NOVA
NEWSLETTER OF THE VANCOUVER CENTRE RASC
VOLUME 2019 ISSUE 4 JULY AUGUST 2019

Visual Aid

by J. Karl Miller

Many times, during our public astronomy nights, people have asked about buying a telescope. If this request comes from someone who has just looked through a telescope for the first time, I recommended to start with binoculars. This is the second step after having acquired at least a little familiarity with "naked eye" constellations, location of some of the major "targets," and their seasonal visibility. I also explain the reason for the timing on the orbital position of the Earth in its orbit around the Sun.

Having used telescopes for most of my life, I always use binoculars as helpers to locate objects I want to look at. I am talking here about finding them "manually," not using computerized telescopes. In many cases, people already own some binoculars, they've just never thought of using them to look at the sky. Most of these "found" binoculars are quite suitable for this kind of use.

Fig. 1: A selection of binocular types, sizes and powers

For astronomical purposes, binoculars with larger front lenses are better. Astronomical objects, other than the Moon and the bright planets, tend to be quite faint; the larger the front lens, the more light you gather; that makes these faint targets easier to see. Personally, I use two pairs of binoculars with the magnifying power (power equals magnification) of 10 and one stabilized pair with the power of 15 (see fig. 1, left to right).

The OLYMPUS binoculars on the left, above, have 10 power and a front lens diameter of 42 mm (fig. 2 on p. 10), the Bushnell and stabilized Canon (fig. 3 and 4 on p. 10) have 50 mm diameter front lenses. Power and front lens diameter

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JULY 11 **SFU**
Ted Stroman and Leigh Cummings on the Apollo missions and the future of manned Moon missions. Room SWH10041.
SFU

NO MEETING IN AUGUST

SEPTEMBER 12 **SFU**
Colleen O'Hare from the Okanagan Centre will be our speaker. See Meetup for details.
SFU

Canada Day in Maple Ridge

Photos from this year's Canada Day festivities in Maple Ridge. Clockwise from upper left: Suzanna's first Canada Day in Maple Ridge; Jennifer and Ken enjoy a rare quiet moment; Jennifer and Kyle doing some solar viewing; Ken Jackson at the Solar and LPA display.

President's Message

by Leigh Cummings

An organization like ours relies heavily on the generosity of its members as well as the generosity of the community in which we dwell. I often talk about the hours of work our council members put in, but they are not the only people who give freely of their time.

Everybody knows that Alan Jones has been doing a fantastic job repairing the Antony Overton Memorial Observatory (AOMO) but few will have heard of Rick Gregory's contribution. Rick is a civil engineer who has designed and managed the construction of some of the more famous buildings around the world. He has been indispensable in helping Alan with the design and fabrication of the parts needed to bring our AOMO up to the quality it needs to be. He, along with Alan, have put plenty of "sweat equity" into the project. The project still has a way to go but I am very excited about what the future holds in store for our little observatory in the forest.

Another example of generosity and kindness came from a great cor-

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About RASC

The RASC Vancouver Centre meets at 7:30 PM on the second Thursday of every month at SFU's Burnaby campus (see map on page 4). Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently $81.00 per year ($47.00 for persons under 21 years of age; family memberships also available) and can be obtained online, at a meeting, or by writing to the Treasurer at the address below. Annual membership includes the invaluable Observer's Handbook, six issues of the RASC Journal, and, of course, access to all of the club events and projects.

For more information regarding the Centre and its activities, please contact our P.R. Director.

NOVA, the newsletter of the Vancouver Centre, RASC, is published on odd-numbered months. Opinions expressed herein are not necessarily those of the Vancouver Centre.

Material on any aspect of astronomy should be e-mailed to the editor or mailed to the address below.

Remember, you are always welcome to attend meetings of Council, held on the first Thursday of every month at 7:30pm in the Trottier Studio in the Chemistry wing of the Shrum Science Centre at SFU. Please contact a council member for directions.

