Nova Notes

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

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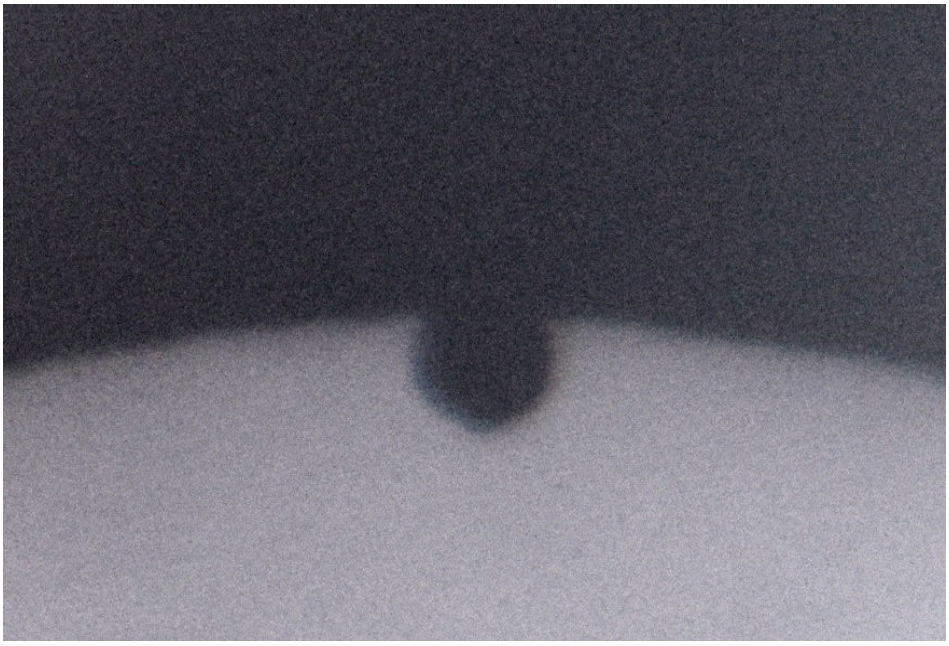
Volume 43 Number 3 of 5 June / July 2012 E mail: novanoteseditor@rasc.ca

In this issue:

Front Page Photo: Roy Bishop
"The image was taken between 1st and 2nd contacts, at 22:18 UTC. At the time I was standing in an open corner of a parking garage beside the Winnipeg airport."



"Here is an image from June 5 taken afocally with a Canon XTi held at the eyepiece of a 56-year-old 2-inch terrestrial refractor, with a Baader mylar filter sandwiched between the two lenses of its objective. Some air turbulence and scattered light has made the images less than crisp." - Roy Bishop

From the editor *Quinn Smith*

Well here's a surprise! A major theme of this edition is the Transit of Venus, which took place in the evening of June 5th 2012. Of course we live in Nova Scotia and as usual the weather did not co-operate and the Transit events in the Halifax area (and I think all of Nova Scotia) were clouded out. Several of our members, however, were either away from the area or actually left the area for the Transit, and so we do have photos and stories about the event.

This edition includes a new article, which I hope will become a regular feature. It is called ***"Quick Tips"*** and was inspired by Dave Chapman who suggested it (thank you Dave). It is essentially a series of brief ideas to either save money or to increase our astronomical enjoyment. All submissions are encouraged and if we have enough suggestions this will become a regular feature of Nova Notes. Short and sweet—that's the idea.

I can't end the editorial without reminding everyone of our Nova East Star Party which will be held at Smiley's Provincial Park on August 17th—19th. A feature of this year's Nova East will be a 50:50 auction. Donate an item for the auction and receive 50% of the auction price (the Nova East fund gets the other 50%). Also the weekend before Nova East, Keji will be holding their Dark Sky Weekend (see page 3).

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 grown over the last few years to include a roll-off roof observatory with electrical outlets, use of the Centre's 437mm dobsonian telescope and 100mm 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) are open to both members and guests. If you are not a key holder and would like to become one, or need more information please contact the Observing Chairman, John Liddard (for contact info, see below).

Upcoming Observing Nights:

July	20th	2012
September	14th	2012
October	12th	2012

Meetings begin at 8 p.m. at Saint Mary's University

Our usual room is AT 101 although check the web site (www.halifax.rasc.ca) for room changes.

No meetings July and August 2012

Sept. 21st 2012

Guest speaker: Tim Ducett – "Deep Sky Eyes" .
Tim is a legally blind amateur astronomer and will describe how he overcomes his visual limitations.

Oct. 19th 2012

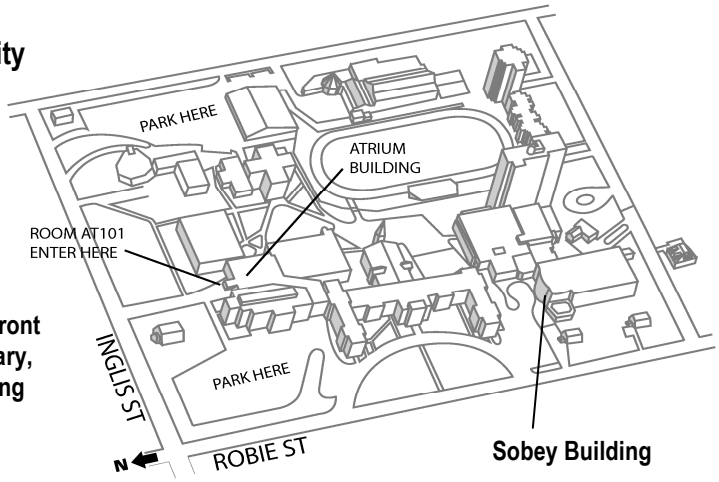
Guest speaker Dr Roy Bishop - "Celestial Navigation".
Roy's presentation will navigate the technology of finding one's position, from the astrolabes and cross-staffs of the 15th century to the GPS receivers of today, - with a bit of salt spray thrown in.

