

Nova Notes

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



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Front page photo :

8 Day old Moon - Mike Boschat

October 8/9th 2008 22.25 UT

USSR Intes-150 15cm f/10 Maksutov at 60x

Centrios 3.0 MP Digital Camera hand held

over eyepiece.



From the editor

Quinn Smith

This is the last edition for 2008, and I have a lot to tell you about.

The December meeting on the 12th is the Annual General Meeting (see details on page 2). This is your opportunity stand for an executive position and to elect your executive members for the next year. It is also the time to find out how the Centre is doing financially and to ask questions of your executive.

The IYA committee has been working hard, planning events for next year (see page 3). We have created a web site for all things astronomical for Nova Scotia. Please visit www.AstronomyNovaScotia.ca and see what we've been up to.

The Murray Cunningham Astrophotography Award was established by the Halifax Centre in 2003 to promote interest among centre members in astrophotography, including digital imaging. The award is named after Dr. Murray Cunningham, one of the Centre's founding members and long-time Honorary President. Any member wishing to be considered for this award, please go our web site (www.halifax.rasc.ca) and follow the link under astro-photography

Clear skies, and happy holidays.

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., and all members are welcome to attend.

Note that the meeting room for December (only) will be SB 160

December 12, 2008 - Meeting night

The Annual General meeting. Discover the excitement of astronomical accounting, elect new officers and generally have the time of your life! Tim Donovan will also give a presentation about his telescope building project.

January 16th, 2009 - Special Meeting

This special meeting will be held at the Halifax Planetarium located in the Sir James Dunn Building of Dalhousie University

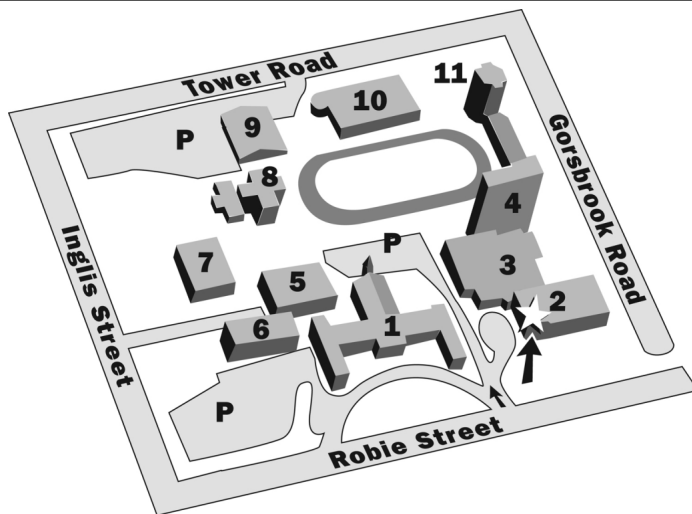
February 20th, 2009 - Speakers night

Our regular monthly meeting. This month, former Haligonian science writer Dan Falk will give a talk on the subject of his latest book “In Search of Time”

[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, 2008:

Honorary President	Dr. Roy Bishop	902 542 3992
President	Paul Evans	902 827 5977
1st vice-president	Gary Weber	
2nd vice-president	Wes Howie	835-3966
Secretary	Alex LeCreux	404-5480
Treasurer	Pat Kelly	798-3329
Nova Notes Editor	Quinn Smith	852 3894
National Rep.	Pat Kelly	798-3329
Librarian	Gilles Arsenault	864 6654
Observing Chair	John Liddard	902 865 7607
Councilor	Paul Heath	457 0610
Councilor	Jim Dorey	464-8781



IYA update.

Dave Chapman

There has been a lot going on during October and November in preparing for the International Year of Astronomy 2009.

The Halifax RASC Centre IYA Committee Chair, Quinn Smith, has returned from a 6-week trip and the Committee met with him on November 12th to review developments and make plans. He asked me to issue this update.

By now, most of you will have heard about (and likely visited) the new Astronomy Nova Scotia website www.AstronomyNovaScotia.ca. There are ALREADY events and news items being posted. This will continue to be the principal vehicle for providing information about IYA to the local community. There will be more that just RASC activities posted there.

The site is hosted by Saint Mary's University Department of Physics & Astronomy and is jointly managed by SMUAP and RASC. Any relevant news and events can be sent to me or to Rob Thacker at SMUAP for posting.

You will see that the first round of talks at the Halifax Public Libraries has already been posted and the volunteers have been contacted.

Andrea Misner has sent out a call to teachers looking for guest speakers and several of these have already been booked. She has also publicized the Star

Trails Contest.

A "dry run" of sidewalk astronomy at Chapters Bayers Lake was a great success.

Soon we will be getting RASC "swag" to handout: planispheres, trading cards, sidewalk astronomy notebooks, "Mary Lou's First Telescope" story book.

Final details of RASC members' involvement with the Halifax Planetarium still have to be worked out, but we think this will happen soon.

