

Nova Notes

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



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March/April 2016

March Meeting Report - **member's night**—Smartphone Adapters, Transit of Mercury, **Time Lapse Photography, Astronomy What's Up, and Awards**

April Meeting Report - In Praise of Smaller Telescopes and Imaging the September 2015 Total Lunar Eclipse

Paul Heath gives us
Food for the Soul

**Quinn Smith on What's
Happening at Nova East
2016**

The naturalist Sherman Williams
looks back at his 45 years of
astronomy in national parks

Member Profile : Karl Hudson

Dave Chapman's Lunatic Ramblings: In and Out of the Shadows

Art Cole's Starlight and Semiconductors: Stretching the Image's Histogram

Tony McGrath reviews a compelling story of the beginning of astrophysics

St. Croix Observatory

Part of your membership in the Halifax RASC includes access to our observatory, located in the community of St. Croix, NS. The site has expanded over the last few years and includes a roll-off roof observatory with electrical outlets, use of the Centre's new Go-To 400-mm Dobsonian telescope and 100-mm binoculars, 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 (Fridays close to the New Moon or Saturday backup) are open to both members and their guests. If you are not a key holder and would like to become one, or need more information, please contact the SCO Manager, Tony McGrath .

Upcoming Observing Nights:

May 6 (alt 7)

June 3 (alt 4) and 24 (alt 25) [pushed forward 1 week due to Canada Day]

Meetings usually begin at 7:30 p.m. at Saint Mary's

University in Room 101 of the Atrium Building (AT).

All meeting locations and presentations subject to change

Friday, May 18th, 2016: 7:30 p.m. to 9:30 p.m.

Dr Luigi Gallo from SMU on the Hitomi X-ray Observatory

X-ray light is thousands of times more energetic than the visible light we see with our eyes. It is not only emitted from the most extreme environments in space, but most of the normal matter in the universe emits at these high-energy wavelengths. The Hitomi X-ray observatory (formally Astro-H) is a Japanese-led mission with contribution from NASA, ESA, and the Canadian Space Agency.

Friday, June 17th : Annual BBQ and observing at SCO

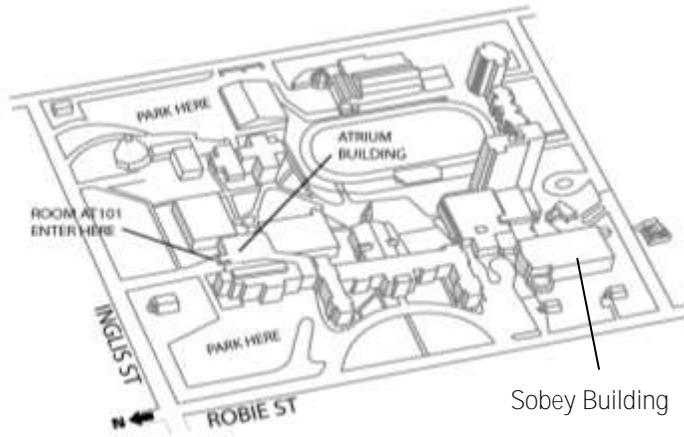
Meeting Location:

Saint Mary's University

Atrium Building (AT)

Room AT 101

The Atrium is located in front of the Patrick Power Library, between the Burke Building and Science Building.



Meetings are usually held on the third Friday of the month, except for the months of July and August, when there are no meetings.

Executive meetings begin at 6:30 p.m., usually in room AT306, and all members are welcome.

Halifax RASC Executive, 2016:

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1st Vice-President

2nd Vice-President

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Andy and Elli Hasler

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Cover Photo Blair MacDonald

Object: The Horse Head Nebula
RA 5:41:00 Dec -2:27:00

Exposure: 75 minutes (15 X 5 Minutes)

Camera: Canon 60Da DSLR

Optics: 200mm SkyWatcher f/5 Newtonian reflector with a Paracorr coma corrector for a total focal length of 1150mm

Location: SCO, St. Croix, Nova Scotia

Processing: Calibration, stacking, DDP and initial microcurves in [Images Plus](#). Masked [noise reduction](#), sharpening and contrast enhancement applied in Images plus 5. Image binned and cropped for web display. Final noise reduction and local contrast enhancement in Paint Shop Pro and Noise Ninja.

From the editor

Tony Schellinck

I put out a call for contributions to this issue and three people responded. Tony McGrath sent me a book review, Paul Heath sent a poem, and Quinn Smith sent me the information on 2016 Nova East. The really good news is that Tony and Paul say they will continue to contribute to future issues of Nova Notes. The June issue will be a special issue focusing on the remote imaging system set up by Dave Lane. Many have already tried the system with excellent results. I would encourage others to give it a go and I would like to hear about what you have done and receive photos.

On April 6th, I found M102 to finish my Messier List. It was the culmination of two years of observing. The previous eight years I had concentrated mainly on photographing the night sky, not looking at it. That meant however that I usually had to find the DSO by myself as I did not very often rely on the GOTO. But in April of 2014 while at SCO I decided to take it on. That night I found M81 and M82 using my 80mm ED refractor. Most of my viewing nights occurred at my observatory in Port Mouton where I found 79 objects, but I also spent nights out while camping looking for objects in Blanche (5) and at Clyde River (4), and when visiting Beatty Nevada (16). I found four more for a total of 6 at SCO. I observed objects with binoculars (42), the 80mm ED (12), my 8" Newtonian (31) and my 16" Newtonian (25). I learned so much about the night sky and how to find faint fuzzies in it. I figured out how to read and use star maps, to star hop and to look for patterns of stars in the maps that would help me locate that faint thing only seen with averted vision. Last spring we barely had a clear night so I could never take on the Virgo Cluster galaxies until this spring. Using my 16" scope (OK so that did make it easier) I managed to find them all in one night, except for M64 which took me three nights to find (thanks to Dave XVII for the map).

