate astronomy student, found the first meteor - a fragment of the 2 meter wide 10 ton parent rock.
2. Discovery of 13 new meteor showers through the Canadian Meteor Orbit Radar (CMOR). The IAU, recognizes of a total of 65 showers.
3. University of Western Ontario has a system to detect and follow meteors in real time at high resolution.

By the way, under the Cultural Property Act, it is illegal to export meteors from Canada without a permit

Top Canadian Asteroid Event:

The Launch of the Near Earth Orbit Satellite (NEOSSat) in 2010, a 15 cm telescope to survey near-sun regions of sky for near earth objects and track high orbit satellites . (This is the satellite which will take the names of enthusiasts who have the astronomy trading cards we have handed out for IYA. See www.neosnat.ca)

Top Meteor Event of Last Year:

The recovery of meteorites in the Nubian desert from a first ever predicted asteroid impact 2008 TC3 (check out the links on Google!)

Top 3 Ways You Can Contribute to Meteor Research:

1. Contribute visual observations to the IMO - International Meteor Organization
2. Contribute high resolution photos of meteors to study ablation phenomena.
3. Study impacts, and contribute to the NASA Marshall Program

Top 3 Meteor Shower Websites:

1. www.astro.amu.edu.pl/~jopeck/MDC2007/
2. www.imo.net/imo/intro
3. www.meteorshoweronline.com

Bob finished by describing the current work at Mount Allison related to their newly operational Observatory.

IYA Update

Quinn Smith

The first part of 2009 has been a busy and successful time for the International Year of Astronomy, especially for the Halifax Centre.

As most of you know, the Halifax Centre has teamed up with Saint Mary's University, Dalhousie University and The Discovery Centre to promote Astronomy via a collective known as Astronomy Nova Scotia (www.astromynovascotia.ca). This venture has been very successful in allowing the public easy access to a single website for learning about astronomy related events in, and around, Nova Scotia. Thanks to our own Dave Chapman and Rob Thacker of Saint Mary's for establishing and maintaining this web site.

During this period members of the Halifax Centre have given many astronomy talks, both through the library system and through youth group activities. These talks are a great way to reach the general public and I would like to thank all members who have given their time in giving, and supporting, these talks.

One of my personal areas of interest is the promotion of "mall" type displays - of which we have put on several in the first months of the year. However an unexpected form of public outreach as appeared, in the form of displays at local exhibitions and shows. Thanks to the generosity of the promoters, we have displayed at the Outdoor Sports and RV show, as well as the recent SaltScapes Expo (both at Exhibition Park). These shows have been tremendously successful and the last show (SaltScapes) gained us over 1,500 "Galileo moments".

Talking of "Galileo moments", the current count for Nova Scotia is over 6,000! For those of you who may be wondering what a "Galileo Moment" is, it is a count of people's astronomical awareness moments such as a look through a telescope, attending a talk or lecture, a show

at the Planetarium, or visiting one of our astronomy displays. The aim is to have 1,000,000 "Galileo Moments" across Canada in 2009. As of the end of June there have been over 420,000 reported "Galileo Moments" in Canada of which well over 6,000 were in Nova Scotia. Astronomy awareness is defiantly becoming much more common in Nova Scotia and Canada in general. In reality this is the goal of IYA.

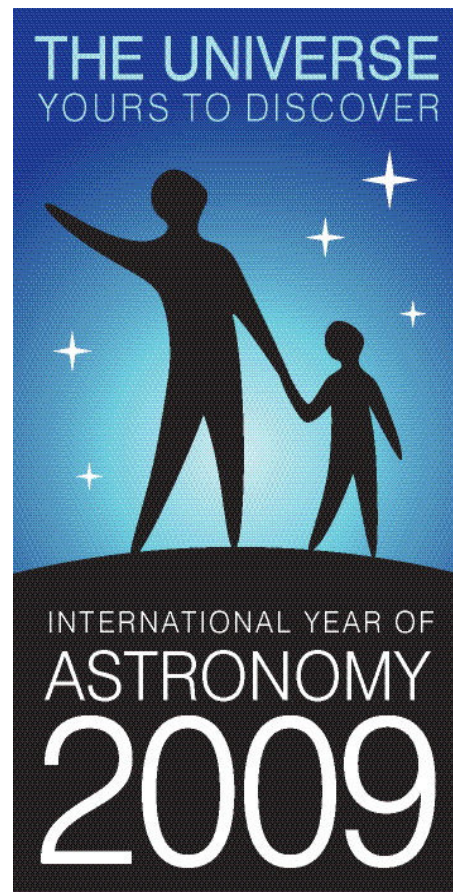
Karl Penney has been doing a fantastic job of organising public observing events not only in the Halifax area, but also further afield. Events are planned at several area parks as well as in Cape Breton. A huge thanks to all members who have helped at these events.