We are in final negotiations with other local astronomy organizations to put on a special week of events for the IYA kick-off starting January 10. As events are confirmed they will be posted. We are hoping to see:

- an RASC mall display at the Mic Mac Mall,
- StarLab shows for kids at the Discovery Centre (with RASC display support),
- planetarium shows at the Halifax Planetarium (operated by the folks at Dal Physics and RASC volunteers),
- a public lecture at SMU by Prof. Marcin Sawicki (with possible sidewalk observing outside),
- a public lecture at Acadia,
- our first Library talk at Spring Garden Road, and
- our first guest speaker in a school classroom.

The SMU lecture is one of a planned series that may include some speakers from "away" as part of the Galileo Speakers Series. All RASC Centres



were informed of this, but there was some lack of clarity in the call for proposals that has only just been resolved. In the meantime SMU has drafted a proposal for two GLS speakers. Since "community involvement" was a key part of the proposal, the existence of the Astronomy Nova Scotia collective and website, indicating strong involvement from our Centre and local astronomy educators, should help there.

Editor's note:

Thanks to Dave and Andrea for doing such a great job in keeping the IYA planning 'ball' rolling in my absence.

IYA volunteering

For those of you who were not at the September meeting, we had a request for volunteers. Thank you to the 30+ members who offered their services in IYA events in 2009.

We listed the following categories in which members could volunteer:

Library presentations
School outreach

Mall Displays
Scouts & Guides

Planetarium presentations
Dark Sky awareness

Sidewalk observing

If you would like to volunteer in any of these areas, please contact the editor at novanoteseditor@rasc.ca

September Meeting Report

Larry Bogan

The meeting took place our new location, in Room 260 of the Sobey Building at Saint Mary's University. Quinn Smith was in charge in the absence of the President and 1st Vice President.

After welcoming members, new members, and visitors, Quinn enumerated the benefits of joining the RASC for the new annual fee of \$67 (recently passed at the RASC General Assembly).

It was a beautiful evening with clear skies and a few members were absent in their pursuit of observing versus education. As compensation, Dave Lane, offered an observing session at the Saint Mary's observatory after this meeting.

Librarian, Gilles Arsenault, is leaving the area and has to step down. Andrea Misner will take over for the rest of the year. We do need a new librarian for next year so all members are asked to consider volunteering. There will be other positions on the executive available also for those of us with 'higher?' aspirations. A nominating committee will be created soon to ask members which executive position they wish to take on.

A presentation was made to Dave Lane in recognition of his multitude of services to the Halifax RASC over the years. The gift was a framed, photo of Dave's observatory with a very beautiful Milky Way in the background sky. The photos were taken by Blair MacDonald.

Pat Kelly, our National representative to the RASC reported on recent happenings in RASC National.

- The 2008 General Assembly was a joint effort of three centres, Toronto, Hamilton, and Mississauga.
- New bylaws, including fee increases, were passed.
- Problems with a tenant in the RASC building has disrupted the office and caused unexpected expenses.
- There will be some astronomy

stamps from Canada Post recognizing IYA2009.

- The 2009 RASC General Assembly will be in Saskatchewan in a remote national park (Cypress Hills).
- The 2010 RASC General Assembly will be in New Brunswick so all will have a near-to-home chance to attend this annual gathering.

The meeting talk titled "The International Year of Astronomy 2009 in Nova Scotia" was then given by members of the IYA committee.

Quinn Smith introduced the Halifax IYA committee

- Gilles Arsenault
- Dave Chapman
- John Higgins
- Ron Mills
- Andrea Misner
- Quinn Smith

Quinn started with an excellent introduction to IYA. The IAU (International Astronomical Union) initiated IYA2009 to mark the 400th anniversary of Galileo's use of the telescope in astronomy. If you missed the meeting, you can read most of what he said in his IYA - Update on page 8 in the October 2008 issue of Nova Notes. There is abundant material about IYA and the Halifax Centre at the new astronomy web site www.AstronomyNovaScotia.ca.

Quinn then spoke of the two "legacy" projects that the IYA committee is planning.

The first is to help Dalhousie University get the planetarium up and running on a regular basis. The RASC contribution will be to offer volunteers to make some of the presentations at the planetarium. The second legacy project is to get a Dark Sky Preserve (maybe at Kejimikujik National Park) and an Urban Star Park (perhaps Point Pleasant Park).

Dave Chapman next showed us a clip of the documentary film "400 years of the telescope" and introduced the website giving information about its production and schedule on television (see <http://www.400years.org>)

Dave then spoke about some of the IYA activities that are being planned for 2009. The sidewalk astronomy project of the Halifax RASC will probably more of the "busking astronomers" type with no advanced announcements. This way good weather can be used effectively and the observers will be just those that happen to be at the observing location. St. Mary's University has purchased several Dobsonian telescopes that will be available for this activity.

The Library presentation will be at various branches of the HRM libraries (15 branches). These will most likely be 30-40 minute talks with 20-30 minutes of discussion and/or questions. Volunteers will be given help in their preparation of the presentations so no great effort is needed in preparing new material.

There are going to be resources available from the RASC national, such things as a planisphere, astronomy trading cards, a booklet (comic form) on the dark sky and a Sidewalk Astronomer's Handbook.

Next, Andrea Misner introduced some of her work with a astronomy slide show theme accompanied with rock music. She then suggested some projects to take astronomy into the school system.