2019 Vancouver Centre Officers

President	Leigh Cummings president@rasc-vancouver.com
Vice-President	Gordon Farrell vp@rasc-vancouver.com
Secretary	Olivier Eymere secretary@rasc-vancouver.com
Treasurer	Phil Lobo treasurer@rasc-vancouver.com
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LPA	Vacant lpa@rasc-vancouver.com
Dir. of Telescopes	Ken Arthurs telescopes@rasc-vancouver.com
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Speakers	Scott McGilllivray speakers@rasc-vancouver.com
Past President	Suzanna Nagy
At Large	Howard Trottier, Bill Burnyeat
Honourary President	J. Karl Miller

Library

The centre has a large library of books, magazines and old NOVAs for your enjoyment. Please take advantage of this club service and visit often to check out the new purchases. Suggestions for future library acquisitions are appreciated.

On the Internet

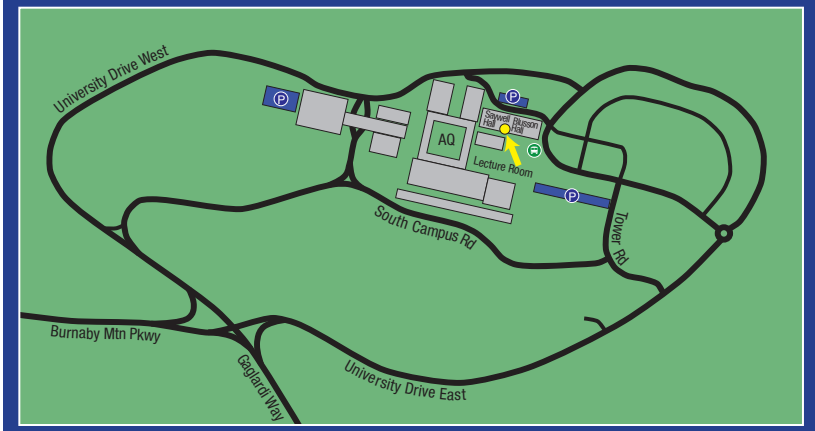
http://rasc-vancouver.com or
http://www.rasc.ca/vancouver
http://astronomy.meetup.com/131/
http://www.facebook.com/RASC.Van

@RASCVancouver

Mailing Address

RASC Vancouver Centre
PO Box 89608
9000 University High Street
Burnaby, B.C.
V5A 4Y0

Map to Meeting Site



Our July meeting is in room SWH10041 of Saywell Hall, about halfway down the main corridor as indicated by the arrow on the map.

Pay parking is available at several locations located around campus (indicated as "P" on the map).

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porate citizen, Markarian Fine Optics. They helped our centre in our effort to help out another charity organization, the Zajac Ranch in Mission. The Zajac Ranch runs summer camps for children who otherwise would not get the opportunity to go to camp. The ranch was given a Sky Watcher 8" Dobsonian telescope by an anonymous donor. They hoped to use it to add to the children's camp experience and contacted our centre for our expertise. Suzanna and I drove out to the ranch to check out the telescope. Besides having no eyepieces (which made it impossible to test the optics), it became apparent to us that the telescope base would also need some further work because it was grinding when spun around. We decided that I would bring it home for a closer examination. After I got it home and dismantled the mount, I soon realized that the telescope, at some point, had been sitting in several inches of flood water that resulted in swelling of the base. It was beyond my ability to repair. The finder scope mount was also damaged beyond my ability to fix. I phoned Harout Markarian and asked him if he could be of any help. He told me to bring it in and he and Bryce Tordiffe would see what they could do. When I took it to them, they discovered they had a brand new base that would fit. They also will supply a brand new Telrad to replace the damaged finder scope, and a new eyepiece, all at no charge. Bryce also offered his labour free, to clean up and adjust, tighten and lube whatever was needed to bring the telescope up to prime working order. A huge thank you to them from our centre. Markarian Fine Optics has proven to be a great corporate citizen which is also devoted to delivering quality service and products to the Vancouver astronomy community. Please continue to support them as they have supported us.

