

Nova Notes

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



PO Box 31011, Halifax, Nova Scotia, Canada B3K 5T9 www.halifax.rasc.ca halifax@rasc.ca

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E mail: novanoteseditor@rasc.ca

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Front Page Photo: Blair McDonald

Our Moon, 2009-Oct-04 10:57pm AST

Cannon EOS 350D ISO 400 at f/5.6

Cannon 70-300mm IS at 300mm



From the editor

Quinn Smith

It is hard to realise that another year is nearly over. It seems like only yesterday that the Millennium was approaching. Now we are approaching 2010. Personally I'm still writing 199 (something) on my cheques!

With the end of the year two important events are upon us. The first, and the one that most directly affects the Halifax membership, is our December Annual General Meeting. This is our opportunity to thank (or curse) our outgoing Executive and to nominate and vote for the new Executive that will take us into 2010. We still need volunteers, including the all important role of President. I hope you all try to make this meeting and support your Centre.

This time of year also signals the end to International Year of Astronomy. And what a year it has been! I will write a summary in the next Nova Notes (February), but I do want to thank all the members who have contributed to its outstanding success over the year. We have achieved a great deal, and I think most of us will agree had a lot of fun in the process.

I particularly would like to thank Karl Penny and Dave Chapman who have done an enormous amount of work to support IYA. We have helped support the planetarium at Dalhousie University, helped initiated a Dark Sky Preserve program at Keji and based on figures from our record keeper John Higgins, have exceeded 10,000 Galileo Moments in Nova Scotia. Way to go!

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.

Normal Meeting Room SB 260

Note: December Meeting only - Room SB 160

December 18th, 2009

- AGM

This is the Annual General Meeting of the Halifax Centre. Guest speaker Hugh Thompson will talk about his current project, the Thirty Meter Telescope.

January 15th, 2010

- Meeting night

The speaker (yet to be confirmed) will be Peter Giles.

February 19th, 2010

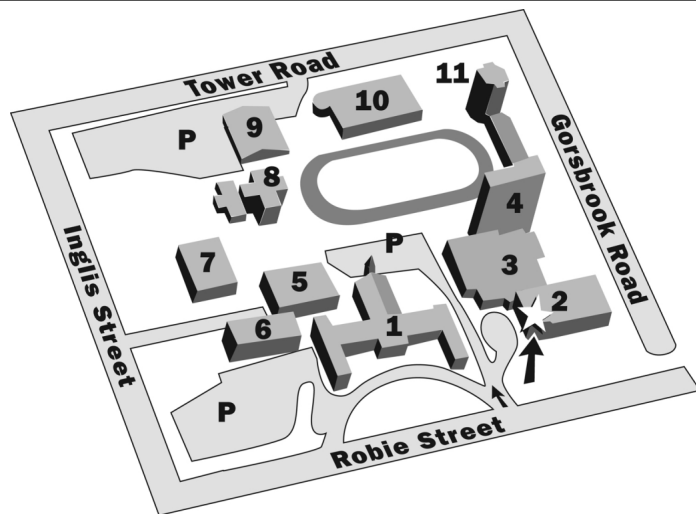
- Meeting night

The meeting agenda is still under review. Watch this space!

[The content of all meetings is subject to change]

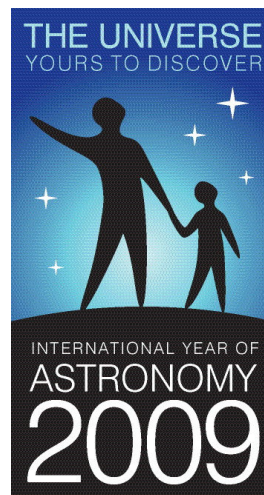
Meeting Location:

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
Acting President	Wes Howie	252-9453
2nd Vice-President		
Secretary	Chris Young	466-0489
Treasurer	Pat Kelly	472-2322
Nova Notes Editor	Quinn Smith	852 3894
National Rep.	Pat Kelly	472-2322
Librarian	Robert Bussieres	434 4821
Observing Chair	John Liddard	902 865 7607
Councilor	Paul Heath	457 0610
Councilor	Sean Dzafovic	430 9062



2010 Executive

Quinn Smith

The December meeting of the Halifax Centre of the RASC is the time we have the opportunity to elect the Executive that will lead us through the next year.

It is also the opportunity for those members who are interesting in sup-

porting that Executive, to offer their support by standing for a position.

At this point we have nominees for all positions other than the most important - namely President. This is a great opportunity to take a leadership role in your Centre, so we ask all members to consider standing for this position.

The current nominations for the executive are as follows:

President – position still open !

1st VP: Richard Vanderburgh
2nd VP: Jim Dorey
Recording Secretary: Chris Young
Treasurer: Ian Anderson
Nova Notes Editor: Quinn Smith
National Rep: Pat Kelly
Librarian: Robert Bussierres
Observing Chair: John Liddard
Councilors: Paul Heath
Sean Dzafovic
Honorary President: Roy Bishop

Quantifying a 5 mW Laser

Roy Bishop

I note in the recent flurry of emails on Green Laser Pointers, that some people seem to underestimate the hazard these devices pose if aimed at someone, particularly from a distance of several kilometres. I did some calculations for my 5 milliwatt green laser and arrived at these results:

Intensity = 3.8×10^6 cd i.e. 3.8 multiplied by 10 raised to the power 6 (candelas).