- Make class presentations that teachers do not have the time or knowledge to do.
- Make time available on Burke-Gaffney telescope for a student. Ask the students to study and write a proposal for using it, then judge the best and make the award.
- Introduce Art and Astronomy project for the schools.
- Use the Star Lab (an inflatable planetarium) at the Discovery Centre for class programs.
- Displays at schools showing telescopes and astronomy items.

Mary Lou Whitehorne then updated us on what plans are for the Spitz Projector and planetarium housed at Dalhousie University. The University and Nova Scotia Museum have been giving programs to schools and will continue with the Museum collecting an entrance fee.

Gilles Arsenault described the effort to involve the Scouts and Guides IYA2009 by offering help in the attainment of their Astronomy badges. Included would be some sidewalk astronomy for them as well.

Quinn Smith summarized the IYA events and encouraged members to start (or finish) RASC observing certificates during IYA. He mentioned several RASC certificate programmes including:

- Explore the Universe Certificate (a challenging beginners certificate)
- Messier Certificate
- Finest NGC Certificate
- Isabel Williamson Lunar Certificate
- Nova Program (a beginners introductory program)

The presentations ended with he showing of the IYA video. This was a collection of various nice graphics and celestial photographs interlaced with phases describing plans for IYA2009. You can see it (if you have high-speed internet connection) at :

http://www.astronomy2009.org/resources/multimedia/videos/detail/iya_trailer/

There are many other videos at the site to enjoy.

The meeting ended with the presentation of "What's Up" by John Liddard, our Observing Chair. He pointed out that it is a good time to be observing because:

- The weather has turned better.
- The summer (Milky Way) is well

positioned in early evening

- Venus is rising in the southwest
- Saturn is near the sun in the morning - with rings nearly edge-on
- Jupiter is prominent low in the south most of the evening
- Meteors: Draconids Oct 8 4am
- Objects: Andromeda Galaxy, Double Cluster in Perseus, M34, M39, etc.

The evening finished with our usual feed of pop and munchies. As noted at the beginning of the meeting several members headed off to the rooftop observatory at Saint Mary's do take advantage of the clear skies

October Meeting Report

Paul Heath

Our President Paul Evans opened the meeting at 8pm in our new meeting room SB 260. Paul welcomed the 39 members and 5 guests and outlined the benefits of RASC membership.

Paul then noted that our AGM will be in December, and asked (actually he pleaded) for volunteers to join the executive. As of this meeting we are in need of a Librarian and a 1st VP. (the position of librarian has been filled)

Andrea then gave an IYA update, pointing out the IYA kick-off events will be planned around the weekend of January 10/11th 2009 (see the IYA update on page 3).

Paul then introduced our main speaker for the evening, Dr Rob Thacker from the department of Astronomy and Physics Saint Mary's University. Dr Thacker's talk was titled "Computing the Cosmos - The Universe in a Computer".

Dr Thacker explained there are many possible types of Universe, depending on the physical properties and laws within that Universe. Varying the strength of gravity, the values of the

strong and weak nuclear forces and other physical values will produce a Universe very different to the one we observe.

Dr Thacker explained that creating possible Universes was somewhat like cooking. One starts with a recipe (the initial state of the Universe), cooks the items together (the laws of physics) and allows it to cool (the time since the Big Bang).

The great difficulty is to predict why our universe looks like it does, especially since we know so little about dark matter and even less about dark energy.

The idea behind computer modeling of the Universe is similar to computer modeling of the weather. Start with the initial conditions, iterate the equations governing the system (laws of physics), and see how the system evolves over time.

Of course the sheer number of interactions that need to be computed are "astronomical" and require that simplified approximations be used. For example, at present, we cannot hope to calculate all the interactions between all the stars in a galaxy. However, even with these simplifications, massive computer systems are still required to calculate the results.

Despite the need for simplifying assumptions, computer modelling is shedding light on how the universe got to be the way it is, and how galaxies and stars were formed.

The computer models begin from an initial state described by data from the cosmic microwave background and are then evolved until the present day is reached within the model. The results can then be tested against observations of individual galaxies as well as entire galaxy surveys. The resulting comparison then tells us whether the assumed model has been validated or whether it should be dismissed.

After Dr Thacker's excellent talk, John Liddard (our observing chair) gave our monthly "What's up" talk. John mentioned that the members night at SCO was October 24th, and that the new Moon would be on the 28th. John pointed out the October 27th would be an excellent opportunity to observe the Zodiacal Lights. John mentioned two upcoming meteor showers, the Orionids on October 21st and the Leonids on November 17th (unfortunately a full Moon).

After the meeting was formally closed by Paul Evens, members socialised and devoured the pop and cookies that the "snack fairy" had brought to the meeting.

168 Satellites:

A problem for the Observer and the Handbook.