An unfortunate incident this past winter ended up becoming another example of the corporate community showing us their support. When the power line to the AOMO was damaged in a windstorm, we contacted Boileau Electric in Pitt Meadows to repair the line for us. At the first chance the weather gave them, they went up the forestry road, executed the repair and sent us the bill, which we paid. It was not until after all this was done, we were informed that the power line was to be decommissioned. What a blow to us. I approached Boileau Electric and asked if it would be possible to get a partial refund to help us cover our new expense of purchasing a generator to power the observatory in the future. They were very generous and refunded us a substantial portion of our bill. Bob and Jacob Boileau were under no obligation to be so generous. They were just great corporate citizens.

I will save some other samples of good deeds and generosity for future messages.

In other news, at our July council meeting, council voted to agree to hold the 2020 General Assembly of the Royal Astronomical Society of Canada. In 2020, it will have been

17 years (back in 2003) since we last hosted the GA. I know you will be very excited to play host to our fellow astronomers from all the centres across our country. Our Events chair, Hayley Miller, will chair the GA committee that is tasked with taking on this Herculean endeavour. Normally a centre has 2 to 3 years to plan such an event. We will have less than a year. As with Alan Jones, Hayley will not be alone. Suzanna has volunteered to be events co-chair to help take over the organization of most of our other events throughout the coming year. This will free up Hayley to concentrate on the rapidly closing deadline for organizing the GA. Suzanna, being a past events chair, is well aware of the responsibility she has taken on. Also, Hayley has already attracted other members to serve on her committee. They are members Marina Miller, Meredith Miller, Francesca Crema and Doug Montgomery. She will be looking for some more volunteers from our general membership to join her committee. As next June approaches, we will be needing even more volunteers to welcome our fellow RASC members from all over our country and beyond. With our members' help, we hope to leave our guests with nothing but fond memories of west coast hospitality. If any member, regardless of age or skill set, feels they would like to contribute in some way, please contact Hayley. I'm sure she will be creating several mailing lists for various types of help. I also believe that our members will greatly enjoy meeting and socializing with fellow astronomers from so many diverse regions of our country.

To finish, I wish you all a fun and safe summer filled with dark and clear skies. ✸

Alan and Rick with new roller plates for the AOMO dome

Membership has its Privileges!

Are you tired of looking at the same objects again and again (planets, moon, etc.)? Is your telescope collecting dust because it's hard to locate deep sky objects? Would you like to bring your observing to a stellar level? Robert Conrad, our new observing director, revived the Vancouver RASC observing group and invites you to join by sending him an email at observing@rasc-vancouver.com. Some of the benefits of belonging to this group include:

- Hands on training on how to operate the SFU Trottier observatory
- Weekly observing sessions at the observatory or at dark sky locations
- One-one-one coaching on how to locate thousands of objects in the night sky
- Attend small interactive seminars delivered by Robert on a range of topics including failsafe star-hopping, charting challenging objects and understanding the motions of the cosmos
- Learn to make your telescope dance by locating objects such as asteroids, nova, and supernovae
- Spectroscopy and imaging training from Howard Trottier and an opportunity to collaborate on observatory research projects
- Updates on observable sky events happening during the week like asteroid/comet/deep sky conjunctions
- Access to observing guides and lists that Robert created that took hundreds of hours to create and will help with planning observing sessions
- Knowledge and expertise from other observing group members
- Learn how to quickly and efficiently find and star-hop to deep sky objects using a range of binoculars and telescopes

Upcoming Events

July
20 – Apollo 11 50th anniversary at SFU
27 - Aug. 4 – Mt. Kobau Star Party

August
24 - 31 – Merritt Star Quest

October
18-20,25-27 – Manning Park Dark Sky Festival

December
12 – AGM

GA 2019 Report

by Hayley Miller

I am pleased to report about the 2019 RASC GA. This year's 60th RASC GA was the first one ever organized by the National Office in an effort to revitalize GAs. Held in Toronto at York University, where it was last held in 2008, It was also held on a non-holiday weekend and included workshops to share ideas on various aspects of amateur astronomy. As it was on a Father's Day weekend, a public event was offered to promote the hobby of astronomy to families. It was also a joint meeting of RASC and AAVSO. The last joint meeting was in 2007 in Calgary.