Dave Lane and Tony McGrath kindly volunteered to look over my records for the Messier Task to ensure I had completed it properly. Both of them took more than 20 minutes looking in detail at the notes, checking my maps and the spreadsheet with the times, locations and equipment recorded for each object. In the end they put their names on the certificate application form. What a relief. Within days of sending it in, Alan Whitman, RASC Observing Committee Chair and James Edgar RASC President notified me that my application had been accepted.

My goal was to improve my observing skills and it certainly did that. I didn't always spend time sketching or studying the objects in detail (some nights the darn no-seeums limited my time under the night sky). I plan to spend some time now going back over what I know are some of the more interesting objects and taking a better look.

Clear skies,

Tony Schellinck

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

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The deadline for the next edition is April 15, 2016

The opinions expressed herein are not necessarily those of the Halifax Centre.

Articles on any aspect of Astronomy and related activities will be considered for publication.

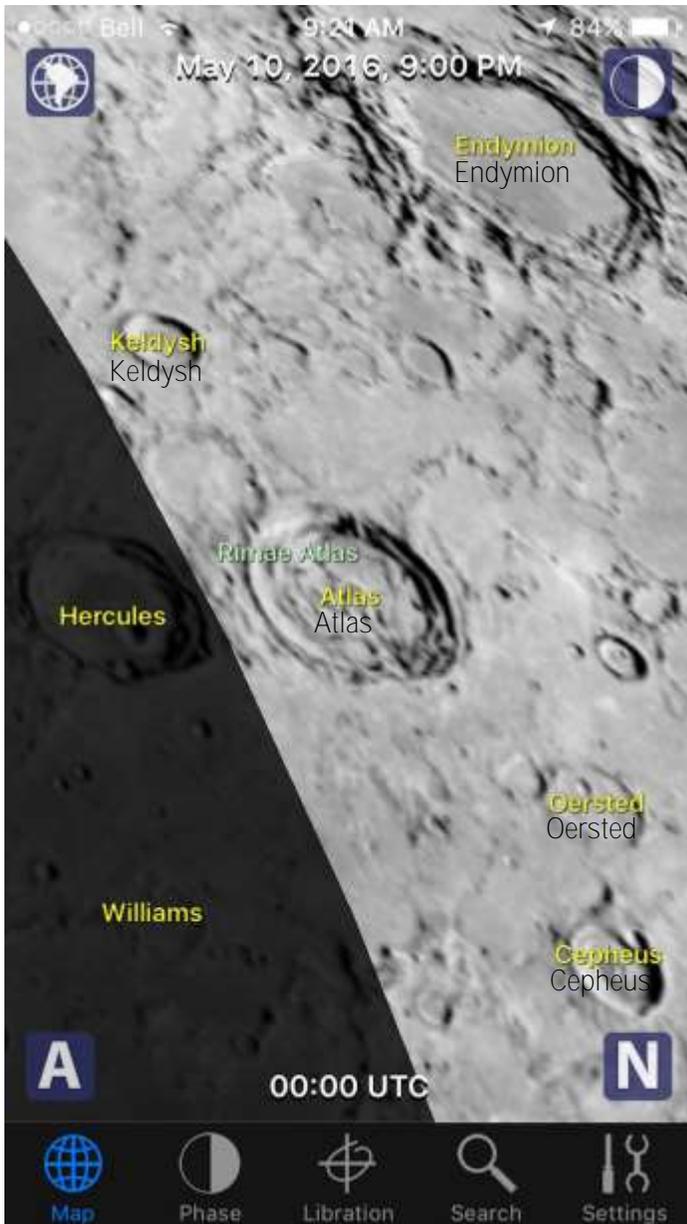
Lunatic Ramblings 5: In and Out of the Shadows

Dave Chapman

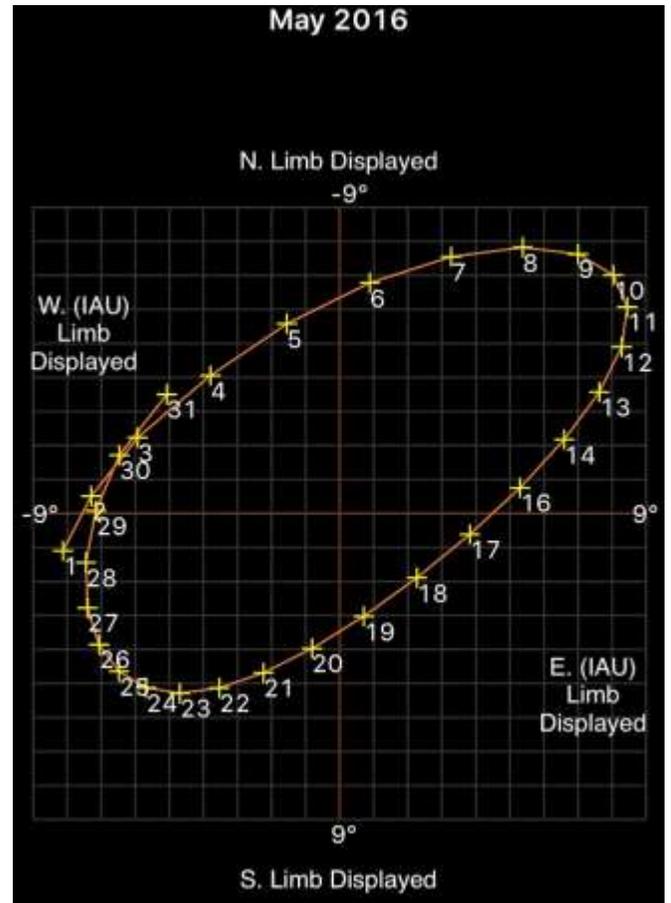
This issue, let's focus on features visible around Q-day -3 that is, about 3 nights *before* First Quarter. The Q-day system not only tells you *where* to look for an object, but *when best* to look, relative to the FQ date. Read the first couple of columns in this series to catch up on this system. If you want to know more, contact me and I'll give you links to all the mate-

