

NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC | VOLUME 2011 ISSUE A | ASTRONOMY DAY 2011

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About Astronomy Day

Founded in 1973 by Doug Berger, former president of the Astronomical Association of Northern California, Astronomy Day's goal is "to promote the forerunner of all scientific endeavors and to provide information, resources, and encouragement in all facets of astronomy." On this day, professional and amateur astronomers the world over host events which bring this oldest and most accessible of sciences to the public.

Information about the RASC, our services, and how to join can be found on page 5.

Looking Ahead

May 12: David Helfand, president of Quest University in Squamish: "How Superman Sees the Stars."

Title image: Jason Rickerby

Introducing the Night Sky

by Bob Parry, Past President RASC–Vancouver Centre

The night sky has been a fascination to our fore bearers since before recorded history. In the past, humans looked at the sky through naked eyes alone. We now look at the sky through ever-increasingly sophisticated equipment, but is this really necessary?

In ancient times, people had two eyes, imagination, dark skies and curiosity. In modern times, we have three of these four features, we are just missing the dark skies of our ancestors. What can one observe from our increasingly light-polluted cities? Well, quite a bit actually. In the front of my house in East Vancouver, there are eight globe street lights in my block—eight street lights of the worst kind. Observing from the front yard is difficult but not impossible. I can see all the classic planets, the Moon of course, and many of the constellations.

Constellations were patterns of stars that the ancient people saw many things in, such as animals, heroes, gods, and other flights of the imagination. These groups of stars changed from season to season but the same group of stars was visible at the same time each year. This continual repeating of the constellations

with the change of seasons brought about astrology and attempts to forecast what was going to happen and try and connect people to the heavens and their surroundings. In ancient times, astrology was a science, but in modern times it has no basis in the science of the day.

So what can one see in the night sky tonight? As of this writing, the time is early May and the constellations of Spring are out. High and due south is Leo (the lion), to the West are Cancer (the crab) and Gemini (the twins) and to the East is Virgo (the virgin). Leo is easy to identify but the others—especially Cancer—are hard to pick out in urban skies. Leo actually looks like a lion; Gemini has two stars that look to the eye as being twins. Virgo however does not look like a woman—one needs the imagination of the Ancients to see that one.

The stars, in their groupings as constellations, moved across the sky steadily and predictably. However, there were other "stars" that did not follow this pattern. They wandered through the constellations of the zodiac, sometimes even moving backwards against the stars of the

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We are all astronomers.

"We" as in everyone. Of course we are! We are born astronomers. We are wired to look beyond ourselves, to ask questions, and to search for answers. What other places are there? Who else is out there? What is the origin and destiny of things? On their largest scales, questions such as these are questions about the universe. Our wiring most truly reveals itself in the irrepressible wonderment of children at the cosmos, and in the questions that inevitably follow from experiences as "ordinary" as looking up at the Moon, or as singular as viewing the rings of Saturn in a telescope for the first time. While for some, the urge to know the cosmos fades away over time, for most of us our "inner" astronomer remains, even if we lose the connection with it for a time. A new experience of the cosmos will rekindle the wonderment, bring back the old questions, and generate new ones.

If you've come out for RASC Vancouver's annual celebration of International Astronomy Day, then you must be in touch with your "inner" astronomer! So you'll be excited to know that RASC Vancouver has teamed up with "inner" astronomers from Metro Parks, and other local and regional partners, to put on an afternoon (and night—if the weather cooperates!) filled with ways to know and experience the cosmos, for "inner" astronomers of all ages and backgrounds!

If at this point you are wondering, "What is the RASC Vancouver?" you will find many answers to that

question in a column elsewhere in this edition of NOVA, the bimonthly digest of our society's activities. But I can't resist the urge to put it to you this way: RASC Vancouver—more than 250 members in touch with their "inner" astronomers! RASC Vancouver's Astronomy Day is just one of the many functions that we put on throughout the year. So if your "inner" astronomer wants to find more ways to experience the cosmos, and like minds that wrestle with the same questions (and might even have some answers!) then membership in RASC Vancouver is for you!

Metro Parks very generously invited RASC Vancouver to host our Astronomy Day this year at Aldergrove Lake Regional Park, in concert with their annual "Urban Star Quest." Metro Parks is providing the logistical support for our daytime program, including tents, electricity, bathrooms, parking, and security. And the icing on the cake: Metro Parks will permit overnight camping privileges for an all-night star party—if the weather plays along! All of this for a mere two bucks to get on site! Wow! So on behalf of the membership of RASC Vancouver, I would like to express our deepest appreciation to Metro Parks for their support.