David M F Chapman

The title of this article is the same as the title of the 2008 Nova East talk assigned to me by program organizer Roy "The Persuader" Bishop. You will note that I did not volunteer for this task! In fact, I thought he might have made a mistake and called the wrong person, because I am not a noted observer, certainly I am not conversant regarding the planets and their satellites. Well, I picked up the gauntlet and found the topic not only challenging but interesting. (Just to twist the screws a little tighter, Roy casually mentioned that my talk would precede his in the program and that our special guest Terry Dickinson would be in the audience. Yikes! This would be like opening for Jimi Hendrix at the Monterey Pop Festival with Brain Jones of the Rolling Stones in the front row!)

The basic problem, as outlined by Roy (a veteran RASC Observer's Handbook editor), was that the data regarding the natural satellites of the solar system take up 6 pages of the OH and the numbers (currently 168) are rapidly increasing, owing to advanced optical technology and spacecraft flybys. The vast

majority of the 168 satellites are a few large "regular" moons and a myriad of small "irregular" satellites in highly inclined and eccentric orbits around one of the 4 gas giants: Jupiter (62), Saturn (60), Uranus (27), and Neptune (13). From the point of view of the amateur observer, how many of these are actually relevant?

To cut a long story short, I acquired the tabular data on the satellites from current OH Editor Pat Kelly and edited them into an Excel spreadsheet. I plotted the data a few different ways, one of which is Magnitude vs. Discovery Year. Another plot I made is Magnitude vs. Discovery Aperture (which took a little detective work, I don't mind telling you!) These can be viewed in my PowerPoint presentation located at public.me.com/chapmandave/satellites.

I also consulted 5 noted visual observers and found out which satellites they had managed to find and the equipment used to make the observations.

It became clear that in practice it is difficult to observe any satellite dimmer than magnitude 15 and/or in orbit close to the primary, which can cause glare in the telescope. It stands to reason that dimmer satellites need larger apertures, but many of the discoveries were not made at the observing limit of the instruments used and modern amateur equipment may indeed exceed the performance of historical telescopes of

similar aperture. Accordingly, surprisingly many of the natural satellites of the solar system may be observed by amateurs using modest equipment. In occasional circumstances, the more challenging objects have been observed by amateurs with rare access to professional equipment. (There is one exceptional report of two amateurs detecting Charon--the largest moon of Pluto--in a professional mountaintop telescope of aperture 1016 mm; I think it is safe to say this is beyond the means of a typical amateur!)

The full story of the history and analysis of visual discovery and subsequent observation of the natural satellites of the planets remains to be written, and very well may appear in the pages of The Journal of the RASC one day. For the time being, I offer the following table, very much a work in progress, to the members of the RASC Halifax Centre. Next year, the UNESCO International Year of Astronomy 2009 leads up to the historic 400th anniversary of Galileo's telescopic discovery of the Jovian satellites in early 1610. This is a milestone of astronomical history, as it demonstrated once and for all that not all heavenly bodies revolve around the Earth, thus pounding nails into the coffin of Aristotle's cosmology and heralding the Copernican revolution. Will 2009 be a voyage of astronomical discovery for you? How many satellites will you observe?

HALIFAX
CENTRE

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Deadline for the next edition is Jan 23rd 2009.

168 Satellites:

(continued)

Planet	Satellite	Magnitude	a/R	Instrument
MARS		1.8 to -2.9		
	I Phobos	11.4	2.8	229 Ro (9")
	II Deimos	12.5	6.9	203 So (8")
JUPITER		-1.7 to -2.9		
	I Io	5.0	5.9	(binoculars)
	II Europa	5.3	9.4	(binoculars)
	III Ganymede	15.0	3.7	(unaided eye)
	IV Callisto	26.3	6.6	(unaided eye)
	V <i>Amalthea</i>	14.1	2.5	914 Ro (36")
VI Himalia (P)	14.6	160	406 N (16")	
SATURN		1.3 to -0.5		
	I Mimas	12.8	3.1	229 Ro (9")
	II Enceladus	11.8	4.0	203 N (8")
	III Tethys	10.3	4.9	127 R (5")
	IV Dione	10.4	6.3	102 R (4")
	V Rhea	9.7	8.7	60 R (2.4")
	VI Titan	8.4	20	60 R (2.4")
	VII Hyperion	14.4	24	406 N (16")
VIII Iapetus	11	59	60 R (2.4")	
URANUS		5.9 to 5.7		
	V Miranda (P)	15.8	5.1	787 R (31")
	I Ariel	13.7	3.2	406 No (16")
	II Umbriel	14.5	10.4	406 No (16")
	III Titania	13.5	17.1	406 N (16")
IV Oberon	13.7	22.8	406 N (16")	
NEPTUNE		8.0 to 7.8		
	I Triton	13.5	14.3	406 N (16")

Notes:

1. "a/R" represents the ratio of the semi-major axis of the satellite's orbit to the radius of the planet's disk.
2. The numerical part of "Instrument" is the diameter in millimeters of the smallest-aperture telescope reportedly used to find the satellite by an amateur observer. The letter part represents the type of telescope: R = refractor, N = Newtonian, S = Schmidt-Cassegrain Telescope; o = occulting-bar eyepiece used. The aperture is also given in inches, in parentheses.
3. The designation (P) after the satellite name indicates that the initial discovery was photographic, not visual.
4. *Amalthea* (listing in italics) has not been observed visually since discovery.