All meeting location and contents subject to change

Meeting Location:

Saint Mary's University

Atrium Building
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.

The NOVA program (an introductory course in astronomy) starts at 7:00 p.m., in room AT 305 (room subject to change).

Executive meetings begin at 7:00 p.m., in room AT 306, and all members are welcome.

Halifax RASC Executive, 2012:

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Nova East 2012

Quinn Smith

Plans are finalised for this year's Nova East Star Party. As usual it is being held at Smiley's Provincial Park, and this year's dates are August 17th—19th.

The main speaker will be Canadian comet hunter Dr David Levy. For those of you that may not be aware of Dr Levy, he is one of the foremost Canadian astronomers and speakers. His talks are always entertaining and this year's Nova East will be an opportunity to meet and talk with him in person. David's presentation is titled "A Night-watchman's Journey: David's life as a searcher of comets". The closing speakers will be Kathryn and Paul Gray.

There will be an auction at this year's NE. It will be a 50:50 auction, the donator receiving 50% of the auctioned price (the NE fund receives the other 50%). Please contact Tony Schellnik at ***schell@dal.ca*** to donate or for more info on the auction.

For more information about the weekend programme, or to download the registration form, go to the Nova East web site at: **http://halifax.rasc.ca/ne/**

A view of last year's solar filter workshop
Photo: Blair MacDonald

Dark Sky Weekend

Quinn Smith

Last year Nova Scotia's first Dark Sky Preserve, Kejimkujik National Park held the first "Dark Sky Weekend" to celebrate the first anniversary of the Park becoming a Dark Sky Preserve.

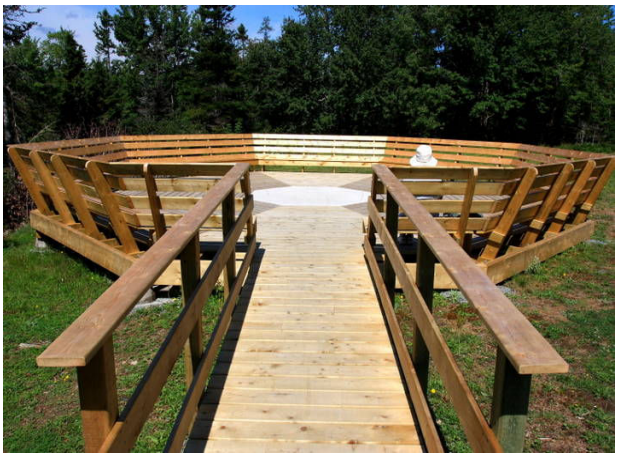
It was a great success and will be repeated again this year on August 10th—12th (the weekend before Nova East). It is an opportunity for members of the RASC to join with Parks Canada and enjoy a weekend of outreach and public observing.

Last year was great fun and I encourage our members to come out and enjoy a weekend of nature and camping in Nova Scotia's first Dark Sky Preserve. Group camping will hopefully be available for RASC participants.

For more information go to the Keji website:

http://www.pc.gc.ca/pn-np/ns/kejimkujik/activ/activ13.aspx#August%2010-12

The "Sky Circle" at Keji. Photo: John McPhee



HALIFAX CENTRE

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

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

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Nova Notes is published 5 times a year, in February, April, June/July, September/October and December.
The deadline for the next edition is Sept 15th 2012
The opinions expressed herein are not necessarily those of the Halifax Centre.
Articles on any aspect of Astronomy and Allied Sciences will be considered for publication.

June Meeting Report

Quinn Smith

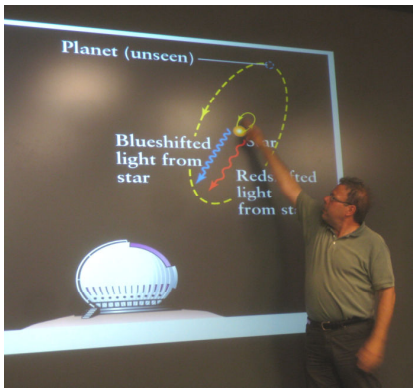
The June meeting was presided over by our President Robert Bussieres. There were 44 members present and 8 guests. Robert introduced the Executive and outlined the advantages of membership.

Blair McDonald gave a brief outline of the upcoming Nova East Star Party (see page 3) and reminded us that there will be an auction at this year's event and members are encouraged to donate unwanted items. Monies received from donated items will be split 50/50 between the NE fund and the donator. Please contact Tony Schellinck at ***schell@dal.ca*** for more info and to donate. Also if you damaged your solar filter or need another, there will be a solar filter workshop on Saturday afternoon.

Our guest speaker for the evening was our very own Pat Kelly, who gave an excellent talk about extra solar planets. In his introduction Robert pointed out that Pat was both a "birder" and an astronomer, and as such hardly ever sleeps. Pat is one of the few members to be grateful for a cloudy night!