rial.

When the Moon is waxing, Q-day -3 means the Moon is a well-developed evening crescent, well-placed to observe in springtime, as the ecliptic is above the equator in the west, and the Moon's altitude (in degrees) is high. You should be able to have supper and start observing a little after sunset (when there is less scattered sunlight to contend with). The *Observer's Handbook* says the next FQ takes place on Friday, May 13, at about 2:00 p.m. ADT. Counting back 3 days, we get to Tuesday, May 10. Let's start observing at 9:00 p.m., when the Moon is a good 35° above the western horizon in the twilight.



▲ Figure 1: On 2016 May 10, the sunrise terminator bisects the almost-twin craters Hercules and Atlas (Moon Atlas iPhone app).



▲ Figure 2: The full libration diagram for May, 2016, showing extreme libration on the 10th (Moon Atlas iPhone app).

North to south, along the sunrise terminator, we should see the almost-twin craters Atlas (87 km) and Hercules (67 km), the Taurus Mountains in the north, the Pyrenees Mountains in the south (southwest of Mare Fecunditatis), the flooded crater Fracastorius (124 km), and the prominent crater Piccolomini (89 km) with its central peak.

But wait a minute! My Moon Atlas app says that half of these are in shadow—what's going on?! The answer is—libration in longitude, an *apparent* rocking motion of the Moon that periodically rotates the east or west limb into better view (Sorry! There's no space here to explain what causes

Lunatic Ramblings 5: In and Out of the Shadows, continued

libration in longitude—a succinct explanation can be found on p. 95 of your *Observer's Handbook*). Along with peek-a-boo limbs, the central longitude is rotated to the west or east, respectively. This causes the phase of the Moon to be ahead of or behind the value suggested by the longitude of the terminator. On May 10, the central longitude is librated west by almost the maximum amount of 8°. Under these circumstances, the Q-day system—which is an approximation—is the

least accurate. The good news is, just wait for the next night! The terminator moves on, revealing the hidden objects. Problem solved!

That's enough for now—in my next column, we'll move on to Q-day -2 and look around. As we get closer to First Quarter, there's much more stuff to see! Previous columns can be found in the archived Nova Notes issues at halifax.rasc.ca/archive.html: look for 2015 April, June, and October, and 2016 February. Email if you have questions or comments!

dave.chapman@ns.sympatico.ca

A Compelling Story of the Beginnings of Astrophysics

Tony McGrath

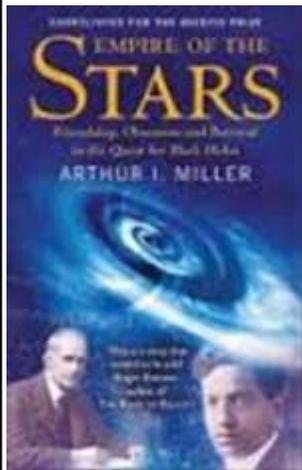
Empire of the Stars *Friendship, Obsession and Betrayal in the Quest for Black Holes*

Arthur I. Miller

Little, Brown 2005

305 pages, ISBN-13: 978-0-349-11627-3

Arthur Miller's book is a compelling story of the beginnings of astrophysics, as well as an interesting commentary on the human condition and its impact on scientific progress. It is a story of people and the science of the fate of stars. Told in large measure from the perspective of one of astrophysics defining practitioners, Subrahmanyan Chandrasekhar (or Chandra as he was universally known), it chronicles the golden age of astrophysics. This was a time when the tools to understand the workings of the stars were just being defined. We often think



of scientific progress as linear, building on the success of previous ideas. This story shows how convoluted the real path can become, and how those convolutions are often induced by the perceived authority of others. This is a tale of the human side of science, rife with failures, false assumptions, unfounded optimism, jealousy and egotism.

Chandra, a mathematical prodigy with a desire to study astronomy, arrived at Cambridge in 1930, following a long ocean passage from India. During the course

of the voyage, the 19 year old carried out some calculations that foretold a completely unexpected fate for small dense stars known as white dwarfs. Chandra's work bore directly on that of Arthur Stanley Eddington, at the time the Plumian Professor of Astronomy and Experimental Philosophy, and acknowledged as the leading authority in the burgeoning world of astrophysics. During World War I, Eddington, as secretary of the Royal Astronomical Society, was among the first in England to receive a series of letters and papers from the continent concerning Einstein's theory of relativity. He became one of the world's leading experts on Einstein's work, and from the 1920's onward concentrated on developing what he called the "fundamental theory", with which he intended to unify quantum theory, relativity, cosmology, and gravitation.