Luminance = 5×10^{12} cd/m² (candelas per square metre)

To put these numbers into perspective, the luminance of the surface of the Sun = 1.9×10^9 cd/m², so my green laser has 2600 times the luminance (surface brightness) of the Sun.

The luminance of the fireball of a nuclear fission bomb 0.1 milliseconds after ignition is about 2×10^{12} cd/m², brighter than a thousand suns, but less than half that of my laser.

The power required to light an incandescent light bulb (sending light in all directions) that appears as bright as my green laser (when aimed at someone) = 3 megawatts. (Three megawatts will power a sizeable

town).

At a distance of 3.5 km my green laser will provide the same illuminance (surface illumination) as does the full Moon.

From a distance of 200 km (for example, from the ISS) my green laser will appear as bright as the planet Venus (neglecting atmospheric absorption). Thus, at "everyday" distances (several kilometres or less) a 5 mW green laser is going to be damn bright, and a major hazard to anyone whose attention is needed elsewhere, like a pilot or the driver of a car, especially at night.

It is the extremely small divergence of its beam that gives the laser these impressive figures.

And this is only a 5 mW laser. 600 mW (!) hand-held green lasers are being advertised for sale to the public, few of whom understand physical concepts like solid angles and luminance.

Appendix:

If anyone would like to check my results, here is the input information:

Power: 5 milliwatts (Advertised)
Beam diameter at the laser: 1.0 millimetre (I measured this.)
Beam divergence: 1 milliradian (Twice the half-angle) (I measured

this.)

Wavelength: 532 nanometre (Advertised, and I measured it.)

At the wavelength of the peak sensitivity for bright-adapted (photopic) vision (555 nm):

1 watt produces 683 lumens (p. 36 of the Observer's Handbook).

At a green laser's wavelength (532 nm), the response of the eye is about 0.88 as great (p. 70, Observer's Handbook).

Sun's radius, power, and luminous intensity: p. 34 Observer's Handbook.

Photometric efficiency of an incandescent light bulb: p. 36 Observer's Handbook.

For the illuminance provided by a light source of a certain visual magnitude: p. 35 of the Observer's Handbook.

For the visual magnitude of the full Moon: p. 35 Observer's Handbook.

For the relations between the units lm, cd, lx, and sr: p. 36 of the Observer's Handbook.





Blair McDonnald

This edition's question was posed by several members after my talk at the last meeting. Several budding astro-photographers were curious about *image stacking*, what it is, and how it's done.

Before I describe stacking and its uses it's necessary to understand some of the issues involved with digital imaging, namely noise and dynamic range. Noise is something almost all imagers discover very early in the hobby. It has lots of causes (that's a topic for another column) and it looks like snow in a bad TV picture. Longer exposures will increase the signal to noise ratio (SNR) making for a better image. As usual there is a down side to improving the SNR through longer exposures and that is where we run up against dynamic range limitations.

Dynamic range is the ratio of pixel values between the brightest and dimmest parts of the image. For those with a mathematical bent;
 $DR = \text{brightest} / \text{dimmest}$.

The detector chips used in all cameras have a specification called *full well depth*. This is a measurement of the number of photons that the pixels can acquire before they are full. When the pixels fill up they cannot record any additional information so areas of the image saturate and usually end up looking white in a colour image. As you expose longer to combat noise, more and more pixels saturate destroying detail in the brighter areas of the image. Thus trying to reduce the noise ends up reducing detail. One of the first things to be lost is star colour.

This is why many long exposure images have big white stars even when there should be lots of colour. To work around these issues as much as possible, astro-photographers resort to stacking.

The idea here is to expose just long enough to capture the bright areas of the image while getting the sky background out of the camera noise. Your DSLR's histogram (or the one that is accessible from one of the many menus in your CCD imaging software) is the tool to use to get it right. Expose long enough to get the peak of the histogram about $\frac{1}{4}$ to $\frac{1}{3}$ of the way from the left edge. This will leave you with an exposure with some noise in the dark areas and the sky background, but the brighter areas will not be burned out.

Now is where stacking comes in; to improve the SNR in the dark areas we need longer exposures and through the wonders of stacking we can get them. The idea here is to increase the SNR by averaging many of these shorter exposures to get the best of both worlds, high SNR and detail in the bright parts of the image. Stacking software allows you to align the images and average them to produce the final image ready for additional processing.

There are lots of stacking programs out there; some also do image calibration and camera control as well. Images Plus, Maxim DL, Nebulosity and Deep Sky Stacker all are decent programs for stacking and image processing. You can even stack a few frames in Photoshop or Paint Shop Pro if you

are desperate. In particular, Deep Sky Stacker is an excellent package that will take your darks, bias frames, flats and images (in camera raw or fits formats), calibrate them, automatically align them and stack them using a variety of algorithms. Its interface is a little quirky, but the software is free and well supported. There is even a Yahoo group moderated by the author where you can have all your questions answered.

My usual work flow involves getting home from an imaging run, downloading all the images from my camera, turning Deep Sky Stacker loose and then going to bed. When I get up in the morning there is a fully calibrated and stacked image waiting on my computer screen. The process can take a while, about $\frac{1}{2}$ to one hour for 30 or 40 light frames and the same number of darks, but what the heck I'm sleeping anyway.

That is really all there is to it, no magic, just lots of computer software. For those that want to try any of the packages mentioned in this article, just do a quick web search to find them, they all have demo versions that you can play with for 30 days or so.

Remember, this column will be based on your questions so keep them coming. You can send them to the list at hfxrasc@lists.rasc.ca or you can send them directly to me at b.macdonald@ns.sympatico.ca. Please put "IC" as the first two letters in the topic so my email filters will sort the questions.