Pat began his talk by discussing that there are two basic ways to find extra solar planets; direct and indirect. The direct methods consist of direct imaging and observing transits. The indirect methods consist of measuring the effects of the planet on the radial velocity of the star and micro lensing effects.

Of the direct methods, transit measurements have produced the most results. In this method slight changes in the brightness of the star can be measured as the planter transits (crosses) the face of the star. Although very sensitive, it can only work for planets



that orbit in the same plane as the Earth / star.

Radial velocity measurements are very sensitive (due to Doppler shifts) and are the most successful method of indirect extra solar planetary detection. Unlike the transit method, radial velocity measurements do not required that the planet passes in front of the star, although the closer the star, planet and Earth are to the same plane, the greater the effect.

So far over 778 extra solar planets have been detected, although most of them are large planets orbiting close to the host star. That is not because most extra solar planets are large and close to their star, but because those are the planets we can currently detect. As the sensitivity of our equipment, and our techniques improve, astronomers are beginning to detect smaller planets, further away from their host star.

In fact we are beginning to detect rocky "Earth like" planets in the habitable zone around the star (the "goldilocks zone). This is the zone in which liquid water could exist—which is believed to be a pre-requisite for life to evolve.

Pat concluded his talk by answering questions. He believes that planetary systems are the norm around stars and that soon we will be detecting more and more extra solar planets located within the "goldilocks zone".

May Meeting Report

Quinn Smith

The May meeting was hosted by our President Robert Bussieres who welcomed the members and guests to the meeting. After a small amount of Centre business, Dr Roy Bishop was introduced as our guest speaker. Roy was speaking on the upcoming Transit of Venus and gave a historical perspective.

Roy's talk was in four parts:

1. Roy presented a few photos of Venus in the evening sky this past winter/spring, including contrasting a transit of Venus with other things that pass in front of the Sun, including the Moon and Earth (at every "sunset"!), both of which are far more spectacular. Given that a transit does not look any more interesting than a sunspot, he posed the question: "Why get excited about a transit of Venus?"

2. Roy then gave a brief illustrated history of transits, mentioning the first to be predicted (by Kepler for 1631), the first to be observed (by Horrox and Crabtree in 1639), the significance, scientific and geographical, of the transits in the 18th century (1761 and, especially 1769), including the expeditions of James Cook to Tahiti and of Wales and Dymond to Hudson Bay. For lack of time, he said very little about the 1874 and 1882 transits!

3. Roy described several features of transits, and explained how those features arise out of the orbital dynamics of Venus and Earth. (For this part, he referred the audience to his article in the April JRASC for a better-organized and more-detailed account!)

4. He then described four techniques for observing the transit on June 5, with the advantages and disadvantages of each method.:
(a) Unit magnification methods (various filters in front of one's eyes).
(b) Pinhole-mirror projection (as in our Handbook, p. 143).
(c) Projection onto a viewing screen, using binoculars or a small telescope.
(d) Direct viewing with filtered binoculars or telescope.

He closed by telling people to check out their proposed viewing site and equipment on a sunny evening several days prior to June 5.

Venus progressing towards the Transit

(a*ll photos by Roy Bishop}*

May 25th - 11 days before transit

May 27th - 9 days before transit

May 28th - 8 days before transit

May 31st - 5 days before transit

Right:

Picture submitted by Michael Boschat from the Solar Dynamics Observatory . The light arc caused by diffraction through the atmos-phere can be seen.

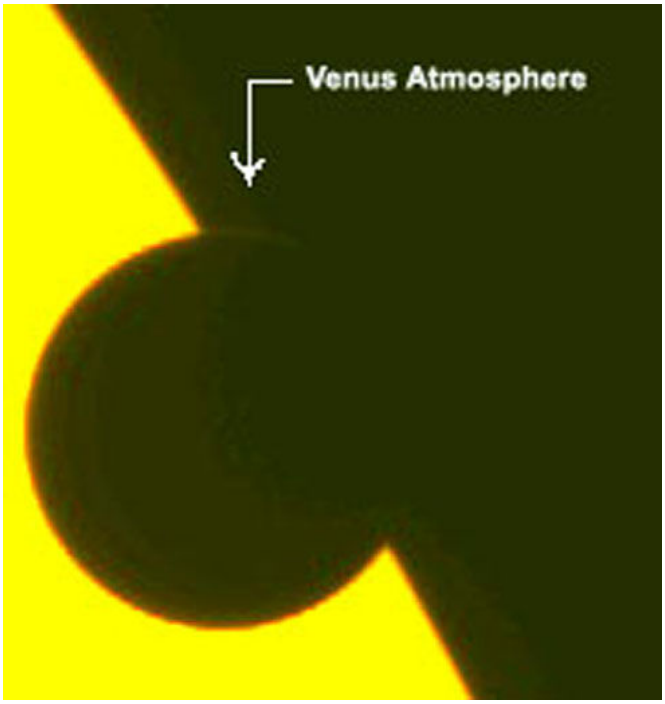
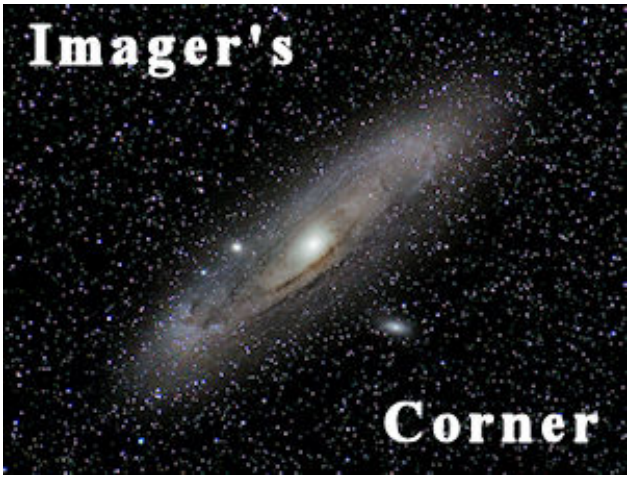