With Chandra's arrival at Cambridge, the supercilious Eddington began what Miller describes as a duplicitous relationship with Chandra. Chandra's work, which would ultimately lead to the acceptance of the theory of black holes, had the potential to upset Eddington's "fundamental theory". Eddington used his position and influence to set the stage in 1935 to publicly humiliate the young Chandra at a meeting of the Royal Astronomical Society. The effect of Eddington's efforts was to set back research on black holes by 40 years. Chandra knew he was right. He was supported in private by leaders of the scientific establishment of the day, however none appeared to have had the fortitude to oppose Eddington. Eventually Chandra's work was re-discovered, and proved fundamental in the development of the theory of black holes.

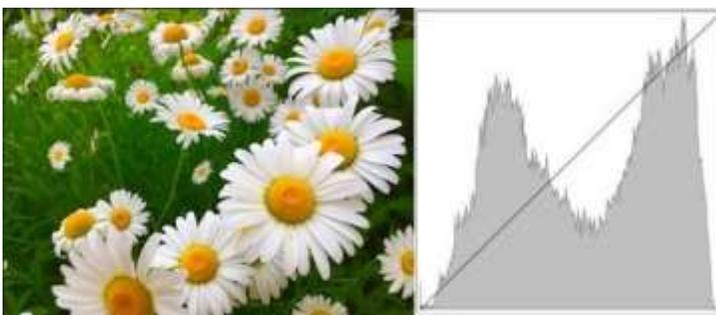
Miller takes the reader through the science in a thorough and understandable, if at times tedious, way. He introduces us to all the players, and paints an elaborate picture of how our current understanding of black holes developed.

Starlight and Semiconductors: Stretching the Image's Histogram

Art Cole

We often hear astrophotographers talk about “stretching” an image, but have you ever wondered what that really means? Contrary to what its name suggests, stretching actually has nothing to do with the size and shape of an image – it actually refers to stretching the image’s histogram.

So let’s talk about histograms. A histogram is a plot of the intensity (or brightness) distribution of an image’s pixels. The horizontal axis (X) represents the intensity levels of the pixels, with black at left and pure white at right. The vertical axis (Y) represents the number of pixels at each particular intensity value. In Figure 1 we can see a histogram of a photograph of daisies. The histogram has two large peaks, suggesting that most of the pixels fall into one of two general intensity ranges – one dark (the left peak) and one bright (the right



▲ Figure 1: The histogram of this image shows two main pixel intensity distributions – One dark and one light. (Photo: Art Cole).

peak). The histogram plot also falls back to the X-axis on both ends before meeting the sides of the histogram box, meaning that the image has no pure black or pure white pixels. Looking at the image, this seems to make sense, as the pixels are mostly in the green background, which is dark but not black, or in the petals, which are bright but not pure white.

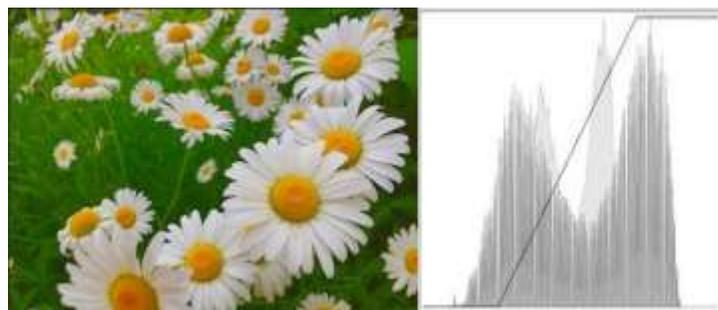
This image makes use of the full dynamic range of the pixel intensity, as its intensity distribution is spread across the entire intensity range possible in the image (i.e., its distribution takes up the entire X-axis). In general, we want our images (astro or otherwise) to use the full dynamic range so that we get good contrast. Looking at Figure 2, we can see the same camera shot, but

the histogram has been compressed so that the pixel intensities have been constrained to a narrow band. This image has very poor contrast because all of the pixels have similar intensities, and is often what we get as a starting point for our astroimages after they have been stacked. The main goal of stretching an image is to expand, or “stretch” the histogram so that it has better dynamic range (i.e., takes up more of the X-axis) and thus has better contrast.



▲ Figure 2: A low-contrast version of the image. The histogram shows how the pixel intensities are constrained to a narrow band. (Photo: Art Cole).

This is where another concept comes into play. Did you notice that diagonal line running across the histograms? That line is called the stretch curve (or “curve”) and describes how the pixel intensities map between the pre- and post-stretched histograms. This curve assumes that both the X and Y axes represent intensity. The X-axis is the same as before, but the Y axis is zero intensity (black) at the bottom, and maximum intensity (white) at the top. So to understand how the pre- and post-stretching intensities relate, do the following: pick an intensity value on the X-axis (the pre-stretch intensity) and trace it vertically until you intersect the curve. Then from that point, trace a line horizontally until you hit the Y axis. The Y axis value at that point will be post-stretch intensity value for the X-axis value you picked. Up to this point, the curve has been a straight line from corner to corner, meaning that the pre- and post-stretch

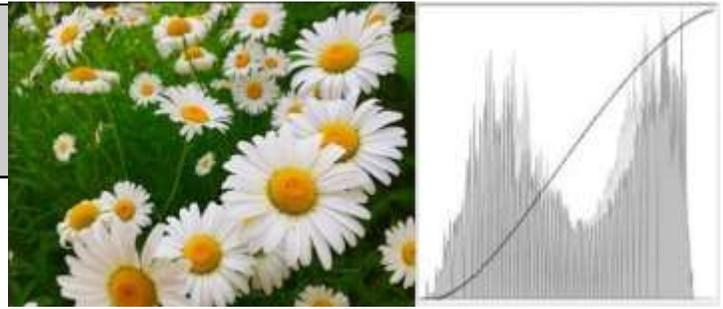


▲ Figure 3: A linear stretch increases dynamic range, thus improving contrast. (Photo: Art Cole).