A new publication was released at the GA: *A Night Watchman's Journey*, David Levy's autobiography. David was in hand to speak about the book and to sign copies. We now have a copy of it in the library at the Trottier Observatory.

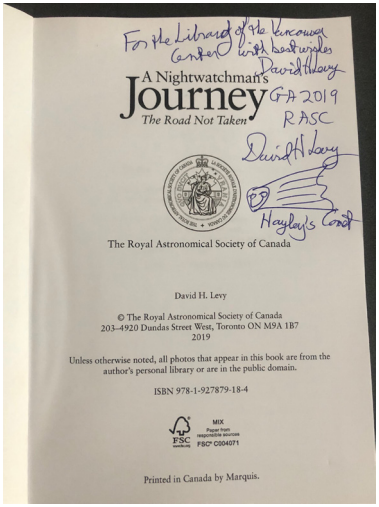
First up on my list of things to see and do when I arrived was geeking out at the registration table with swag to purchase! I received a beautiful bag, pin, and stickers and bought a T-shirt and a pop-up for my phone.

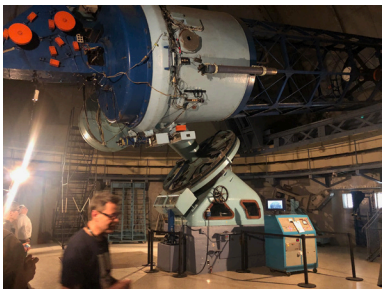
The beautiful GA logo design is the twin observatories of York University and seen above the domes is Beta Persei (Algol), The Demon Star—an eclipsing variable. This acknowledges the long history of the AAVSO's observation of variable stars by its members. The Apollo Lunar Module represents the celebration of the 50th anniversary of the Apollo 11 moon landing mission.

A highlight of this year's GA was the celebration of the first landing of humans on the Moon. Historian James Hansen—the author of the great Neil Armstrong biography that inspired the movie, *First Man*—spoke for nearly 2 hours about his two-year process of interviewing Neil for his book. His talk can be seen on YouTube here.

Included are images of the weekend I wanted to share. The images reflect my perspective and memories of this unforgettable weekend!

I am looking forward to planning the next RASC GA 2020 in Vancouver, June 5-7 at the Coquitlam Executive Inn Hotel and Conference Center. ✸





For Sale

Newtonian telescope for sale.

44mm Secondary elliptical flat mirror (OPFLAT44HX)

Minor axis 44mm, Major axis 62mm, Thickness 10mm

In box and never opened – Excellent condition.

Hilux coating. Sells at £50 in the UK ($100 Can+)

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A new aluminium coating with enhanced multi layered overcoats to increase the reflectivity of telescope mirrors to almost 97% over a wide range of the visible spectrum.

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Repping Youth Members at the 2019 RASC GA

by Francesca Crema

Meredith, Marina, and I met at the YVR airport on the early Friday morning to catch our flight to Toronto. We were very excited to meet our fellow RASC Youth Committee members in person later that day, and to take part in the 2019 General Assembly. The Youth Committee is a group of youth members from various centres across Canada who give their input and perspectives on RASC matters, especially to help improve youth involvement. Jenna Hinds from the National Office had offered us the amazing opportunity to attend the GA along with other members of the Youth Committee, covering our flights and accommodation. After arriving at YYZ, we taxied over to York University where the GA was being held. After settling in our rooms, we attended a barbecue where we met Hayley and Doug from the Vancouver centre, as well as Jenna and Jessica, another Youth Committee member. While there, we all took part in a group picture for the GA, which was jointly held by the American Association of Variable Star Observers.

Saturday was much more eventful for us. We woke up early (which felt even earlier due to our jet-lag) to attend a talk and watch a short film about the 2017 total solar eclipse, and later saw another talk on Toronto's astronomical heritage. I appreciated how there were so many different topics in astronomy explored through different lenses, with some talks being more technical and scientific while others explored artistic perspectives.