M33 before stacking



M33 after stacking

October Meeting Report

Chris Young

Wes Howie, 1st VP and acting President, opened the meeting and greeted the 22 people in attendance, including 3 guests who received the Halifax RASC introduction package and a brief outline of the benefits of membership.

Roy Bishop has finished his term as Chair of the Nova East Committee and requested volunteers for the new committee! (see page 9). Roy has enjoyed his experience as Chair and recommends it as a rewarding experience. The duties of the Chair are to oversee the committee and you have the opportunity to put ideas forward for the annual event. Nova East is shaped by the choice of speakers and the program put together by the entire Committee. Roy particularly enjoyed the Awesome Astronomy Auction. Roy notes that there is a very experienced Committee in place to assist the new Chair and that he is preparing a guide for organizing the event.

Wes then advised that the Executive positions are filled with the exception of President, which is open and members are asked to consider taking on this position. The President is assisted by the executive and anyone interested can contact Wes or any member of the executive for more information.

The December meeting will be on the 18th of December to accommodate the guest speaker, Mr Hugh Thompson, who will provide a presentation on his involvement with the 30 Meter Telescope and the Hertzberg Institute of Astrophysics. Hugh was a member at the Halifax Centre as a young man and looks forward to his visit.

Dave Chapman gave an update on IYA for Quinn who is away. Dave noted that in September there had been 6 observing events on a single weekend with 250 participants and at least 7 library talks had been held that month.

The next weekend is to be "Galilean Nights" in Nova Scotia with a number of events, listed on the Astronomy Nova Scotia website, including:

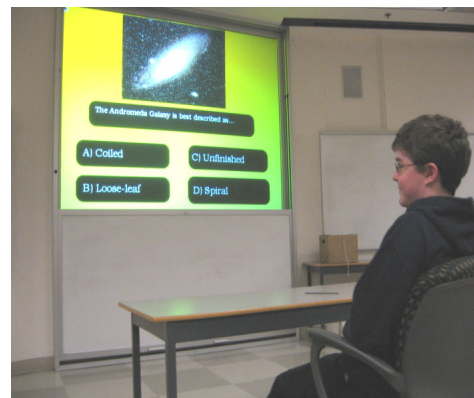
- SMU "Café Scientifique – Ripplés from the Big Bang"
- Planetarium Show (Galileo will be present!)- book early!
- Galilean Lecture: Professor Christine Wilson's "Beyond the Visible Universe"
- Public Observing at Chapters
- Astronomy Café at Café Ristretto "Conversations with Backyard Astronomers"
- Bridgewater Public Observing with Jerry Deveau

Paul Heath proudly showed his newest constellation poster "Cepheus" which is one of a series, all displayed in his bus and which has introduced his students to astronomy.



The main event of the evening was Speaker and Games Master Pat Kelly with a return engagement of "Who Wants to be a Gazer?" - a quiz show of increasing difficulty, where volunteers from the audience are put in the hot seat and subjected to multiple-guess questions flashed on the front screen. The contestant is permitted a limited number of "life lines" including "eliminate 2 wrong answers", "poll the audience" and "ask an expert" to hang in the game which tests your knowledge from Star Trek to astrophysics.

Four volunteers were selected by lot-



tery (some anxious moments there for some of us) and sportsmen all they proved to be! – oblivious to the whispered hints, groans & applause. Each contestant faced a maximum of 10 questions.

The surprise contestant was a young man, Devon Hartland, a guest here at his first meeting who had us all sitting up in our seats and went 8 rounds before being taken down. (photo – Devon Hartland) The scores were Dave Chapman 9, Tom Crossman 4, Devon Hartland 8 and Paul Heath 8.

"What's Up" was presented by Mike Boschat who provided details on the upcoming meteor showers, occultations, planets and the dates & times for the Werner "X" on Oct. 25, Nov. 24 & Dec. 24 (at 8:22 PM!). Dave Chapman expanded on the "Lunar X" explaining how he had happened to observe this lunar feature of high crater walls which catch and reflect the sunlight as an "X", well before the terminator gets to this location. Dave found there were stories of this occurrence but little had been written. Following some investigation and analysis Dave wrote an article for the JRASC which he has made available at <http://public.me.com/chapmandave> under the file name WernerX2.pdf. The "X" appears every month with its best view lasting about an hour - but you have to be in the right location to see it! Roy Bishop noted that it also occurs during the lunar sunset.

The meeting ended with the usual munchies and socializing.

How I (re) Discovered the Moon

Dave Chapman

During this International Year of Astronomy 2009 I discovered the Moon. Of course, it was there all along, and other people found it long before me. I have even observed the Moon before, but it has been a long, long time. Let's say I had a "moment of personal discovery" involving the Moon.

Why don't we start from the beginning? When I was a boy, just getting interested in astronomy, the Moon was one of the first objects I observed through a telescope. On my 10th birthday, on July 21, 1963, I received as gifts a 60 mm Tasco refractor and Patrick Moore's "The Amateur Astronomer." Three days later I made my first entry into my astronomy observing log, which I still have: page one contains a list of lunar maria and large craters that I observed that night and the following nights, including The Sea of Crises, Langrenus, Hipparchus, and the Marsh of Putrefaction. I sketched the Moon on September 29 of that year and continued to observe and sketch the Moon off and on for 5 years. (You can view an album of these sketches at <http://tinyurl.com/yz2r3j6>) The first Eclipse of the Moon I observed and recorded took on December 18, 1964, a bone-chilling winter night in Winnipeg, Manitoba.