Photo above: Quinn Smith (my first "real" astro-photo!)
June 5th 2012 @ 7.49 EDT, location Oliphant Ontario.
Cannon EOS Rebel XTi mounted directly onto a StellaView ED 80mm, F:560mm. ISO 100 @ 1/1000 sec. Baader solar filter in front of objective.



Part 11 in a series by Blair McDonald

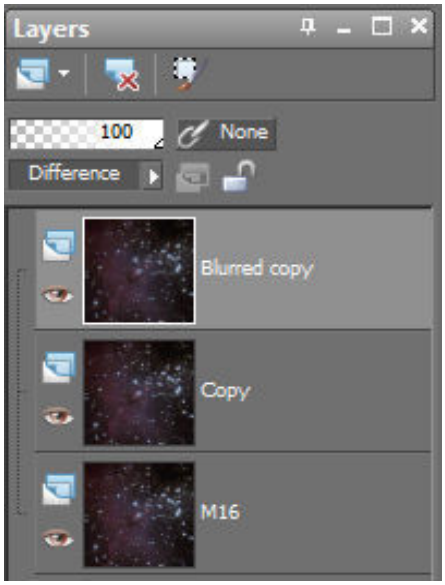
This edition continues a group of Imager's Corner articles that will focus on a few techniques that are useful in processing astrophotos. Over the next several editions of Nova Notes I'll attempt to give a guide to image stretching, background correction, SMI processing and any other technique that I happen to find useful. All the techniques discussed will be useable with nothing more than a standard image processor that supports layers and masks. No special astro-image processor is required.

This edition will deal with fixing those images with **slightly** trailed stars. You know the ones, the deep sky object isn't bad at all but the stars have a slight trail that ruins an otherwise great shot. Now please note the emphasis of the word slight. This technique can fix up stars that are trailed about two to three times their width. Although it can be used to work on longer trails it will start to impact the background and mess the deep sky object as well.

First let's take a look at the kind of image I'm talking about.

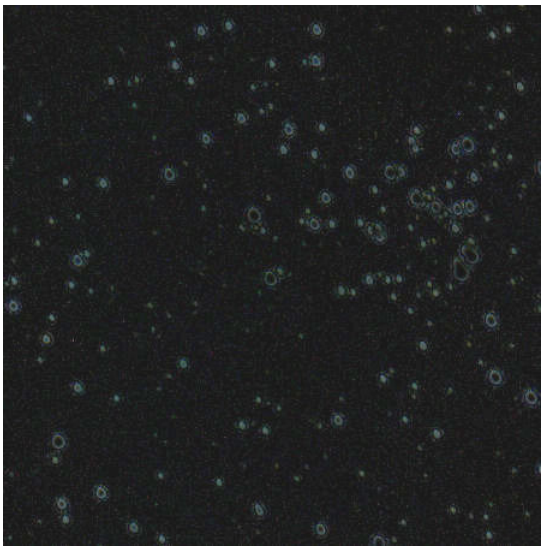
This is a single sub from an imaging session a couple of years ago and as you can see from the image, the stars are slightly trailed toward the top of the image. The first step is to select the stars in the image.

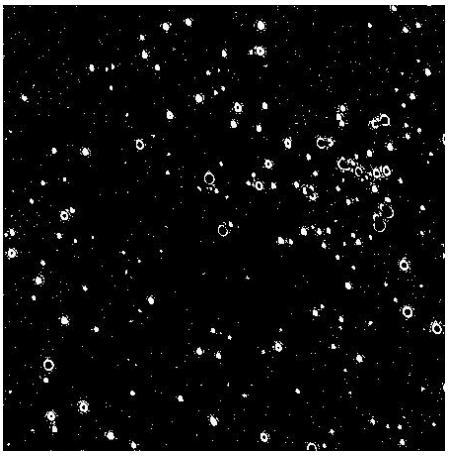
Now here there are a number of ways to go about this including simply clicking on the stars with the magic wand selection tool. The issue with this approach is that it misses a lot of the stars outside the brightness range set in the tool. One of my favorite ways around this is to use a layered approach to select the stars in the image.



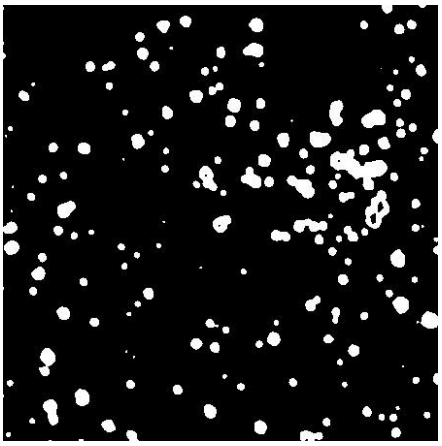
First duplicate the image twice and slightly blur the upper layer. The amount of blurring is determined through a little experimentation, but generally a guassian filter with a radius of two or three pixels will do the job. Next set the combine mode on the upper, blurred, layer to difference. This gives the following layer stack.