After seeing these presentations, we volunteered with Jenna and other Youth Committee members in a nearby hall. There we met Artash and Arushi, sibling Committee members who were showcasing an impressive musical display of the Trappist-1 system. For a few hours we helped set up exhibits and engage guests, mostly families and students, who came to take part in the outreach activities. There was an inflatable planetarium, a comet-making activity, a scale model of the solar system, and more.

Later that afternoon, we saw two more talks which were focused on youth involvement in the RASC, one of which was given by Jenna. The other speaker was a physics teacher from a Montreal college who described the fantastic and diverse ways he teaches astronomy to his students. They were both very inspiring talks that showed how dedicated many RASC members are to encouraging more active youth participation.

In the evening, we attended the Ruth Norcott Memorial Lecture presented by James R Hansen, author of the Neil Armstrong biography, *First Man* (which was recently adapted into a movie starring Ryan Gosling). He gave a unique perspective on Neil Armstrong's life as his only official biographer, and it was a fascinating talk on separating the man from the myths created around him.

The last day of the GA began with another early morning start. Instead of attending talks, though, we took part in the AGM, where the National council discussed finances, outreach, as well as many other reports and issues. Meredith brought up the point of digitizing SkyNews to save costs, which was received very well and earned applause from the council and audience. We have brainstormed ideas like these in the Youth Committee, and this was an excellent opportunity to present them directly to the National Council.

After the AGM, us Youth Committee members went to help Jenna again at the public outreach activities. A few hours later, we all returned to the main GA halls to give a workshop on youth outreach and involvement in different RASC centres. Each of us staffed a table surrounded by the workshop attendees and brainstormed ideas that were good for youth engagement, as well as those which weren't as effective. We each narrowed down the points we thought were most important and presented them to all the workshop attendees. These points and ideas will be shared to all centres interested in improving their youth out- and in-reach. This workshop seemed to be quite popular at the GA, with many people attending and asking us questions afterward. It's clear that youth involvement is a major issue in many RASC centres, and many of them admire the Vancouver centre's accomplishments in public outreach through schools and youth-specific events.

Later, Meredith and Marina led a workshop on creating and managing centre social media accounts, which

are very useful and visual tools for reaching large audiences that may be unaware of the RASC. At the same time, I attended a workshop on the newly created Inclusivity and Diversity Committee, a fantastic and necessary addition to help new and existing members feel more welcomed in the RASC as it becomes more multicultural and reflective of Canada's population.

The next day we left for home, and while we were in Toronto for just the weekend, I'm very thankful to have been able to attend and help provide our unique input as youth to the GA attendees. It has also given Hayley, Meredith, Marina and I ideas for future GAs and what could be added to them. Although I was in the minority there as a young woman, I was very impressed by the progressive attitudes of the GA attendees and organizers such as Jenna, and am hopeful for the Society's involvement of its younger and diverse members. ✸

Above: Francesca, Meredith, Marina, and Hayley at the GA Banquet

Below: Youth Committee members leading the Youth in the RASC workshop

continued from page 1
(in millimetres [mm]) are displayed somewhere on each pair of binoculars in the form of POWER × DIAMETER (i.e. 15×50 for the Canon binoculars). In addition, the field of view in degrees is also shown.

Fig. 2: 10 power and 42mm dia.

Generally, the larger binoculars become, the heavier they are. In this group of binoculars, above, the OLYMPUS pair is the lightest, while the Canon pair is the heaviest—it contains the stabilizing electronics, as well as a battery, in addition the internal prisms which make the image appear upright. All commonly-available binoculars shown are, in a basic sense, refractor type telescopes, which will normally show an upside down image. Additional optical components are needed to turn the image around once more; that delivers an "upside down upside down" image. Galileo would have given his eyeteeth to have a telescope of the quality in today's refractors and their derivatives, i.e. binoculars.