Starlight and Semiconductors: Stretching the Image's Histogram, contin- ued

intensities are the same.

To fix the low-contrast image, I applied a linear stretch to it (Figure 3). You can see that I altered the curve to change the intensity mappings. By moving the endpoints of the curve inward, I increased the output dynamic range by remapping the pixel intensities to take up more of the X-axis. The histogram shows the distribution both before and after the stretch, resulting in much better contrast. To improve the contrast even more, I then applied a non-linear stretch (Figure 4). This particular stretch is often called an "S-curve" due to its shape, and has the effect of making the darkest darks darker and the lightest lights lighter (sorry) while leaving the mid-range alone. A pleasing stretch for the



▲ Figure 4: A non-linear S-curve produces pleasing results. (Photo: Art Cole).

human eye.

So there you go – that's stretching in a nutshell. I encourage you to always keep an eye on the histogram while processing so that you can more quantitatively control your dynamic range and contrast, and to ensure that you don't extend your distribution beyond the ends of the X-axis (called black- and white-point clipping – a definite no-no). Have fun!

NOVA EAST 2016 (August 26th – 28th) 30 YEARS OF ASTRONOMY AT NOVA EAST Quinn Smith

The *Nova East* planning committee is pleased to announce that the *Nova East* website and registration is now open [www. http://halifax.rasc.ca/ne/](http://halifax.rasc.ca/ne/)

Nova East is Atlantic Canada's longest running star party and this year we are celebrating the 30th year of *Nova East*. As usual *Nova East* will be held at Smileys Provincial Park near Windsor Nova Scotia. The site has group camping, good skies, and is easy to reach from Halifax and other parts



▲ Photo: Tim Doucette

of Nova Scotia. Registration forms are available on the *Nova East* web site – register early for the best camping sites!

This year the guest speaker is our very own Dr Roy Bishop, long time member of the Halifax Centre, and our Honorary President. His talk, which will be on Friday evening at 8 p.m. is titled: "*Sky Perspectives: Notes from a 77-orbit Visit to the Third Planet*".

Features of this year's *Nova East* include:

Door prizes: Each registrant will receive a door prize ticket. There will be "right some good" prizes to be won! Thanks to the efforts of Atlantic Photo Supply and Celestron this year's grand prize is a Celestron "*Skyprodigy 6*" computerised telescope (a \$1,400.00 value!). There will be lots of other great prizes, but remember you have to be present at the draw (Saturday 7:30 p.m.) in order to win a prize.

Saturday evening BBQ: All welcome. We will cook up a delicious BBQ and just ask for registrants to bring a dessert, appetizers/finger food, salad, snacks or rolls (or a \$5 donation to help out with the cost). Please indicate on your registration form if you plan to attend and what you might bring.

Astrophotography contest: We will host an astrophotography contest for *Nova East* registrants. Photos will be judged based on several criteria including astronomical interest, originality, artistic value, and technical merit. First prize will be a framed print of the winning submission. One electronic submission (pdf) per registrant, and the contest closes on August 1st 2016. For more information, please contact novaeast2016@rasc.ca.

NOVA EAST 2016 (August 26th – 28th)
30 YEARS OF ASTRONOMY AT NOVA EAST,
continued

30 observing objects: All registrants will receive a star map and a list of 30 observing objects visible from the *Nova East* site. See how many objects you can find. No prizes, just

bragging rights!

Swap Meet table: Got something to sell? Looking for something to buy? We will host a swap meet table in the Event Building at noon on Saturday.

Public observing: Both Friday and Saturday evenings from dusk until 11 p.m. No laser pointers after 11 p.m. please, to allow the astrophotographers a chance to catch some photons.

▼ Photo: Jeff Dalton



Centre Meeting Report 15 April 2016
Chris Young

Paul Gray, the Centre president, opened the meeting and welcomed the 36 members and guests in attendance. Paul provided a brief overview of the Centre and then introduced our Outreach Coordinator, Paul Heath, who gave an update on outreach activities. Paul requested volunteers to assist with library talks and also for presentations to Brownies and Cubs. Next up was Quinn Smith, the Nova East Chair, gave us a quick update on Nova East which takes place the August 26-28 weekend at Smiley's Provincial Park. The NE website is now up and you can make reservations. Tony Schellinck, our Nova Notes editor, then provided a brief overview of the current Nova Notes and advised the next issue is expected shortly.

Paul Gray then introduced Dave Griffith, the first of two presenters for the evening. Dave has been a Centre member for 3 years and is familiar to us for his earlier talk on collecting meteors. Dave's presentation was titled "In Praise of Smaller Scopes or (Arthritis Happens!)". Dave recounted his journey in astronomy and telescopes he has known along the way. He said that while you can't fault aperture, light buckets are a handful. So what do I need - a big light bucket or a portable grab and go? Typically we observers start small and then get hooked, develop aperture fever and move up to larger and larger scopes. Portability however is not a feature with a large scope. A bigger scope does



▲ Dave Griffith holds his Sky Watcher Maksutov-Cassegrain, 127 mm, F 12, which he says is great for planetary, lunar, double star and deep sky object observing. (Photo: Chris Young)

Centre Meeting Report 15 April 2016, continued

give you more detail and brighter images - but the best scope is the biggest you'll actually use.