The RASC Astronomy Day program owes first and foremost to the dedicated efforts of many member volunteers, under the leadership of our masterful Events Coordinator, Suzanna Nagy. "Thank You!" Suzanna!! And to all our volunteers: "Thank You!"

In addition to Metro Parks, our partners at Astronomy Day include the NRC Herzberg Institute of Astrophysics (joining us from Victoria!), and Vancouver Telescope Centre (the Lower Mainland's one-stop shop for astronomical gear and expert advice): RASC Vancouver is very grateful to both for their sponsorship of the very exciting prizes in our raffle!

We are also joined by the Simon Fraser University Student Astronomy Club, the Fraser Valley Astronomers Society, Canadian Telescope, and Space Launch Canada.

If you are reading this while at Astronomy Day, take a look around you: all these people are here to experience the cosmos too! Talk to them! That person next to you might have never lost touch with their "inner" astronomer, with years of knowledge and experience to share with you; or they might have recently "rediscovered" the urge to know the cosmos, and are filled with a fresh wonderment that is sure to inspire you; or perhaps they are just feeling the first stirrings of their "inner" astronomer since they were a kid, and a little conversation with you might help to reawaken their urge (and yours?) to know the cosmos. But the most rewarding conversations to have on Astronomy Day are with the next generation of astronomers: encourage their sense of wonderment at the cosmos, and embolden them to ask more questions!

While you enjoy Astronomy Day, I hope that you will also keep this

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SCHEDULE OF EVENTS

ACTIVITIES (Noon – 6:00):

- Children's crafts and activities
- Educational videos and displays
- Solar observing (weather permitting)
- Merchandise
- Refreshments

TALKS:

- | | | | |
|--------------|---|-------------|---------------------------------------|
| 12:30 | Howard Trottier – The Scale of the Universe | 3:00 | Ron Jerome – Early Observatories |
| 1:00 | Mark Eburne – When Light Becomes Pollution | 3:30 | Harvey Dueck – Stars: Size Matters |
| 1:30 | Ted Stroman – The Apollo Missions | 4:00 | Rohit Grover – The Phases of the Moon |
| 2:00 | Scott McGillivray – A Brief History of Space Flight | 4:30 | Rohit Grover – The Sun |
| 2:30 | Scott McGillivray – Animals in Space | 5:00 | Jason Rickerby – Astrophotography |

RAFFLE – \$2/ticket:

- | | |
|---|--|
| 1st PRIZE: 8" SkyWatcher Dobson Telescope – \$275 Value | 4th PRIZE: NRC Astronomy survival pack 2 – \$100 Value |
| 2nd PRIZE: NRC Astronomy survival pack 1 – \$135 Value | 5th PRIZE: Celestron Outland-X 10x42 Binoculars – \$60 Value |
| 3rd PRIZE: Acuter 8x42 Binoculars – \$105 Value | 6th PRIZE: NRC Astronomy survival pack 3 – \$55 Value |

Draw takes place at 6:00

TABLES:

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| 1 Welcome tent | 12 Jim Bernath – Interactive Science Display |
| 2 Video tent | 13 Ted Stroman – Apollo Missions Display |
| 3 Light Pollution Abatement | 14 Children's Craft #2 |
| 4 Speaker tent | 15 Vancouver Telescope |
| 5 Fraser Valley Astronomy | 16 Children's Activity #3 |
| 6 National Research Council | 17 Display – The Sun and Solar scopes |
| 7 SFU Astronomy | 18 Canadian Telescope |
| 8 Display – Gaseous Planets | 19 Display – Terrestrial Planets |
| 9 Children's Craft #1 | 20 SFU Observatory |
| 10 Raffle and RASC Merchandise/Membership | 21 Volunteer table/trailer |
| 11 Space Launch Canada | |

NIGHT SKY OBSERVING will take place beginning after dusk (weather permitting)



The Earth and Moon shown to scale. At 385 000 km distance, the Moon is very far away, indeed!

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background. What were these wandering stars that the Greeks named “planets?” Astrologers of the time gave them mysterious powers and thought that they could affect people’s lives here on earth. There were five of these wandering stars and the Ancients gave them names. The Greek names have carried down through the ages and they are, working outward from the Sun: Mercury, Venus, Mars, Jupiter, and Saturn.