I should also mention the effect of what is called the "exit pupil" of any optical telescope, including binoculars. The exit pupil can be seen by looking at the eyepiece (the lenses where you place your eye(s) to look through a telescope). Exit pupil diameter, usually stated in mm, should match the diameter of your eyes' pupils when you use binoculars. Exit pupils are the front lenses projected by the eyepieces, and therefore contain all the light entering the front lenses (see fig. 5). Your own eye pupils, which vary their diameter depending on the brightness at which you are looking is high, contract (become smaller) when exposed to brighter light. If your eye pupil is smaller than the exit pupils of your binoculars, you automatically discard some of the light which is contained in the binocular's exit pupils. This is no problem when you use your binoculars during the day, but for astronomy, you usually look at very faint objects and you want to get all the light that you can catch in the objective lenses.

Fig. 3 & 4: The Bushnell (top) and stabilized Canon (bottom) binoculars each have 50mm front lenses

There is a simple way to calculate the diameter of telescope or binocular exit pupil diameter:

DIAMETER divided by POWER
i.e. 50 divided by 10 = 5mm
42 divided by 10 = 4.2mm
50 divided by 15 = 3.3mm

When you are young, your eye pupils can expand to about 7mm in deep darkness. That's why 7 x 50 binoculars are used in the navy. Most sailors tend to be young, and can make use of all the light coming into the binoculars at night. As you get older, the maximum "dark adapted" pupil diameter tends to get smaller. For instance, at age 50 you may only have a 5mm "dark adapted" pupil diameter. I'm way past that age, so my pupil diameter may possibly expand to less than that. Again, if your pupils match the diameter of exit pupil, you see all the light that your telescope or binoculars can catch. Any pair of binoculars worth their salt will also show you the larger craters on the Moon, the Galilean moons of Jupiter, brighter open and globular star clusters, movements of the planets and other interesting astronomical wonders. Much of this information is found in the RASC's Observers Handbook (free if you are a member).

As a couple of examples, there are detailed descriptions of the technical aspects of binoculars by Dr. Roy Bishop contained in the RASC's *Observer's Handbook*, starting on page 60 in the 2019

Members' Gallery

Chilean Eclipse by Andrew Krysa

Our Education Co-Chair Andrew Krysa, his partner Ted, and our other Education Co-Chair Robert Conrad were all lucky enough to be in Chile on July 2nd for the total solar eclipse.

Above image taken with a Panasonic Lumix DMC-GX8. Exposure is 1/60s at f/5.6 and 140mm.

edition. Wikipedia also contains information about binoculars.

Think of how much more light the objective lenses of telescopes and binoculars can intercept than your own pupils (50mm versus 5mm, say). It is the ratio of the disk area of a 50mm objective lens and 5 mm exit pupil you need to consider.

You can see what a great visual aid binoculars can be when using them to look at the sky at night. ✸

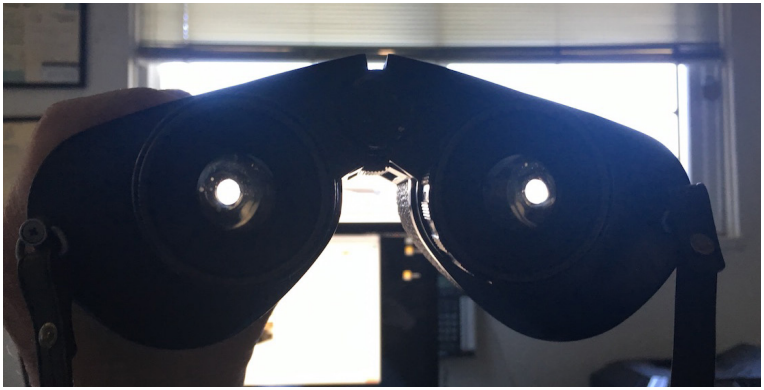

Fig. 5: Exit pupils seen through the eyepieces

Chilean Eclipse by Andrew Krysa

Our Education Co-Chair Andrew Krysa, his partner Ted, and our other Education Co-Chair Robert Conrad were all lucky enough to be in Chile on July 2nd for the total solar eclipse. More detailed photos can be found inside this issue.

Image taken with a Panasonic Lumix DMC-GX8. A 1/60s exposure at f/3.5 and 14mm.