Acknowledgements and Congratulations

The editor

The Halifax Centre would like to acknowledge and congratulate Halifax member Mike Boschat on being recognized by the American Association of Variable Star Observers (AAVSO) for submitting over 1,500 solar observations since 1999! As Dave Lane pointed out, that was 1,500 separate days of observations. That is quite an accomplishment.

For more information on AAVSO go to:
<http://www.aavso.org/observing/programs/solar/>

At the November meeting Andrea awarded Messier pins (a recently introduced item) to several current members who had completed the RASC Messier Certificate. We would like to recognize the following Halifax members for their completion of the Messier Certificate.

William Thurlow, M.D.	1986	(Deceased)
David Chapman*	1986	
Mary Lou Whitehorne *	1987	
Glen K Roberts	1987	
Douglas C. Pitcairn	1987	
Patrick Kelly *	1987	
Larry Bogan *	1987	
Joe Yurchesyn *	1989	
David Lane *	1990	
Blair Mac Donald *	1993	
Reginald D Henderson	1993	(Deceased)
John Reppa	1994	(Deceased)
Paul Gray *	1994	
Stephen Carrigan	1997	
Keith Lowe	2002	
Michael Gatto *	2002	
Paul Heath *	2003	

* current members who received pins at the meeting.

One of the IYA goals in 2009 is to encourage RASC members to participate in, and complete RASC Observing Certificates. We have had no members complete the Messier Certificate since 2003! I for one have set one of my observing goals for 2009 to complete the Messier Certificate.

There are several RASC Observing certificate programs including:

- **Explore the Universe Certificate**
- an excellent (and challenging) certificate for beginners
- **Messier Certificate**
- **Finest NGC Certificate**
- **Isabel Williamson Lunar Certificate**

Go to www.rasc.ca/certificates/index.shtml

November Meeting Report

Quinn Smith

The November meeting was chaired by Andrea Misner as our President Paul Evans was unable to attend.

Andrea opened the meeting, and welcomed the 35 members and 7 guests that were present. She outlined the benefits of joining the RASC and encouraged guests to consider membership.

Andrea then explained to the membership that we still had the position of 1st VP unfilled on the 2009 executive, and asked for volunteers. There was tremendous excitement in the room as members made a dash for the door, but after the dust had settled, no-one had actually offered their services.

Quinn Smith then gave a brief summary of the IYA plans for Halifax. He thanked those involved for SMU, Dal, the Discovery Centre and our own IYA committee. A summary of the IYA update can be found on page 3 of this newsletter.

Dave Lane (National President) showed some of the handouts that will be available for IYA. These included a planisphere, astronomy trading cards, an astronomy book aimed at young astronomers called "MaryLou's First Telescope" and a booklet entitled "Sidewalk Astronomy"

Andrea then congratulated Mike Boschat for his recognition by the AAVO for submitting 1,500 solar observations. She also awarded several Messier pins to members who had completed their RASC Messier Certificate (see details on page 7)

Andrea then introduced the main speaker for the evening Dr Luigi Gallo. His presentation was titled "Super Massive Black Holes"

Dr Gallo started his presentation by explaining what Black Holes were (areas where matter has been gravitationally collapsed to a singularity) and that de-

spite not being able to see a black hole, evidence suggested that there is a massive black hole at the center of most galaxies (including our own!).

He explained that a Black Hole could be (theoretically) of any size (mass) but those made by stellar evolution would initially be in the order of 3 - 30 solar masses.

He then described the concept of a Super Massive Black Hole (SMBH) as one with a mass of millions/billions solar masses. Such a massive Black Holes have probably been made by mergers of smaller Black holes (e.g. galaxy collisions) and accumulative in-fall of material.

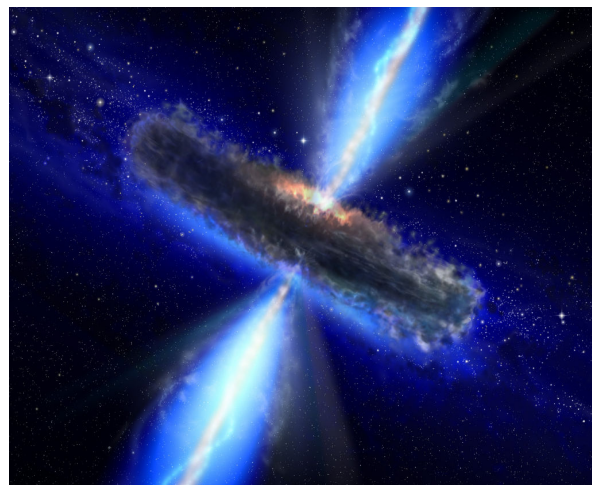
Dr Gallo then went on to give a brief history of our knowledge of Black Holes.

- 1700 The Rev Michell postulated the existence of "dark stars" created by collapsing stars.
- 1916 Schwarzschild predicted the existence of a space-time as a result of the equations of Relativity.
- 1960's Wheeler coined the term "Black Hole" (as a joke!)
- Chandrasekher, Lanau, and Oppenheimer described how a Black Hole was the normal end result of the stellar evolution of stars of 25 solar masses and above.