I sometimes wonder if my interest in the Moon dwindled with the Apollo 11 landing in 1969 and Neil Armstrong's first steps on my 16th birthday. Why observe the Moon when people go there now? Another possibility was that I started getting interested in observing Deep Sky objects, requiring dark skies, and I began to shun the Moon, as others do today. By 1968, I was in Ottawa and caught up in the Observers Group of the RASC Ottawa Centre. The Deep Sky "chief" in those days was the charismatic Ken-Hewitt White, who got us all involved in a

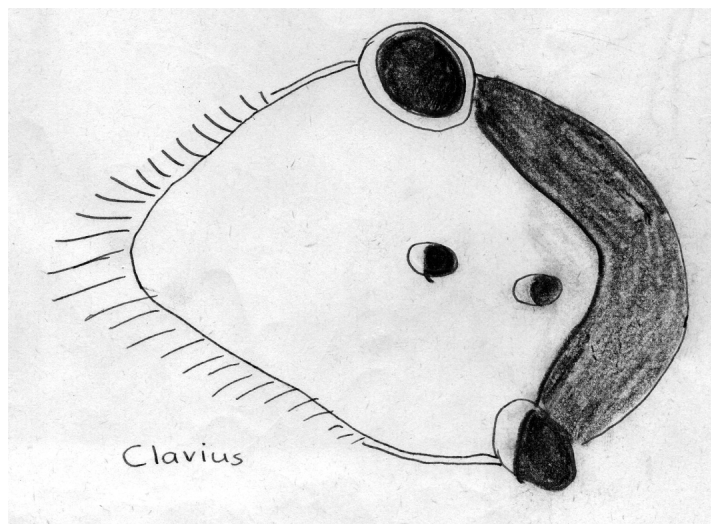
Messier "hunt". My records show that I observed about 45 Messier objects and then abandoned the project. By then I was finished high school and starting university, and thus began a 12-year hiatus in my stargazing. I missed some cool stuff during those years!

Even when I got back into astronomy in Halifax in the early 1980s, I did not observe the Moon, other than the odd eclipse. I did not sketch the Moon again until August 22, 2004, when I noticed the Lunar X near Werner while "tuning up" my telescope at Nova East. (Read the full story in the file WernerX2.pdf at <http://public.me.com/chapmandave>) Observing, researching, explaining, and thinking about the Lunar X rekindled my interest in the Moon along a number of different directions. I learned that "observing" is not simply "seeing", for one thing. It also led to an experiment in cyber-astronomy where I was able to mobilize RASC members across 5 time zones to observe and report on a phenomenon that is challenging to observe at a fixed location.

A few years later, I was one of many speakers at Nova East 2007—which had a lunar theme that year—speaking about the Lunar X and listening to John Jarvo speak about the RASC's fairly recent Isabel Williamson Lunar Observing Certificate (<http://www.rasc.ca/williamson/>). I was tempted. When I looked into it, I saw that there were roughly 150 observing objectives, some fairly easy, others a bit tougher, such as the observation of a slender moon (less than 24 hours from New Moon, either a waxing or waning crescent). I quickly surmised that this objective could potentially be a show-stopper,

so I set about fulfilling that one first. The other objectives could wait! The "young Moon" observation cannot be attempted any old month: The Moon has to be close to the Sun (but not too close) yet well above the horizon (springtime is best, for waxing crescents); the sky has to be clear and free of haze; the observing location must have a low horizon (no nearby buildings or trees). With a bit of planning and a lot of luck, I snagged my young Moon (along with several other RASCals) on April 6, 2008. (At the time I write this, the RASC Observing Committee has relaxed the time window of this objective to 36 hours, with 24 hours as a "challenge" objective.)

With this auspicious beginning, you might expect that I would immediately launch into a disciplined program of lunar observing, to complete the objectives, but this was not the case. I have no explanation. My observing log is practically empty for over a year following that date. I suspect IYA 2009, which has kept me pretty busy "organizing" and "communicating". At some point this fall, inspired in part by Quinn Smith (who observed all 110 Messier objects during IYA 2009) I got off my astro-butt and resumed the project. I started keeping my 8" f/6 dob in the garden shed, instead of in the basement, so ease of access might have been a factor. I can haul it out



An early lunar sketch done by Dave at the age of 10

and set it up in a couple of minutes. Both Jupiter and the Moon were high enough for me to observe from the backyard, and there many clear nights, so I made good progress. At the time of writing, I have completed about 1/3 of the objectives for the Isabel Williamson Lunar Observing Certificate, plus I have found about 1/3 of the challenge objects required for additional recognition.

The objectives for the certificate are ordered by increasing lunar longitude east to west, so once you know the longitude of the terminator it is easy to come up with a short list of features in high relief for ease of identification. (I found an Excel spreadsheet that quickly calculates the terminator longitude and lunar libration from established formulae.) At the telescope, along with the short observing list, I also have the Sky&Telescope laminated Moon chart (24" square but folds to 12" square showing a single lunar quadrant) that I picked up for \$12. The observing program recommends using Antonin Rukl's *Atlas of the Moon*, as a reference, but this book appears to be out of print and hard to obtain. (Halifax Public Libraries has one reference copy and one circulating copy.) The laminated chart is great at the scope and the cartographer turned out to be Rukl! The chart labels most of the "mandatory" observing objectives, but only some of the "challenge" objectives in the RASC program. (There exists a "mirror-reversed" chart for telescopes with an odd number of reflecting elements.) I have found that the excellent online source <http://the-moon.wikispaces.com/Introduction> fills in all the gaps, as it apparently has information on all named lunar features, with links to photos and maps.