What happens is that the blur slightly dims the stars because of their small size. The deep sky object brightness is left virtually unchanged because of its size. Merge the top two layers. This removes the nebula leaving the smaller stars and outlines of the larger ones as shown below.

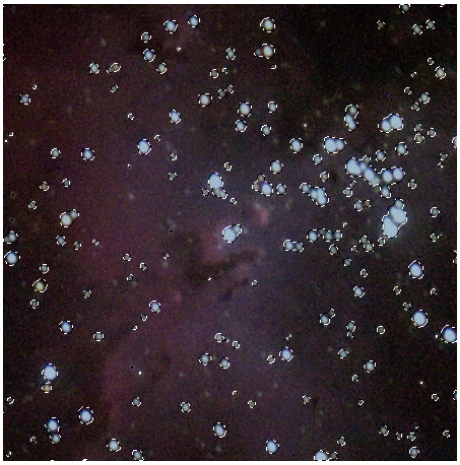




Next use the threshold function to produce a high contrast version. You can do this with a curves adjustment as well, but it's not as simple as using the threshold function. Play with the threshold level to produce an image with the stars standing out and the noise minimized as shown .

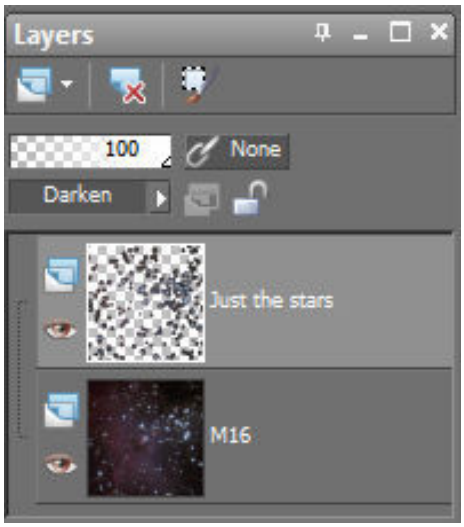


Apply a slight blur, again a two pixel guassian is about right, to remove the small noise dots introduced by the thresholding and then threshold again to produce the image.



Now use the magic wand and select the black background with continuous mode turned on and invert the selection. Presto you have a selection of the stars in the original image. Delete or hide the top layer and see the selection on the original image.

Enlarge the selection by about the number of pixels that the stars have trailed, in this image that is four pixels. Copy the selection to a new layer and you have a layer of just the stars in the image. Turn off the selection and set the combine mode on the new layer to darken. This gives the following image stack.



Now make the top layer active and use the move tool to nudge it around while looking at the image. As the you move it down in the direction of the trail the stars will become rounder.

What happens is that the darken combine replaces the brighter sections of the bottom layer with the darker sections of the upper star only layer.

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.

Transit of Venus

Members reports

Roy Bishop

During the week before the transit I monitored the weather forecasts for Halifax, Toronto, Winnipeg, Calgary, and Vancouver. Winnipeg had, by far, the best prospects for clear skies on June 5, so on June 3 I booked a flight for June 4 to Winnipeg, plus another for June 6 on to Vancouver where I have family. (I returned to Nova Scotia on June 10).

During the flight to Winnipeg there was solid cloud cover from Halifax to southern Ontario. There were some clear areas around Lake Huron, but the sky was not entirely clear until we reached the Manitoba border. Two days later I encountered solid cloud before reaching Saskatchewan, a few clear areas in southern Alberta, then solid overcast from there to, and including, Vancouver.

The Winnipeg sky was completely clear on June 5, except for a few small cumulus clouds mid-day which were not a problem. The transit was in view for more than 4 hours.

I took a very-portable, 2-inch refractor that I bought 56 years ago (and a camera tripod to hold it) . The telescope was made in London, England, of brass construction, covered in leather, with uncoated optics. Before I left home I sandwiched a piece of Baader solar filter between the two lenses of its objective.

I watched the first half hour of the transit by myself, from an open corner of a parking garage beside the Winnipeg airport terminal building. About 30 s after the predicted time of first contact I detected a small notch in the Sun and sat mesmerized as Venus ever so slowly moved in front of the solar disk.

Half an hour later I took a taxi to Assiniboine Park where the RASC Winnipeg Centre was giving a public observing session. Over the next few hours (until sunset) approximately 2000 people viewed the transit from perhaps three dozen telescopes, including mine. Only two people were there from Nova Scotia: myself and Dave Chapman.

The two views of the transit I remember most were the first notch near the top portion of the Sun, and 4.5 hours later when some distant tree branches slowly rose with the turning Earth to cover an elliptical Sun. A distant flying bird joined Venus in silhouette against the solar disk as that apparition, which I would never see again, vanished behind the trees.