Dave has owned a number of scopes over the years of increasing size, but now with the onset of arthritis he has shifted to more portable scopes. Dave now has a fleet of small scopes to suit his varied observing interests. He uses a Sky Watcher short tube refractor (F5, 120 mm, 4 kg achromat) which is good for rich field and grab and go. The cons are low magnification, some chromatic aberration and it is not great for lunar or planetary objects. Dave notes that he is a visual observer and not an astrophotographer and while he has had a Go-To he's quite happy finding his way around the sky. Dave also has a Sky Watcher Maksutov-Cassegrain (127 mm F 12, 5 kg). It is a poor man's APO and it is great for planetary, lunar, double star and deep sky object observing and requires little collimation. The cons of this scope are a long cooldown period and a narrow field of view but it is good on Jupiter! He also has a PST (40 mm F 10 1.3 kg) hydrogen alpha solar scope. This is an affordable solar scope which shows prominences, filaments, sunspots and granulation and it a great daytime outreach scope. The cons are it's a dedicated scope and it's only 40 mm aperture.

So why the fleet of three scopes? These are all grab and go and the optical configurations suit his observing interests be it wide field, high magnification or daytime viewing. These are easily portable with quick setup and takedown and minimizes any physical discomfort to Dave. With these easy choices he finds he's likely to use them while a lot larger scope would sit in the corner - for Dave "size does matter".

The second speaker was a long term Centre member, Paul Evans with a presentation titled "Imaging the September 2015 Total Lunar Eclipse". Paul is a visual observer and also a wildlife photographer and these two interests have now merged, although he says he's in that awkward stage where he needs to take some time off work to master the basics. Paul first showed us his 35 seconds time lapse video of the total eclipse. He then gave us a breakdown of his equipment and the procedures he followed in planning, capturing the eclipse and the processing of the capture data to create the finished video.

For equipment Paul was using a Celestron CGE DX Mount, a Televue NP 101 wide field refractor, a Cannon 5D Mark III DSLR and a Canon 500 mm lens with a 1.4 X extender (effectively a 700 mm lens) as well as an intervalometer.

Paul described his intent and planning for recording the eclipse event and also a number of the difficulties or challenges he encountered along the way.

He set the exposure to occur at 13 seconds apart, not too long and not too short and it would all fit nicely on a 32 GB card. Managing the exposures (a mix of shutter speed, lens aperture and scene luminance) was a challenge as it ran over a

huge range of 14 stops. With no easy answer available Paul allowed the camera to use its automatic spot metering and made minor manual adjustments through the eclipse.

Keeping the image centred in the field of view was another challenge for which in the end he used his mount tracking with periodic manual fine tuning to centre the moon's image. Having fully planned the capture he was able to let the equipment run and apart from some fine tuning was able to enjoy looking at the eclipse.

Following the event came the processing of all the image data. As Paul was unable to find software to stack the image accurately, he ended up manually aligning the over 900 images to keep the moon centred in the field of view. Paul used several types of software in order to create the finished product. When asked how much time he had spent on this project he replied 30 to 40 hours which included learning some digital processing tools.

Paul is pretty happy with the results compared to others he has seen on the web as he said "I was not smoked by anyone".

In the discussion which followed Jerry Black suggested using "dslrdashboard" as software as an option which might provide easier exposure control. Overall the video was a success and we much appreciated the insight into what was involved in creating a time lapse video.

Two brief presentations finished up the evening. Barry Burgess showed some time lapse photography that he had done of the sky of Aurorae, the Milky Way and meteor showers. Jason Adams then did a quick show and tell of a refractor



▲ Paul Evans showed us his 35 seconds time lapse video of the total eclipse and the technical details and difficulties in making it. (Photo: Chris Young)

and a Cassegrain-Newtonian on two different mounts which he had brought in so new observers could have a look at the equipment options available.

Overall it was an interesting and educational evening. As always, refreshments and discussion followed the meeting.

Halifax Centre Meeting Report: March 18,
2016
Jim Millar

The meeting was called to order by President Paul Gray. There were 51 members present with 2 new members. Paul informed the group of the following:

1- Guest speakers lined up for upcoming 2016 Halifax Centre meetings:

- a) April: Paul Evans to address his Lunar Eclipse Time Lapse, and David Griffin to address portable telescopes
- b) May: Luigi Gallo
- c) June: Annual BBQ and observing at SCO
- d) September: Dr. John Spray, UNB (Or Dr. Roy Bishop to address Gravity Waves)
- e) October: SMU MacLennan Lecture may replace the regular Halifax Centre Meeting
- d) early November: Dr. David Levy as part of his Maritime Talk Tour
- e) November: Dr. John Spray, UNB (Or Dr. Roy Bishop to address Gravity Waves)
- f) December: AGM

2- General Assembly (GA) 2016 will be held in London, Ontario on May 19-23, 2016 in conjunction with the AstroCATS (Canadian Astronomy and Telescope Show). The logo for the GA shows the two entities as merging spiral galaxies. Information about the GA and how to register can be found at this link: <http://www.rasc.ca/ga2016>.