With good preparation, the time at the telescope is more relaxing. I mainly use my Discovery 8" f/6 with a 5 or 7 mm eyepiece for 250x and 175x, respectively. I have a Moon filter but rarely use it at these magnifications. Sometimes I use my TeleVue Ranger 70 mm f/6.8 with a 2x Barlow and the

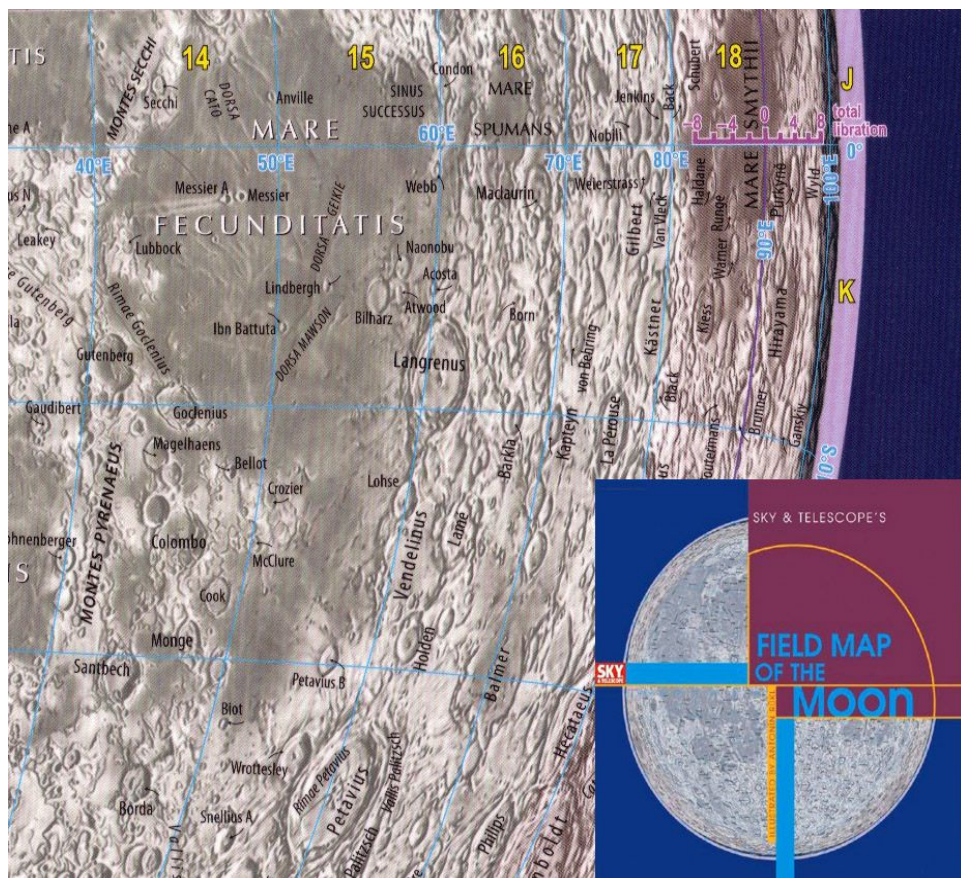
7 mm eyepiece for 136x. Ideally I would like a larger-diameter refractor for this job. My principal difficulty is the vision in my 56-year-old eyes. It just is not the same as when I was 10! I find that "floaters" interfere with the view and I need to keep moving my eyeball around to compensate.

In a given session, I tackle 6–8 objectives, which generally consist of a group of several objects. In addition to craters, there are: craterlets; crater chains; central peaks and features on crater floors; single mountains, domes, and mountain ranges; ridges, rilles, and valleys; "seas", "lakes", and "bays". Some objects—especially the tiny challenge objects—require 200+ power on the telescope, and on many nights the seeing does not support this. I probably spend as much time planning my session and interpreting the observations as I do actually at the telescope. There are times I have to come inside to check a detail or two. The lighting conditions on the Moon change dramatically from one night to

the next, so it is sometimes necessary to observe an area more than once to tick off an objective.

I am enjoying this project, visiting some old places on the Moon I recall from my first days (literally) with a telescope, but also discovering some new, interesting features I did not know about. I would recommend it to anyone as a project, whether new to astronomy or an old hand. If you find the RASC project too much to tackle, there is a shorter list of 109 easy lunar features in the Observer's Handbook, with an accompanying illustration and finder chart. (The cartographer turns out to be our own Roy Bishop!) There is no certificate, but I am sure the Centre could come up with something. In any case, all these observations would count for the other!

If anyone out there is observing the Moon, please contact me.



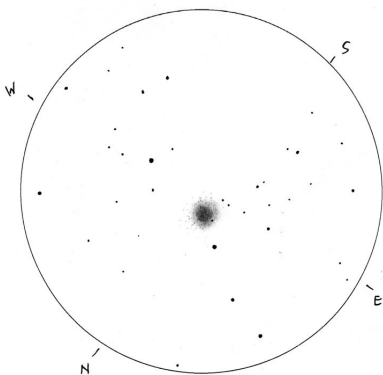
Sketching Deep Sky Objects

Michael Gatto

Ever since I have been observing I have enjoyed sketching the objects I was looking at, and prefer that to simply logging them with a text description. I have always enjoyed drawing and find it an easy way to get a visual representation of what I am seeing at the eyepiece. To date I have sketched all of the Messiers, all of the Finest NGCs, some of the Herschel 400, and I am currently going back and re-sketching the Messiers.