Dave Chapman

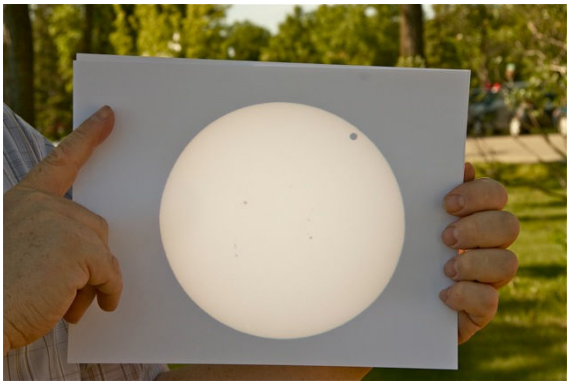
To be honest, initially I was not that excited about the 2012 Transit of Venus but I resolved to view it from Halifax if the sky turned out to be clear. As the event approached, there was much discussion of the event, including the historical-scientific significance, and I started to anticipate the transit more and more. When it became apparent that the weather was almost certainly going to be awful in Halifax, I had a decision to make: stay home and be grumpy, or find a place where the sky was likely to be clear, and go there at the last minute.

Day after day for the week leading up to the transit, I pored over the Environment Canada forecasts for accessible cities with clear skies, friends, and not-too-expensive air fares. It was boiling down to Hamilton vs. Winnipeg, and on the Sunday before the Tuesday transit, I chose Winnipeg, because the forecast had consistently clear skies for that city from Monday through Wednesday. Finally, the Clear Sky Chart confirmed that Winnipeg would be clear. Moreover, Roy Bishop had reached precisely the same conclusion: Winnipeg it is! So I bought my ticket for Monday and off I went. I arrived about 6:00 p.m. and was able to visit family that night and the next day before heading off to the observing site, Assiniboine Park.

Although I wanted to observe somewhat privately for first and second contacts, I soon got swept up in the public event organized by Andrea Misner and other Winnipeg RASCals. Many people said they the view through my "small" TeleVue 70 mm refractor.

We also discovered that eyepiece projection onto a white card was effective in sharing the view with groups, especially families with young children and casual photographers.

I do not regret for one instant the journey to Winnipeg to see the 2012 Transit of Venus. It was an amazing sight, the weather was great, and the people were in a festive mood. It was a once-in-a-lifetime event, and I was pleased to share it with Roy and other RASC members. A truly memorable day.



Sherman Williams

My plans for viewing the transit of Venus was combined with a family visit in British Columbia. It was noted that the weather prospects at the time of the transit were about the same in Houston (near Smithers), B.C. as in Avonport, N.S. My son and his family live there and that location gave the full transit of Venus before sunset. So, I reasoned that is was an appropriate time to visit my son. Should there be cloudy weather, I had over 6 hours to catch a cloud break to view Venus.

June 3rd and 4th were sunny in Houston (B.C.), it was used to check our observing equipment; we could see the sunspots quite nicely. Unfortunately, on June 5th pretty much the whole of B.C. was enveloped in a huge mass of cloud and periods of steady rain. Flood warnings were issued for some parts of BC. UGH!!

I must introduce Harm Dekker, a Dutch Canadian, with a serious interest in amateur astronomy. Harm has just retired and had invited me to share the Venus Transit event at his observatory above Houston. I have included a photo showing some of his viewing equipment: a homebuilt 12.5 inch Dobsonian mounted reflector. He also has a 4 inch, 900mm Antares refractor and as a retirement gift he was given a 14 inch Celestron which he has in his homebuilt roll-off-roof observatory. He is working on getting comfortable with all the computerized aspects of the latter scope.

We were ready for any break in cloud but it did not happen. Fortunately Harm had high-speed internet and we were able view the live coverage of the transit via Slooh and NASA. We would occasionally snap a photo from his large HD monitor, a really comfortable ringside seat to the event (although we would have swapped our comfort for even a 5 minute direct view of Venus on the Sun).

Harm Dekker's setting and hospitality which included, good food, nice wine

and lots of astro talk, made the event a memorable day. My daughter-in-law, Jennifer, added to the festivities with a very nice surprise. She designed, baked and served a special Venus Transit Cake. That in itself, made a unique experience.

How often does one get a chance to eat a piece of Transit of Venus Cake while experiencing syzygy with Venus and Sun.

Quinn Smith

I had planned for the Transit before leaving Nova Scotia in April. I was on an extended work related trip Brantford (southern Ontario) which was to include three weeks in Brazil in May. Unfortunately the Brazil trip was cancelled (southern stars still on my "bucket" list!). Because I felt that the chance of good weather in Ontario in June was probably better than that in Nova Scotia, and also because the Transit would last an hour longer in Ontario, I decided to extend my work trip to include June 5th

I had with me on the trip my ED80 and Vixen "PortaMount", so I was well prepared equipment wise. I studied the weather for the week leading up to the 5th and my decision to stay away from NS was well founded. The weather forecast for southern Ontario changed daily—but with 24 hours to go the CSC showed white for Brantford but blue for the Bruce Peninsular.

My wife's family has a cottage in Oliphant (just north of Sauble Beach) and I knew from experience that the Bruce had a micro climate all of its own, Rain in Brantford (where I was based) sunny in Oliphant.

The morning of the 5th saw the CSC show white for Brantford (all afternoon), but blue for the Bruce—so off I headed on a 3.5 hour drive. An hour north of Brantford it started raining—trust the "clock" I thought. Two hours north of Brantford it was still overcast. I called work only to find that Brantford was sunny! What to do? Turn back or continue? Trust the "clock". Fortunately true to form, the weather at Oliphant was beautiful.