He then explained that although it is now known that most galaxies have a SMBH at their center, some galaxies are special in so much as they radiate enormous amounts of energy from their central region. These are known as Seyfert galaxies (or active galaxies).

In 1959 Woltjer showed that the central region of a Seyfert galaxy was very small, so small in fact, that it could only be a SMBH.

Dr Gallo then went on to explain why some SMBH were active and some were not. It was, he said, due to the proper-



NASA artist rendition of the accretion disk and outburst "jets" surrounding an active massive black hole.

ties of the accretion disc surrounding the Black Hole.

He explained that most most material falling into a Black Hole will have some angular momentum. This angular momentum causes in-falling material to collect in a disk (like the rings of Saturn). If this accretion disk is rotating quickly enough, interactions of material within the accretion disk will cause enormous amounts of energy to be created as some material is converted into energy. This process will also create "jets" that could focus a lot of this energy at right angles to the rotation of the disc (see artist rendition above). The mechanism of these jet formation is not fully understood, but probably has something to do with the magnetic lines of flux.

Dr Gallo then explained the principle of the Chandra X-ray telescope (in orbit) and how such a telescope could be used to observe the rays being emitted from the area surrounding an active SMBH.

Dave Chapman then gave a quick "What's up", pointing out that Venus was "closing in" on Jupiter in the SW evening sky and pointing out that, due to the Moon being at perigee, the December 12th high tide would be especially high. Dave also pointed out that this is a very good time of year to observe many of the objects required in the RASC Exploring the Universe Certificate.

SCO Observing Report

Mike Gatto

Observing reports for Monday, Tuesday, and Wednesday (September 22/23/24th 2008) - is that possible?!

I enjoy posting observing reports to the list but with three late nights I have been a bit tired! On Monday night I made it to SCO and for the first time since I have been going there, the imagers outnumbered the observers.

I decided that I would restart my Messier list and re sketch them as my next endeavour, taking all I have learned and applying it to this new set of sketches. What I see is that, a) this level of sketching is much more time consuming but b) they are a vast improvement from the sketches that I worked on from 99-01. Monday night at SCO I sketched 2, Wednesday I got 3.

Monday night conditions were good at SCO and I sketched M15 (a globular cluster) in Pegasus. Easy to find, very bright, lots of resolved stars at all magnifications, with several arms of stars extending out from the core making it look a bit scattered, the core was well resolved, and fairly condensed. Very nice! The other object was the Little Dumbell, M76 in Perseus. This took a better map to locate. At all magnifications it appeared as a small peanut, two joined lobes, quite small but not that dim. The S lobe appeared brighter to me. Lots of field stars - I have in the sketch over 50, and some down to 13.7, 13.9 when checked in Starry Night.

Tuesday night I stayed in the backyard with my 80mm scope and looked at what Messiers I could pick out from home (Dartmouth).

M52, M78, M31, M33 Yes

M74 No

Wednesday I was back at SCO with Tony and the conditions were much better, the seeing was excellent and so was the transparency. Tony lent me his OIII filter and since it was a 2 inch I had to hold it in front of the field lens to use

it, but it worked, I wondered though if 8" was enough aperture for an OIII. I looked at the veil and the ring for awhile with the filter. Then I was back to sketching, and on this night I did M57, the ring, as well as M103, a triangular shaped open cluster in Cassiopeia. It has a nice double at the NW corner and a very nice golden star that stands out just NE of the center. I have about 35 stars drawn as "members" and tons of field stars.

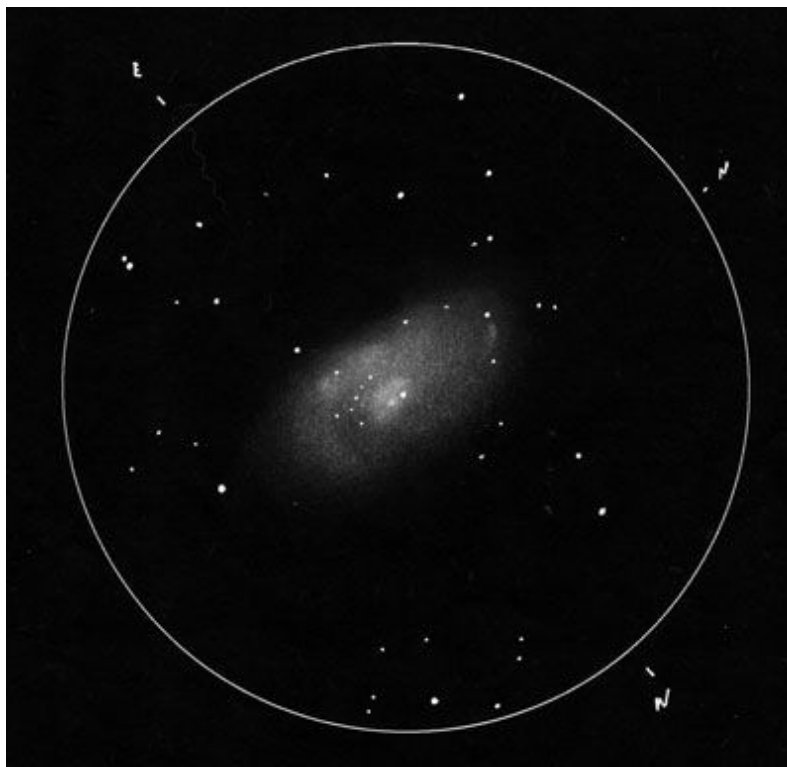
After this I took a look at M33, it had looked pretty good in the Center's 17" so I thought that conditions might be right for a shot at a good sketch in the 8", remember folks, the sky's the limit (not necessarily the scope). It was well worth it, but I spent almost an hour studying it. It did show structural detail. There was an obvious broad condensed core, and under higher magnification that broad core had a distinct inner core, with a bright star just N of it. There was an appearance of a spiral arm on the S side of the galaxy. After a while it became evident that in the spiral arm there were two brighter patches. Just S of the core there was a darker dust lane, and that darker area had 5-6 stars sprinkled over it in a Y-shaped asterism. It appeared elongated N to S. The N side of