All of these are visible, even from my light-polluted skies. Mercury is the most difficult but, when it is favourably placed, it can be seen just before sunset or sunrise. All of these planets are visible without any optical aid whatsoever. So to answer the question from the first paragraph—is it necessary to have that latest, greatest telescope?—no, not at all. With your own two eyes, many things are visible if you just look up.

So let’s start with what we can see without optical aid and progress to more powerful optics and I will try to explain what you are seeing and some of the history and facts as they are now known about the stars and other objects that one can see in the night sky.

The first object that everyone wants to see and can recognize is the Moon. It has been looked at by more humans than anything else in the sky. With your naked eye, you can see the changing of the phases of the Moon as it progresses from New Moon, to First Quarter, to Full Moon to Third Quarter. Some very large surface structures are visible, such as the mare which (before telescopes) were thought to be oceans. Now let’s move

up to a pair of binoculars—how big, how powerful? Does not matter; whatever you have—even a pair of opera glasses will show the Moon better than Galileo was able to see it in the first telescope. Galileo would have had somewhat more magnification but not much. His telescopes were approximately 20 to 30 times magnification. Most binoculars are in the 5 to 15 times magnification, however even the cheapest binoculars have better optics than his primitive telescope.

So what will you see? Large craters will now show up and the mare will not look like oceans but will have detail and might even show craters. A telescope will show mountains and very small craters, ripples on the surface and amazing detail that changes with the angle of the Sun. The Moon can provide lots of things to see and some observers get so enthralled with the Moon they do not want to look at anything else.

From ancient times, we have always wanted to know how far away the things we see in the sky are. The Greeks managed to determine the distance to the moon using basic geometry to remarkable precision. Their measurements were within about 5–10% of what we know it to be today, about 385,000 km. If you want more detail on how the Greeks did this, see: <http://galileoandeinstein.physics.virginia.edu/lectures/gkastr1.html>

This naturally brings up the question of how far are the stars? The Ancients knew they were a long way away but did not know how to measure this distance. They tried using parallax (also known as triangula-

tion) but the problem was they could not get a long enough base to the triangle to get accurate measurements. This changed when it was accepted that the Earth was not the centre of the universe but went around the Sun. They reasoned that they could use the Earth’s orbit as a the base of the triangle. This is still the basis of most of our measurements to this day. With this method, we are now able to determine the distance of nearby stars to high accuracy.

Once they were able to measure these distances, the calculations revealed mind-blowing numbers, numbers so large one has a difficult time comprehending them. In the time of the Greeks, the most common means of transportation was walking! Can you imagine how far 385,000 km was to them! This is still a problem today and astronomy is filled with mind-blowing numbers that are only getting bigger. So we needed to come up with ways to bring these numbers down to something we can comprehend. Astronomers and physicists use the term “parsec.” This is derived from geometry and works very well for astronomers but not so much for the rest of us. The measure that is commonly used is the “light year.” This is not time but the distance that light travels in one year—a very, very large number. Are you ready for this? A light year is about 10 TRILLION kilometres—and this is just the base number! The nearest star, our Sun, is 9 light minutes away or 150,000,000 kilometres. This has been defined as the “astronomical unit” (AU), the base of the triangle to measure dis-

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About RASC

The Vancouver Centre, RASC meets at 7:30 PM in the auditorium of the H.R. MacMillan Space Centre at 1100 Chestnut St., Vancouver, on the second Thursday of every month. Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently \$73.00 per year (\$41.00 for persons under 21 years of age) and can be obtained by writing to the Treasurer at the address above. Annual membership includes the invaluable *Observer's Handbook*, six issues of the RASC Journal and *SkyNews*, 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.

LIBRARY

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

RASC-VC on the Internet

<http://rasc-vancouver/> or
<http://www.rasc.ca/vancouver>

Details of upcoming meetings and events can be found at our Meetup group at:

<http://astronomy.meetup.com/131/>

H.R. MACMILLAN SPACE CENTRE

The H.R. MacMillan Space Centre Society is a non-profit organization operating the H.R. MacMillan Space Centre and the Gordon M. Southam Observatory. Annual membership (\$30 individual; \$80 family) includes newsletter, discounts on Space Camps, birthday parties, lectures, Museum of Vancouver admission, plus free admission to the Space Centre. Admission includes: multi-media Planetarium productions, interactive demonstrations and hands-on exhibits. For membership, contact Gayle Seaman 604-738-7827 (ext 221) or star@spacecentre.ca

<http://www.spacecentre.ca>

MEMBERSHIP HAS ITS PRIVILEGES!