I set up on the cottage deck overlooking Lake Huron with a clear view to the western horizon. The Transit was fantastic. I timed first and second ingress, saw clearly to glow of the sun arcing through the atmosphere of Venus and also the "black drop" effect at second ingress. I followed the progress of Venus as it crossed the Sun's face right up to the Sun setting over the lake. It was magical.

Happy Birthday SCO

Member's thoughts . . . .

15 years ago Halifax Centre members acquired and built an observatory at St Croix now known as SCO (St Croix Observatory). I think all current members owe a debt of thanks to all the members who were involved in that enterprise. Because of their hard work and foresight we have a wonderful asset to enjoy our hobby. From the entire membership—thank you all!

The following are a few comments from some of our current members.

The Halifax Centre web site has an excellent history of SCO. Go to:
http://halifax.rasc.ca/sco_history.html

By the civil calendar, tomorrow (June 21st) is the 15th anniversary of the official opening of Saint Croix Observatory, but I think we should celebrate it TODAY, because 1997 June 21 was the date of the Summer Solstice, which is June 20 this year. I was Centre President at the time (and take no credit for the building of SCO, which was carried out by an amazing team of Halifax RASCal volunteers), but I presided over the official opening. I delayed the event sufficiently to open the roof at EXACTLY the instant of High (Solar) Noon, as calculated by Roy Bishop. So that event was about exactly 15 "tropical" years ago, almost to the instant I am writing this.
The list of SCO volunteers and Centre executive that year includes several names of members who have served in prominent RASC positions.
Happy Solstice and clear skies!
Dave XVII

WOW! 15 years ago! Was it that long? Ah the memories.....I remember the cold windy night on courthouse hill near Gore after which Roy told us to follow him to a site he knew about, now known as SCO.
I recall the first load of gravel for the drive way and the crew spreading it. As well the day we cleared the land and brush and all watched how quickly Roy "the beaver" Bishop could cut down trees! I have a photo somewhere of me 20 feet up a tree tying a rope to it so we could pull it to free a chain saw. The roofing party was a beautiful sunny summer day! It was alot of fun and honor to be part of the centre that built SCO.
I dropped by Friday night on my way back to the valley for another work week, my first time in a few years and I must say was impressed with how well it looks and the growth and improvement it has undergone.
Great work Halifax RASC!
Paul G

That excursion to Gore was carefully planned by "the beaver" on the coldest, windiest night to make sure we figured out for ourselves that the Gore site was not a good one! :-)
Dave Lane

I was suffering from Astronomer's Fever in 97. I didn't pick up the Hobby until 2006 when I first joined the RASC. I was into astronomy ever since my first view of Saturn when I was 10 years old.
I appreciate all of the work done at SCO, past present and future! I use SCO as often as I can. I am now an imager and my camera appreciates the extra photons. Thank you Everyone who was involved!
Jeff Donaldson

Here are four of my photos taken at SCO, three in 1996 and one in 1997. Incidentally, construction was mainly 16 and 17 years ago, not 15.

The people "in" the warm room are (L to R): Gertrude Bishop, Frances Young, Andrew Young, Dr. Hamish Young. The Youngs are from New York, and Frances's father was Dr. William Holden, who was the Honorary President of the Halifax Centre 1980-1984. (Aug 2nd 1996)

Walter Urban of Avonport volunteered his time and tractor to back-fill the foundation columns for the roll-off track. (Sept 24th 1996)

David Levy (Nova East's 2012 special guest speaker) in the roll-off before the roof was constructed. (Oct 18th 1996)

L to R: Wendee Levy, Clint Shannon, Paul Gray (behind Clint), Susan Gray, Carolyn Shoemaker, David Levy, Eugene Shoemaker. (Seventeen days later, Eugene was killed in Australia). (July 1st 1997)

This is the time frame regarding SCO, which should be recorded for posterity:

1993
The Halifax Centre forms an Observatory Land Search Committee.

1994
October - In a letter on the 15th to Dave Lane (Centre President), Shawn Mitchell and Clint Shannon, Roy Bishop proposed the St. Croix area for an observatory. On the 28th the Observatory Land Search Committee went to its proposed site at Gore, and then Roy took them to see St. Croix.

1995
June - Lease signed for St. Croix with Minas Basin Pulp & Power.
July - Site survey.
September, October, November - Cleared forest and prepared driveway.

1996
May - Cleared more trees, buildings designed, and permits received.
June - Excavated for foundations.
July & September - Concrete poured.
October - roofs on and rails installed for roll-off.
November - Vinyl siding completed.

1997
June 21 - SCO official opening (at solar noon 13:18 ADT).

During those years, Dave Lane and Dave Chapman served as Centre presidents.
Roy Bishop

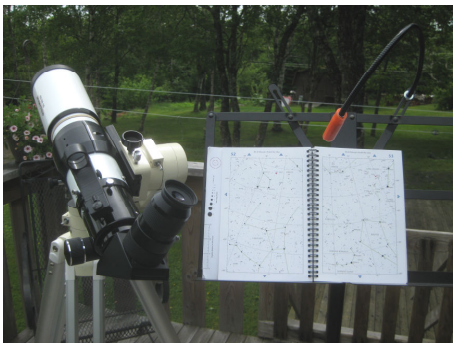
"Quick Tips"

Member's Astronomy Tips

This is a new feature in Nova Notes and I hope that with enough ideas from our members it can become a regular feature. I would like to thank Dave Chapman for suggesting it.