the galaxy did not appear more than a non-distinct faint glow, on the leading edge of the N side the small NGC 604 (a star-forming region of the galaxy itself) was easily visible. It was the best that I have seen it in my scope for sure.

There were a few things that helped with this observation, I spent almost an hour on it, I used Roy's trick he mentioned at Nova East where I used the cloth scope end covers over my head as shields for blocking all stray light, and - surprisingly - the Ultrablock (narrowband) filter did a great job on this object. With the filter in place the structural elements were more defined. I knew that there were several OIII areas in the object and I thought that it might help with those but it really helped over all, must be the large size of the object. I also studied the central region at mags up to 200X to pull out those faint stars and that central small condensed core, I may even have gone to 300X.

Here is the sketch I made at the eyepiece (scanned and reversed) North is top right, west bottom right corner, it is hard to make out.

Overall a very nice run of observing!



Gershwin's - An Astronomer in Paris.

Daniel Majaess

(Daniel Majaess is a graduate student in astronomy at Saint Mary's University)

It has been at least a decade since I was last in Paris, and a recent visit revealed an unexpected transformation in the eyes of the beholder.

I adore France, but Paris less so, which I find only particularly appealing at night or perhaps while romantically intoxicated. I had managed to escape the dominance, some would say slavery, imposed by my graduate supervisors for a meagre two week visit. Unfortunately, in a move characteristic of the many abuses endured by graduate students, my master's thesis defense was scheduled for the day after my return(!).

Nonetheless, one aspect of Paris remained worse than can either be remembered or fathomed, namely the olfactory delightfulness that permeates the metro. Undoubtedly, there were many new things to appreciate, such as the lighting of the Eiffel Tower in lovely indigo.

Perhaps most striking, however, was the realization that once fleeting looks towards my female Parisian counterparts turned to a nearly obsessive search to frame Jupiter upon the city's landmarks.

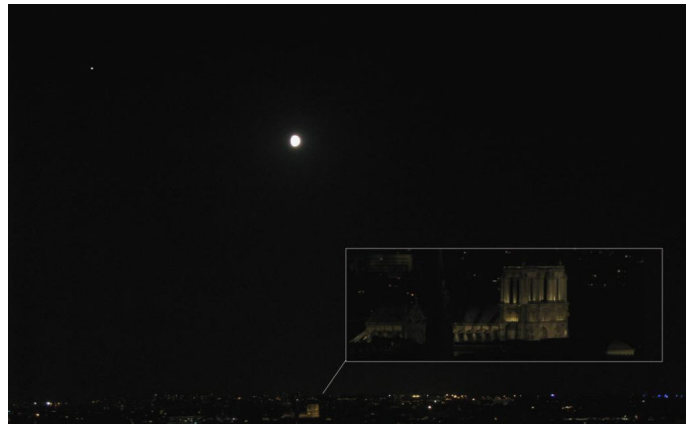
The first picture is shot southward from la Basilique du Sacre-Coeur (Montmartre) to capture Jupiter, the Moon, and the Notre-Dame de Paris.

The second picture is taken beside the Ecole Militaire, which concludes the beautiful lawns that stem from the Eiffel Tower and is where Napoleon Bonaparte graduated. Again, Jupiter, Moon, and military college are framed in a trifecta exposition.

The third picture is of the moon and the Pantheon de Paris, which many may recall as one of the sites of the famed Foucault pendulum experiments. Leon Foucault conducted this research to demonstrate the effects of the Earth's rotation, indeed a pendulum remains there in homage.

These new pair of eyes also actively scanned the city's art collections, which sought out Edouard Manet's *The Port of Boulogne in Moonlight* while visiting my favorite Parisian museum, the Musee d'Orsay. Curiously, Cunningham (2004) notes that X-rays reveal Manet had originally placed the moon lower.

Indeed, one often wishes that the moon could be so readily moved so to induce a solar eclipse!



Cosmic Debris

Odds and sods from the world of Astronomy and Cosmology

**It never rains, but it pours
Not one planet from another solar system photographed but four planets from two systems!**

(From the NRC web site November 12th, 2008)

NRC astronomer Dr. Christian Marois and an international team of researchers are the first to capture images of three planets circling a star other than the Earth's Sun.