For me, sketching the deep sky objects (DSOs) and their star field has several advantages. The resulting sketch of the object and the stars around it makes for an easy comparison of photographs of the object – making confirmation a snap. I usually compare my sketches to images pulled off of the Digitized Sky Survey website to confirm I was looking at the right object. This is less of an issue for brighter Messiers, but helps a lot once you get into the galaxies of Spring, and is invaluable when working on fainter lists like the Herschel 400, where objects start to all look like “faint oval glows”.

Sketching – by its very nature – forces you to look a bit longer and can lead to seeing more detail. And by looking around the outer edge of the field at the stars (making you use averted vision) you often see objects and details appear in the field that were not



M2 - Mike Gatto

there initially which is always my most rewarding observation. I love to suddenly realize that there is another DSO in the same field that I did not even notice at first!

When I began sketching I was simply using a sketch book with no predetermined way of going about it, with a very small circle to represent the field of view of the eyepiece, and would draw the most basic shape and maybe 5-7 of the brightest stars in the field. Almost all of my first-run Messiers are like this. I then moved to better formatted sheets with room for three objects per page. Over time the circle representing the FOV has grown, and I am making a conscious effort to capture almost all stars in the field - providing that the object is not in the Milky Way!

Materials

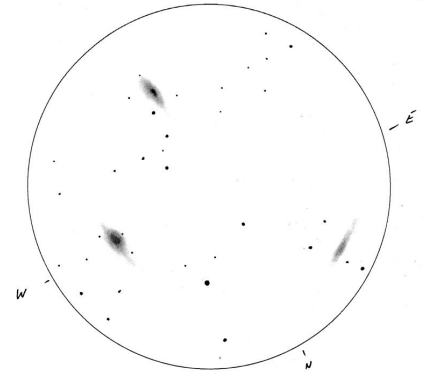
I sketch on log sheets that I print at home on a laser printer, just on typical bond paper - no fancy art papers. The log sheet contains the image circle, about 4.5" in size, with an area below to fill out the particulars; date, time, place, constellation, seeing, transparency, etc, and a large area for notes.

I record stars with a Pilot Fineliner that has a hard plastic tip that holds its shape well, and is good for recording tiny dots for the faintest stars. Using ink for stars smudges less than a pencil and scans into the computer better as well. I carry a variety of pencils – nothing fancy – to record the faint non-stellar objects, and I use a diffuser (a pencil that is basically a roll of paper with no lead) to blend and soften the pencil lead on the paper. It is crucial for capturing the soft, diffuse ghostly look of most deep sky objects. An eraser is also handy for lightening objects and fixing mistakes.

Process

The process I go through on most objects is basically the same.

- a) Find the object !
- b) Observe it at low power, usually



M65 / 66 - Mike Gatto

70X but sometimes 45X, for a few minutes to get an overall impression and see if there are interesting details. Your low power view will always be the brightest view. While in this low power view I also center the object and let it drift to determine the East - West direction and mark the cardinal directions on the outer edge of the image circle.

c) I then start to up the magnification, through all my eyepieces; 90,120, 200, even 300X, and I take text notes of interesting features that come into view, or if the object looks any different, or if the object gets too faint, etc. After this I decide on the ideal field of view to sketch, it is determined by the size of the object and the complexity of the surrounding star field. Big clusters need a large FOV, galaxies are often framed better when magnified, etc. This is a personal preference.

d) Once I settle on the FOV then I begin sketching the stars, usually drawing the 4-5 brightest in the field. Once that looks OK I begin to draw in the fainter stars in relation to the brighter stars. I sometimes look for little patterns to draw, such as triangles or little asterisms to fill in 4-5 stars at a time. I try to do this portion quickly - always re-centering the field due to the drift of the stars. If the object is directly in the Milky Way – where there might be hundreds of stars – I draw as many as I can to get a good representation of the view, but I always note “too many stars to draw” in the note section. Otherwise I try to draw all of the stars in the field.

e) Once that is done I switch to pencil (for most objects) and begin to sketch the overall size and orientation, always in relation to the stars already on the paper. I think that the most common mistake would be to over exaggerate the size of an object, you really need to pay attention to how large the object really is in relation to the surrounding stars. All DSO's are done in pencil with the diffuser. Any graininess where an object is almost resolved I pattern with the pencil. Well-resolved globular clusters I do with ink for individual stars and chains of stars or patterns, with pencil giving the effect of the glow of unresolved stars and the brightness of the unresolved core. Open clusters that are resolved are the same, ink for individual stars and patterns, and the pencil and diffuser for filling in any overall glow. For galaxies I usually draw the core with the pencil but make the coma with the diffuser.

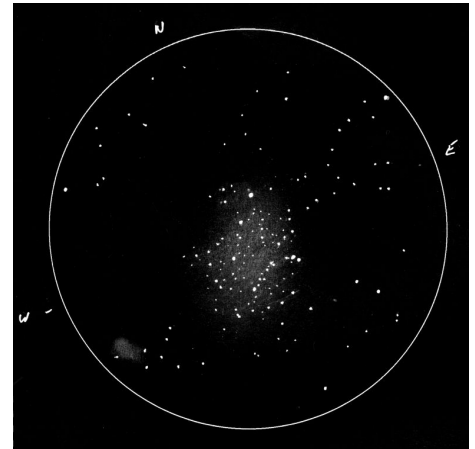
f) Once I am satisfied that I have captured the view I sit back and take a

good look at the view in the eyepiece and evaluate it against what I have drawn and ask a few questions; Which stars are the brightest stars? Is there detail in the object like brighter or darker areas? Is the size OK? Is the placement right? Is the orientation right? Are there other things in the field now visible that weren't before? I make any necessary adjustments and by this time 20-30 minutes have usually elapsed since I first found the object.