3- Summer Star Parties

Spring Star Fest VI – Kouchibouquac National Park, June 10-12

C.O.W. Summer Stargaze XII – Mactaquac Provincial Park, July 8-10

Mount Carleton Star Party – Mount Carleton, July 29-31

Keji Dark Sky Week-end – Kejimikujik National Park & National Historic Site, August 5-7

Nova East – Smiley's Provincial Park, August 26-28

Fundy Stargaze IV – Fundy National Park, September 2-4

4- 17-1/2" Dobsonian for sale

The Dobsonian that Chris Young brought in for members to view, was built in 1977 and is now considered surplus SCO equipment; it is not being used due to the newer telescope in use. Bids are open to RASC Halifax Centre members only for now, with the reserve bid of \$1200.00. All members will be notified of the Auction through the Announce List. Sealed bids are to be sent to the President Paul Gray up until the opening of the next Centre meeting of April 15, 2016. Bids will be reviewed at that time, and the buyer will be announced at the April meeting.

Paul Heath reported on the Outreach events that have taken place. He mentioned that there are many requests and he would like help in filling all the requests. If anyone is interested in helping out, please notify Paul directly.

Members' Night Presentations:

Mark Robertson, "Using an iOptron Smartphone Adapt-

er": Mark has had a life long interest in astronomy and, despite being legally blind, enjoys seeing and taking photos of objects in the night sky. His most recent purchase is a Meade EXT-80 refractor with the computer GOTO feature to help find the sky objects he can no longer find himself due to his limited eye sight. The iOptron Adapter for his Smartphone, with a 12.5 mm lens attached, allows him to enlarged the view to where he can see objects easier than just with an eye piece alone. He now owns a Celestron Nexstar 4SE that has a longer focal length and therefore greater magnification of objects such as planets and still has the GOTO feature he requires.

Dave Chapman, "May 9 Transit of Mercury": Dave noted the transit occurs on 2016 May 9, from 8:12 a.m. to 3:42 p.m. ADT. In Halifax, about 10 transit occur per century, 6 in November and 4 in May. Looking at the cloud forecast, there is a 75% chance of cloud cover on the afternoon of the event. The transit can be viewed safely using one of the following methods:

a filtered telescope is preferred over a large scope as the larger scopes tend to display interfering turbulence. projection telescope – but make sure no one looks through the eyepiece!

Depending on the weather, we may declare a pop-up public observing event somewhere on the Halifax waterfront, which would be announced through social media.

Safety tips for observing the transit include:

- Don't look at the unfiltered Sun
- Advise onlookers NOT to look at the unfiltered Sun
- Only use astronomical-grade solar filters or solar 'scopes
- Attach filters securely—use duct tape if necessary!
- Remove or cover your finder 'scope.

NEVER leave your telescope unattended—use the buddy system

Jerry Black, "Time Lapse": Jerry showed seven of his time lapse videos taken at various locations – Peggy's Cove, Slap-foot Beach at Kejimikujik National Park & National Historic Site, daybreak over Canning, First Lake (until lake fog and low temperatures created frost on the lens), and the Minas Basin (taken over 12 hours). He informed members of the type of equipment and software used, and addressed questions from members regarding picture size and colour banding. Members were impressed.

Dr. Roy Bishop presented *What's up?* with astronomical events from now to the next meeting on April 15. Two planets are well placed for viewing: Jupiter (6° N, DEC in Leo) and Mercury (low in West evening twilight). Three planets are OK: Venus (on June 6, low in East dawn twilight), Mars (in opposition May 22 at 19 arc seconds), and Saturn (in the morning sky, begins retrograde motion on March 25). March 20 is the Equinox at 01:30 AM ADT. The double shadow transit of Io and Europa across Jupiter occurs on March 22 and April 8 in the early morning. Zodiacal light can be seen March 25 to April 9 in the west at the end of evening twilight. The

March 18, 2016 Halifax Centre Meeting Report, continued

New Moon is April 7 when it is at close perigee – 357,163 km away. On April 8 is the Crescent Moon 7° left of Mercury, with a photo op at 20:45 ADT. On April 10, the moon occults Aldebaran at 20:56 ADT with a telescope photo-op at twilight.

Of special note is an extreme tide happening on April 9 at 02:50 AM ADT. This is an extreme tide that happens every 18.61 years. This one is extra-special as it is a combined Perigean-Spring-Equinoctial-Declination tide. There will be a 16.8 metre tide range. Parts of Truro and Windsor have been underwater consequent to these higher than normal tides. The next one will not be until 2034.

From: Sherman Williams

Re: Book your site for the Keji Dark Sky Week-End!

Date: January 21, 2016 at 3:40:00 AM AST

To: Judy Black

I will be making plans to attend Kejimkujik Dark Sky Week-end for 2016. I have been enjoying Kejimkujik under the stars since 1971. That was the summer that I had the good fortune and the pleasure of being a seasonal naturalist at Kejimkujik (that is what they called us in those days). In addition to participating in the main program, each seasonal naturalist was encouraged to offer a special event that came out of a personal interest that could connect visitors with the Keji surroundings. In 1964, I had met Roy Bishop. From his friendship and influence, I had been developing a keen interest in amateur astronomy. I was also discovering that a dark, clear night in Kejimkujik was a special experience. My special event at the park became focus around clear evenings with starry skies or an interesting Moon.

In those early days of Kejimkujik as a national park (opened officially in 1969) there was a large open area that had been a farm field, near what had been our naturalist field station and the public Interpretative Centre, located just above Jake's Landing. Jake's Landing still exists but, over the years the large field has been more or less permitted to fill in with trees, the naturalist field station is gone, so too, is the large trailer that was the Interpretive Centre. This was the location for my first star gazing sessions that were held in the park. On one occasion, as the session was beginning, much to everyone's surprise and delight, a bright bolide burst forth! The comment of the evening became, "You sure timed that well!"