When we started our IYA planning we had set ourselves two "legacy" projects. These are projects that will continue beyond 2009. The first was helping get the Planetarium (located at Dalhousie University) operation on a more regular basis, and the other was to establish a Dark Sky Preserve in Nova Scotia.

Thanks to Stephen Payne and David Tindall (of Dalhousie) and the support of several Halifax Centre members the Planetarium is now offering regular evening shows for the general public. To find out more go to the Astronomy Nova Scotia website and follow the links to the Planetarium.

In mid May David Chapman and myself met with several staff members at Kejikujik National Park. The meeting was to discuss the possibility of the Park becoming recognised at a Dark Sky Preserve. The meeting went very well and plans are being made to move forward in this direction. With good planning, hard work and a few changes to Park lighting it is possible that the Park could achieve a Dark Sky Preserve status early next spring.

A Dark Sky Preserve is an area that has been cited as having very dark skies, and where efforts are undertaken to preserve, and enhance those dark skies. The Park has also to undertake public outreach in the form of astronomy and Light Pollution awareness. Keji has some of the



darkest skies in the province (21.8 on the SQM) and is already very aware of its exceptionally dark skies. We look forward to helping Keji achieve its DSP status.

We have a presentation and public observing session planned for July 25th at Keji, and any help and support for members would be greatly appreciated

I cannot end my update without mentioning the upcoming Nova East at Smileys Camp Ground (Aug 21st - 23rd). The theme for this year is IYA! If you do not know what a star party is; Nova East is a two day astronomy "camp out". It is a great opportunity to meet members, learn about equipment, and get in some great observing (it WILL be clear this year!). Please go to page 8 and read the enclosed NE flyer for more details.

Quinn Smith
Halifax Centre IYA Chair
902 852 3894

Cosmic Debris

Odds and sods from the world of Astronomy and Cosmology

Solar Storms

The precise spot at which a space storm struck the Earth's outer atmosphere has been pinpointed for the first time.

These storms are caused by the bending and stretching of the Earth's magnetic field by material from the Sun.

Observations like this may one day lead to better forecasting of these events, a meeting of the American Geophysical Union in Toronto, Canada, has heard.

This would provide more time to power down satellites and electrical grids, which can be damaged by these storms.

"If we can start to understand when and why these space storms occur, then we can try to move from short-term forecasting to long-term forecasting," Dr Jonathan Rae, from the University of Alberta, told BBC News.

Space storms are the result of billions of

tonnes of material thrown into space by the Sun in great plumes.

These plumes stretch the planet's magnetic field like an elastic band, distorting the field from its usual circular shape to a long ellipse that reaches out behind our planet.

Eventually, when the field can stretch no further, it snaps back into place, rocketing particles into the Earth's upper atmosphere. This causes the auroral displays known as the northern and southern lights.

It also floods the space in the planet's immediate vicinity with radiation at such huge levels that they would endanger the lives of astronauts. This process also generates electrical surges on the ground capable of disrupting a country's power grid.

Dr Rae led a team of scientists who took measurements of changes in the Earth's magnetic fields using a system of cameras and magnetic instruments on the ground, while simultaneously observing the onset of a space storm from Nasa's five-strong fleet of THEMIS spacecraft.

They saw magnetic oscillations hit the upper atmosphere in a particular location - somewhere over Canada - and ripple out across the ionosphere. These events were followed, three minutes later, by an auroral display.