In general - and this should be obvious - the smaller objects go faster and the larger and more complex objects take longer. The hardest objects to me are the large open clusters, often you might be dealing with 30, 50 even 100 stars scattered over a large view, often in busy star fields. Getting the overall size and patterns of the stars right is quite challenging. Especially clusters that are resolved well, but have dozens and dozens of stars of similar brightness. It is hard to not start to add in stars at random to fill in the spaces,

but sometimes that is necessary to capture the feeling.

This is - without question - a more time-consuming way to observe. If I go out simply to take a look around I might look at an object every 5 minutes, but when I sketch this way I often only get 2 or 3 in one night. Perhaps that is why it took me about 7 years to finish the finest NGC list!



M35 (reversed) - Mike Gatto

Nova East 2010 - an opportunity

Roy Bishop

The annual star party of the RASC Halifax Centre has been held under the banner *Nova East* for the past 23 years. Anyone unfamiliar with Nova East should read two recent articles in Nova Notes: "Nova East History" in the July edition (page 8), and "Nova East Report" in the October edition (page 6).

Nova East is the highlight of the year for amateur astronomy in Nova Scotia. As such, it provides an opportunity for a few RASC members to have a major

impact on the pursuit of astronomy in our region. Traditionally, the person who heads the Nova East Program Committee has the main role in shaping the event — through selection of a theme, designing the program, choice of speakers, and keeping track of the planning.

I have headed up Nova East for the past two years, which is the usual term for that position. I now step aside so a new Chair can take over, with fresh ideas and energy.

The Nova East Committee is reformed each autumn, and planning for the next Nova East starts in December or early January. Two key roles on the

new Nova East Committee (Registrar and Door Prize Organizer) are already filled, so the person who leads Nova East 2010 will already have strong support.

Like Dave Parsons, John Jarvo, and Daryl DeWolfe, I shall now be on the sidelines with advice (if asked) for the new Committee. Also, I will give a summary of "what to do when", with contact information, to whoever accepts the opportunity to lead Nova East 2010.

Contact Centre President, Wesley Howie <Wesley.Howie@nsc.ca> if you are interested.

HALIFAX
CENTRE

Nova Notes: The Newsletter of the Halifax Centre of the RASC

PO Box 31011, Halifax, Nova Scotia, B3K 5T9

E mail: novanoteseditor@rasc.ca Newsletter editor: Quinn Smith

Nova Notes is published 5 times a year, 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.

Who Wants to Be a "Gazer"?

Pat Kelly

For those of you who could not attend the October meeting, here is a chance to test your astronomical knowledge. The questions start out easy and get harder later in the quiz. Have fun (and don't cheat). Answers on page 11

Q1: A straightjacket is recommended after one term as what?

- a) Centre President
- b) National President
- c) Handbook Editor
- d) All of the Above

Q2: What is a really bright meteor called?

- a) Fireball XL-5
- b) Great balls of fire
- c) Fireball
- d) Firebird

Q3: The Andromeda Galaxy is best described as...

- a) Coiled
- b) Loose-leaf
- c) Unfinished
- d) Spiral

Q4: This stylised version of the Pleiades is the logo of which car company?



- a) Mitsubishi
- b) Honda
- c) Subaru
- d) Mazda

Q5: What is the name of the brightest star in Leo?

- a) Regula

- b) Regulus
- c) Irregular
- d) Regularity

Q6: What is the name of the pattern made by Vega, Deneb, and Altair?

- a) Summer Triangle
- b) Winter Triangle
- c) Great Square
- d) Dunce Cap

Q7: Which planet, hated by Dave Lane, is usually the brightest?

- a) ECUaria
- b) Venus
- c) Mercury
- d) Ford

Q8: What do we call the stream of particles coming from the Sun?

- a) Solar Wind
- b) Solar Plexus
- c) Ion Power
- d) Corona

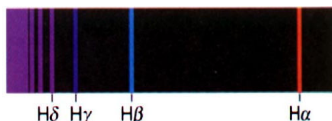
Q9: A comet's tail always points in which direction?

- a) Away from Earth
- b) Away from the Sun
- c) At the North Pole
- d) Towards the Sun

Q10: Galileo was convinced of the heliocentric model by observing the phases of which object?

- a) Mercury
- b) Venus
- c) The Moon
- d) The Sun

Q11: What kind of spectrum is this?



- a) Continuous
- b) Emission
- c) Absorption
- d) Irregular

Q12: Which is the only constellation that consists of two unconnected areas of the sky?

- a) Hydra
- b) Fornax
- c) Serpens
- d) Eridanus

Q13: In the Star Trek: The Next Generation episode "Descent" who played the role of Stephen Hawking?



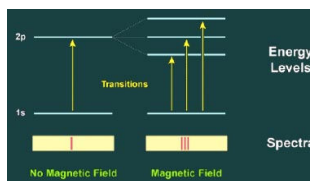
- a) Rick Mercer
- b) Patrick Stewart
- c) John Neville
- d) Stephen Hawking

Q14: Which constellation is largest in area?