Jim Charles Point, where old Ked-ge Lodge once stood, was also used for a few sessions. It had a fairly large open sky above and was closer to the campgrounds. The beach near Jim Charles gave a good view of the horizon to the southward. Keji was a wonderful place to experience special moments created by combining evening sounds, still lake reflections, and the starry sky. When it was my time to do

Four Halifax Centre members will be receiving special awards at the National RASC GA in May. Paul Gray announced Martin Hellmich and Halley Davies as winners of the Simon Newcomb Award; Mary Lou Whitehorne and Dave Chapman, both former recipients of this award, presented them with first edition books written by Simon Newcomb. Mary Lou then announced Paul Gray as the winner of the RASC Service Award; nine other Nova Scotians have also received this award since its inception in 1959. David Lane announced Pat Kelly as the 12th to receive the RASC Fellowship since its inception in 2013; a total of four of the twelve are from Halifax Centre. These were followed by a brief presentation by Martin Hellmich regarding the items received for this award, including an autographed photo. He threw out a challenge to Nova Notes members to identify the signatures on the reverse side of the photo.

the evening slideshow in the outdoor theatre area, if the sky cooperated, I drew attention to any bright stars that were visible. This was especially possible with earlier sunsets in August. A most memorable event was a moonlight paddle. A bit before sunset, with calm, clear weather, we set out in canoes launched from Jake's Landing, taking a leisurely paddle around Jim Charles Point and up into Jeremy's Bay. The returning paddle successfully featured the early rising Full Moon.

The following year, 1972, I continued my work as a seasonal naturalist in Cape Breton Highlands National Park (CBH). Star gazing sessions were worked into my programs. One I well remember began in the open area of Broad Cove campground where slide-talks were given. After some interesting stargazing, we shifted our location to the nearby beach. I had a surprise planned. It worked! To the amazement of the group, as sand was disturbed by waves and our feet, little points of light began to appear, making little constellations at our feet. The tiny creatures at the edge of the summer sea were there! They did not let me down. Stars, twinkling above, were being mimicked by living points of bioluminescence sparkling among the grains of sand. That was so special!

1972 was also the year Nova Scotia experienced its second total solar eclipse in little more than 2 years! It was not difficult to gather a group from the CBH park staff, along with a few other interested people. They followed me to view the eclipse at a location not far from Antigonish. After a pre-arranged meeting with Roy Bishop and his group (they had driven from the Annapolis Valley), we located ourselves in a nice farm field overlooking Northumberland Strait. The weather co-operated wonderfully! The rushing, Moon-shadow washed over us, creating that spectacular, view of our star that we rarely get to witness!

Originally I did not intend to write on like this, ... but the mention of the Kejimkujik Dark Sky event, stirred these favourite memories that were created during my early days associated with Kejimkujik, Parks Canada, and amateur astronomy. Sincerely Sherman Williams

Member Profile: Karl Hudson

Tony Schellinck

When Karl Hudson was 12 or 13 years old (40 years ago now), he had a tour of the observatory at the Canadian Museum of Science and technology



▲ Karl was making good use of his six week old 11 inch Celestron Edge HD scope and CGEM mount at Nova East 2015 (Photo: Tony Schellinck).

where he climbed a ladder and looked through a big refractor and saw Saturn. It was a wow moment and from that day on he was hooked. As an adult he was employed as a software engineer by a company that maintained Canada's frigates and as a consequence got to see much of Canada. During that time he learned about the sky by reading *The Backyard Astronomer's Guide* by Terence Dickinson and viewing the sky through binoculars.

When, three years or so ago, he moved to Windsor (NS) he learned about SCO and decided to get seriously into astronomy. About two years ago he got a key to SCO and started using the 16" Newtonian which he says works very nicely. He tried to take photos but says he was not so successful. He had been thinking about and researching scopes for 20 years when his wife finally said – go and buy one.

Fortunately he had met Blair MacDonald at SCO who gave him a lot of information that was helpful in choosing a scope useful for both astrophotography and observing. He purchased on sale an 11 inch Edge HD Celestron scope with a CGEM DX mount from Atlantic Photo. He wanted a large scope to see DSOs and needed that much aperture so that he could attach



▲ Karl's first astroimage, M57, the Ring Nebula, with ten, one minute exposures, unguided, with darks, biases, and flats. (Photo: Karl Hudson).

a Starizona camera system on the front corrector lens to make the system really fast. The first night out he photographed M57, the Ring Nebula, with ten, one minute exposures, unguided, with darks, biases, and flats. He says it looks great. You can see his photos at <https://wkudson.smugmug.com>.

He joined RASC to meet people who are into the hobby, learn about scopes and learn about astrophotography. He plans to build a small observatory and pier that will look south away from Windsor. Already a photographer of wild life and the great outdoors, his new hobby will extend his nature subjects off this world.

FOOD FOR THE SOUL: *Between A Breath* Paul Heath

Inhale and Stare,
The answer holds a fleeting moment there.
Between the Mind and Eye
Proof . . . sits upon the sky.

Inhale and Stare,
As Cycles wax and wane,
But HEAR NOT! the dazzling disc
His changing faces a mere reflection of the day,
And Cheshire grin will, lead astray.

Await . . . the waning slivers rise
And as twilights end arrives,
With hand upheld toward the sky
Inhale . . . and hold your Stare.

Behold the Wonder,
For within your hand, a Glistening Orb appears
Its form transfixed upon the air,
The proof . . . of the magic . . . of the Spheres.

By Paul Heath