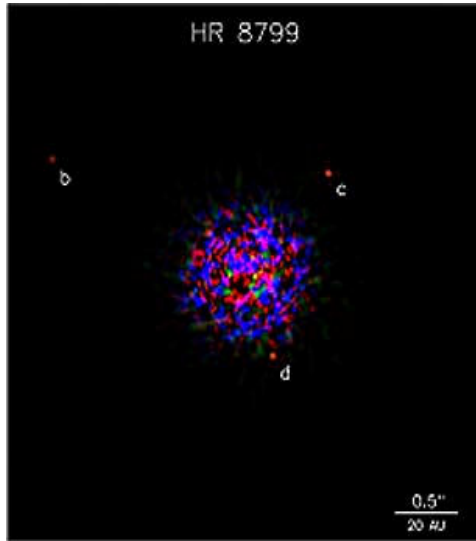
Using high-powered telescopes to capture these images, the team then identified three planets larger than Jupiter orbiting a star known as HR 8799. This star is 130 light years from Earth in the constellation of Pegasus. It is faintly visible to the naked eye.

"We have known for a decade through indirect techniques that the Sun was not the only star to have planets in orbit around it," said Dr. Marois of the NRC Herzberg Institute of Astrophysics in Victoria, B.C. "We finally have an actual image of an entire solar system. This is a milestone in the search for planetary systems around stars."

A team of Canadian, U.S. and British astronomers used the Gemini North and Keck telescopes on the summit of Mauna Kea in Hawaii to capture infrared images of the planets. The images were confirmed using advanced instrumentation and image-processing technology.

HR 8799 is about 1.5 times the mass of the Sun. It is also much brighter and significantly younger. Astronomers estimate the star is about 60 million years old.

"It's amazing to have a picture showing not one but three planets," said Dr. Bruce Macintosh, a scientist at the Lawrence Livermore National Laboratory and a project collaborator. "The discov-



ery of the HR 8799 system is a crucial step on the road to the ultimate imaging of another Earth."

Ultimately, astronomers are working towards images and spectroscopic studies of truly Earth-like planets, but that will require specialized space telescopes that are still on the drawing board.

(From The NASA web site, November 13th, 2008)

NASA's Hubble Space Telescope has taken the first visible-light snapshot of a planet circling another star. Estimated to be no more than three times Jupiter's mass, the planet, called Fomalhaut b, orbits the bright southern star Fomalhaut, located 25 light-years away in the constellation Piscis Australis, or the "Southern Fish."

Fomalhaut has been a candidate for planet hunting ever since an excess of dust (a telltale sign of planet formation) was discovered around the star in the early 1980s by NASA's Infrared Astronomy Satellite, IRAS.

"Our Hubble observations were incredibly demanding" says Hubble astronomer Paul Kalas, of the University of Califor-

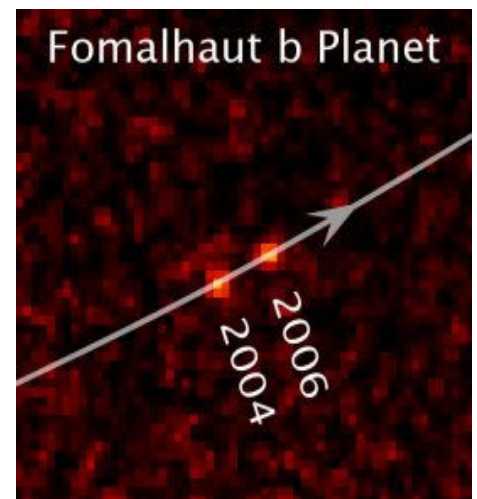
nia at Berkeley. "Fomalhaut b is 1 billion times fainter than the star. We began this program in 2001, and our persistence finally paid off."

Observations taken 21 months apart by Hubble's Advanced Camera for Surveys' coronagraph show that the object is moving along a path around the star, and is therefore gravitationally bound to it. The planet is 10.7 billion miles from the star, or about 10 times the distance of the planet Saturn from our sun.

The planet is brighter than expected for an object of three Jupiter masses. One possibility is that it has a Saturn-like ring of ice and dust reflecting starlight. The ring might eventually coalesce to form moons. The ring's estimated size is comparable to the region around Jupiter and its four largest orbiting satellites.

Future observations will attempt to see the planet in infrared light and will look for evidence of water vapour clouds in the atmosphere. This would yield clues to the evolution of a comparatively newborn 100-million-year-old planet. Astrometric measurements of the planet's orbit will provide enough precision to yield an accurate mass.

NASA's James Webb Space Telescope, scheduled to launch in 2013 will be able to make coronagraphic observations of Fomalhaut in the near- and mid-infrared. Webb will be able to hunt for other planets in the system and probe the region interior to the dust ring for structures such as an inner asteroid belt.





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:

There is no Observing night in December
January 23rd, 2009
February 27th, 2009
March 27th, 2009

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 share the equipment with other members; and treat the equipment, the facilities, and the site with respect. Enjoy!