- a) Virgo
- b) Hydra
- c) Ursa Major
- d) Triangulum

Q15: Spectral lines splitting due to a strong magnetic field is called what?

- a) Fermi Effect



- b) Planck Effect
- c) Zeeman Effect
- d) Drake Effect

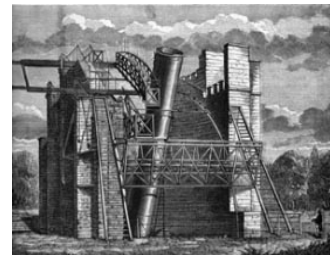
Q16: Which object is currently farthest from Earth?

- a) Pioneer 10
- b) Pioneer 11
- c) Voyager 1
- d) Voyager 2

Q17: The Maktomkus Observatory is in Avonport. What does "Maktomkus" mean?

- a) Many Stars
- b) Black Skies
- c) Black Rocks
- d) No Clouds

Q18: Who owned this telescope?

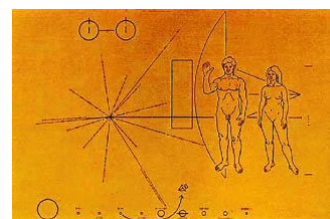


- a) William Herschel
- b) John Herschel
- c) Otto Struve
- d) Lord Rosse

Q19: Which Apollo mission was the first to use the lunar rover?

- a) Apollo 14
- b) Apollo 15
- c) Apollo 16
- d) Apollo 17

Q20: This plaque was attached to which series of spacecraft?



- a) Voyager
- b) Pioneer
- c) Mariner
- d) Viking

Q21: What is the Sun's spectral classification?

- a) G0 V
- b) G2 V
- c) G2 III
- d) G2 II

November Meeting Report

Chris Young

Wes Howie, 1st VP and acting President, opened the meeting and greeted the 50 people in attendance, including 7 guests who received the Halifax RASC introduction package, and gave a brief outline of the benefits of membership.

Wes noted that there are 2 volunteer positions open for the Halifax Centre, first the position of President and secondly the Chair of the Nova East Committee. Members are asked to consider taking on either of these positions. The President is assisted by the executive and anyone interested can contact Wes or any member of the executive for more information.

The December meeting will be on the 18th of December to accommodate the guest speaker, Mr Hugh Thompson, who will provide a presentation on his involvement with the 30 Meter Telescope and the Hertzberg Institute of Astrophysics.

Dave Chapman provided an update of IYA activities during Galilean Nights and noted that things had quieted down except for the subject of the Keji Dark Sky Preserve which has been very busy receiving 2 minutes on CBC *The National*, on local news and on CBC *Information Morning*. In December Quinn and Dave will travel to Keji to collect information to assist the Park in their quest for Dark Sky status. This project at Keji is developing more quickly than anyone had hoped.

Wes introduced Sean Dzafovic who is running the *Nova Program* which teaches new observers the basic astronomy knowledge and skills to enable them to become proficient amateurs. The *NOVA* program (*New Observers to Visual Astronomy*) was created by the RASC Prince George Centre as an intro program for their members. There are currently 8 participants who will meet with Sean for an hour

prior to the monthly meeting in the RASC meeting room. Members are asked to respect their use of the room for that time period. For anyone interested in joining the *NOVA* group please see the information on the Astronomy Nova Scotia website.

The main talk was presented by Dr Roy Bishop on "The Optics of the Galilean Telescope" which will be written up in the next edition of *Nova Notes*.

Paul Gray, the National Observing Chair, was introduced by Wes. Paul presented a Messier certificate to Jeff Donaldson and congratulated Quinn Smith (away at the moment) who both have completed the Messier Certificate Program. David Lane was the recipient of the Finest NGC Certificate for completing that RASC observing program. Paul noted that there is also observing programs for both a Lunar Certificate and Explore the Universe Certificate for members to take on.



Paul Gray presenting Jeff Donaldson with his Messier Certificate

Paul also proudly shared some recent astro photos he had taken using his new 100 ED F9 Skywatcher refractor, Canon Xsi DSLR and autoguider. Images of M33, M31 and the Veil Nebula had been taken using a series of time

exposures which were processed with Deep Skystacker and Photoshop. Paul is contemplating a home observatory to streamline the setup procedure.

"What's Up" was presented by John Liddard who described November's Constellation of the Month - Auriga (the Charioteer) which has a star pattern in the shape of a pointed helmet of a charioteer. Auriga is one of the first 48 original constellations and includes the star Capella and Messier objects M36, M37, M38 and 1 NGC open cluster 1907. The star epsilon Aurigae is an eclipsing binary variable star which drops a full magnitude in brightness (2.9 to 3.8) every 27 years. The current eclipse began August 2009 and will last approximately 700 days. Interested observers can assist in solving some of the mysteries of this binary by participating in a program in the *Citizen's Sky Program* at citizen-sky.org.

With this information having now been displayed the projector shut down and this was taken as a sign to end the formal meeting and for snacks and conversation to begin. It was an interesting and informative meeting for all.

Answers to "Who wants to be a Gazer" quiz on page 10

q	:11	Q
p	:10	Q
b	:09	Q
a	:08	Q
b	:07	Q
a	:06	Q
b	:05	Q
c	:04	Q
d	:03	Q
c	:02	Q
d	:01	Q



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:

January	8th,	2010
February	12th,	2010
March	12th,	2010
April	9th	2010

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!