The idea is to give short and useful tips to other readers of any money saving suggestions, helpful hints, or neat products. Photos would be useful and all suggestions should be short and sweet. By all means use a pseudonym—lets see if we can figure out who you are!

Do you have eyepieces for which the individual cases disappeared or never existed? Try using empty pill bottles. At my age, the size and number of the pills the doctor prescribes call for pretty large containers! If you don't have any, someone among your friends or family must. Don't recycle, re-use! - ***"The Frugal Astronomer"***



If you are like me, I look at a star chart, and by the time I have moved from the table to the eyepiece, I've forgotten what I was looking at! I use an inexpensive music stand placed right at the telescope (with a small red light attached). Now I can quickly and easily move from the star chart, to the eye piece and back again. Works great for those of us with no short term memory!
- ***"Memory Challenged"***

Always tripping over your tripod legs? You can purchase small, round, red flashing lights from the dollar store. They are intended for bicyclist and have a small clip on the back. I purchase mine at the Dollarama. Put an elastic on the tripod leg and just clip on the flashing light. Quick, easy and cheap! - ***"Quinn"***

Pick up stick on strip lights from the Dollarama dollar store. Colour the clear lens with red nail polish, and attach them too your dob's base via some two sided tape or Velcro, and viola!! You now have a couple red lights that keep you from kicking your scope and accessories at night. Also Dollarama has a LED light that's designed to slip on a baseball cap's bib. Colour the LED's with several layers of red light, and you now have a hand's free red light - great for quickly looking at charts, or flipping through guidebooks. - ***"The Dollarama King" (Graham Rose)***

Cosmic Debris

Odds and Sods from the world of astronomy and astrophysics

Voyager 1 at the Final Frontier: June 22, 2012 - NASA science news

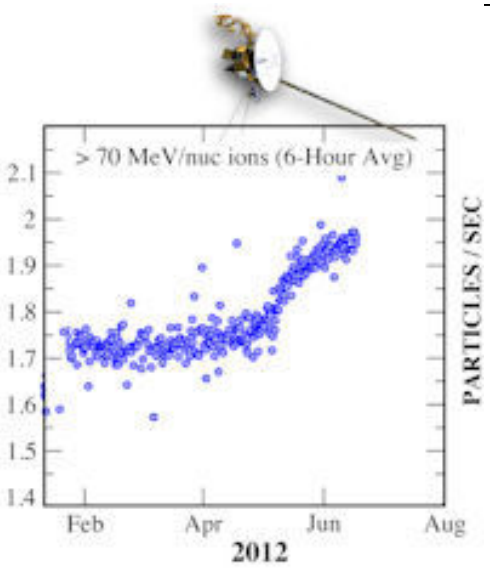
For nearly 35 years, NASA's Voyager 1 probe has been hurtling toward the edge of the solar system, flying through the dark void on a mission unlike anything attempted before. One day, mission controllers hope, Voyager 1 will leave the solar system behind and enter the realm of the stars—interstellar space.

That day may be upon us.

"The latest data from Voyager 1 indicate that we are clearly in a new region where things are changing quickly," says Ed Stone, Voyager project scientist at the California Institute of Technology in Pasadena. This is very exciting. We are approaching the solar system's final frontier."

The "frontier" he's referring to is the edge of the heliosphere, a great magnetic bubble that surrounds the sun and planets. The heliosphere is the sun's own magnetic field inflated to gargantuan proportions by the solar wind. Inside lies the solar system—"home." Outside lies interstellar space, where no spacecraft has gone before.

A telltale sign of the frontier's approach is the number of cosmic rays hitting Voyager 1. Cosmic rays are high energy particles such as protons and helium nuclei accelerated to near-light speed by distant supernovas and black holes. The heliosphere protects the solar system from these subatomic bullets, deflecting and slowing many of them before they can reach the inner planets.



As Voyager approaches the frontier, the number of cosmic rays has gone up. "From January 2009 to January 2012, there had been a gradual increase of about 25 percent in the amount of galactic cosmic rays Voyager was encountering," says Stone. A sharp increase in cosmic rays could herald Voyager 1's long-awaited breakthrough to interstellar space.

"More recently, however, we have seen a very rapid escalation in that part of the energy spectrum. Beginning on May 7, 2012, the cosmic ray hits have increased five percent in a week and nine percent in a month.". The sharp increase means that Voyager 1 could be on the verge of a breakthrough 18 billion kilometers from Earth.

When Voyager 1 actually exits the heliosphere, researchers expect to see other changes as well. For one thing, energetic particles from the sun will become scarce as the spacecraft leaves the heliosphere behind. Also, the magnetic field around Voyager 1 will change direction from that of the sun's magnetic field to that of the new and unexplored magnetism of interstellar space.

So far, neither of these things has happened. Nevertheless, the sudden increase in cosmic rays suggests it might not be long. Meanwhile, Voyager 2 is making its own dash for the stars, but because of its slower pace lags a few billion kilometers behind Voyager 1. Both spacecraft remain in good health.

"When the Voyagers launched in 1977, the Space Age was all of 20 years old," says Stone. "Many of us on the team dreamed of reaching interstellar space, but we really had no way of knowing how long a journey it would be -- or if these two vehicles that we invested so much time and energy in would operate long enough to reach it. "

As the Space Age nears the 55-year mark, there is little doubt: The Voyagers are going the distance.