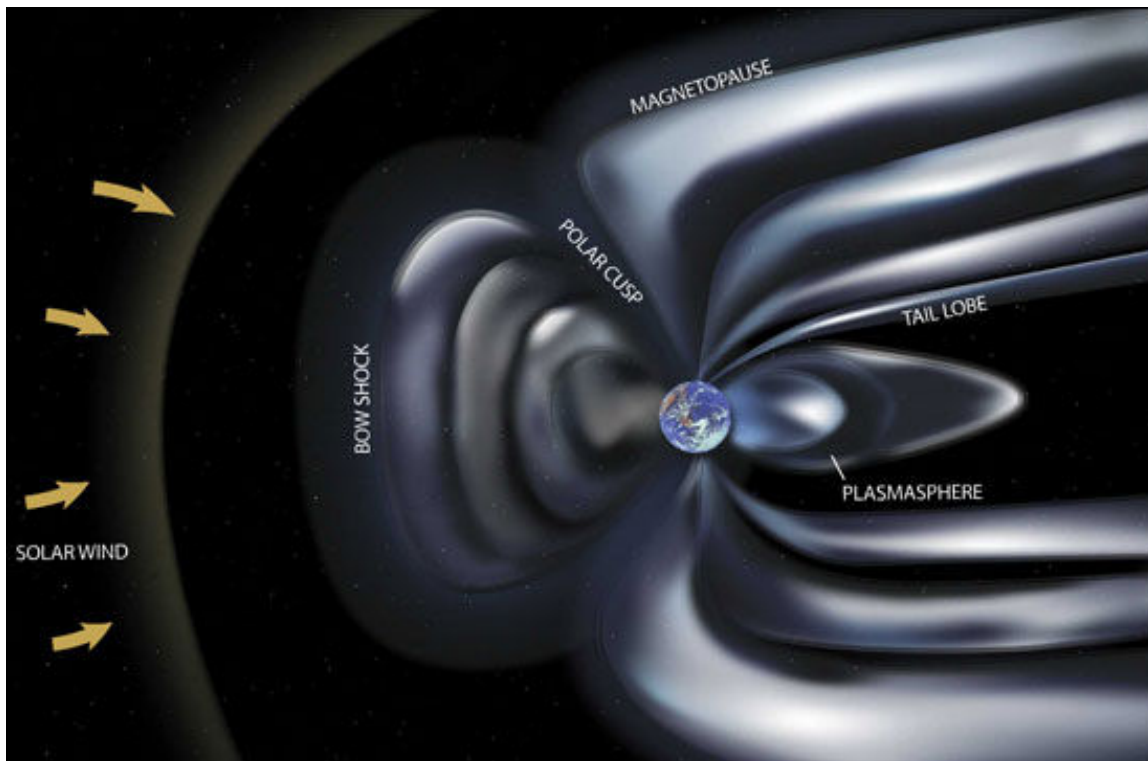
Researchers hope to use these observations to better predict these events. This could lead to the forecasting of storms hours, or even days, before they occur.

This would give more advanced warnings, helping protect humans and equipment from the radiation generated by disturbances.

"In the future, we should be able to predict space weather in the same way that we now can predict long-term weather forecasts [on Earth]," Dr Rae said.

Space storms are expected to increase as the Sun approaches another solar maximum. This is predicted to occur again by 2013 - when the influence of the Sun on the Earth's magnetic field will be greatest.

The work is reported in the *Journal of Geophysical Research* and is co-funded by the Canadian Space Agency and NASA.





St. Croix Observatory

Observing Chair: John Liddard 902 865 7607

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.

Observing Nights:

Every weekend closest to the new Moon, there is an “Observing Night” at St. Croix. The purpose of “Observing Night” is to encourage Centre members, their guests and visitors to share an evening of observing at St Croix. 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 Observing Nights:

July	24th, 2009
August	Nova East
September	25th, 2009
October	23rd, 2009
November	13th, 2009
December	No observing night

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, may 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 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 ask before using laser pointers - other members may be taking astro-photos. Please share the equipment with other members; and treat the equipment, the facilities, and the site with respect.
 Enjoy!