Membership in the Vancouver Centre entitles you to the use of our telescope loan program. This program gives prospective telescope owners a chance to use an example of the telescope of your dreams or borrow a telescope for the family vacation.

The Vancouver Centre is one of 28 chapters of the Royal Astronomical Society of Canada and membership in our centre brings benefits from the our national body including: The *Observer's Handbook*, regarded by many as the most sought after annual astronomical publications in the world, subscriptions to the National Newsletter and *SkyNews*; Canada's national astronomical magazine. Annual Meetings of the society are held in different cities and are opportunities for Canadian amateur and professional astronomers to share experiences, observing tips

and to exchange ideas on astronomy in general.

Aside from the regular meetings of the Centre, where world-class astronomy speakers and knowledgeable amateurs add to our understanding of the universe, there are monthly 'star parties'—places where we go to observe the night sky. Of course Vancouver suffers from sky glow, but we've found a place near the Boundary Bay Airport that is relatively dark. The Centre owns an observatory in the forests north of Haney and it has an association with an owner of a remotely operated telescope in New Mexico. Members can train to use either of these telescopes for photographing the thousands of galaxies, nebulae and other objects in the night sky. For really dark skies and camaraderie, there are two major star parties in BC: the Merritt Star Quest, held near Merritt, and The Mount Kobau Star Party, held on Mt. Kobau, just west of Osoyoos. The Vancouver Centre also has outreach programs such as today's International Astronomy Day where we set up our telescopes, or hold a 'meteor watch' in urban locations to show 'the locals' what's up. The Centre also has an association with the H.R. MacMillan Space Centre that affords us opportunities to use the Gordon Southam Observatory telescope and other instruments the Space Centre owns. When we do sit down for a meeting, they are a wonderful mix of professional and amateur astronomy content. Being close to a number of institutes of higher learning, we are able to draw from a huge number of professionals at the cutting edge of their fields. The 'amateur' content is a mix of 'fact and fantasy': business and observing.

A definition of whether you consider an event a success or not often depends upon your original expectations. Fortunately, with "Sidewalk Astronomy," the bar can be set quite low in regards to "seeing." I have found that The Weather Network's concept of "clear" and an astronomer's concept of "clear" differ by a magnitude or two. To the average sun worshipper, Friday, April 8th was a pretty good day. For most astronomers it was a crappy day. I say most because, as I previously stated, a sidewalk astronomer starts with the bar set quite a bit lower. In fact, any day or night you can show the public anything is a success. That Friday was such a day.

I took my equipment, as well as RASC-Vancouver's solar telescope, to the Save-On-Foods in West Gate Mall, located in west Maple Ridge, in hopes of being able to do some sidewalk astronomy for the public. The store manager, Jim Shaw, was very kind to allow me to set up right near the store entrance next to the buggy storage. This was a very good location not only for the volume of traffic but also because people had to slow down a little, which gave them a chance to notice me standing there. I didn't have to resort to tripping people to get their attention. Some people do not like that technique.

I was all set up to view the Sun by 12 noon, which worked out well. The store faces west so the sun does not come out from behind the storefront until shortly after noon. I only had to wait about 10 minutes before I could start viewing. I used the time to set up

my card table and lay out some star wheels and pamphlets.

As I mentioned in my preamble, the seeing was not very good. Fortunately, the sun is pretty easy to see even through a hazy sky. I was able to make out some nice prominences around the 6 o'clock position and lots



of smaller ones the rest of the way around the perimeter. Not too bad a show for the public.

As soon as I finished setting up, people were already waiting to see our closest star. I had a busy afternoon trying my best to answer people's questions about the sun, the telescope and RASC. Some of the public spent a good amount of time really taking in the view. I could tell some were very fascinated with what they were seeing with their own eyes and in awe of the idea of what they were observing.

Quite a few times during the day, I had people that came out of the store, looked through the telescope, and asked me how long I was going to be at that location. I told them

I would be staying as long as there was enough of a crowd and as long as the sky remained clear enough to see something. They told me they were glad because they planned to return with other family members so they could have a look for themselves. This led to several gatherings of whole families spending time with me at the telescope, taking turns and discussing what they had seen. When interest was expressed by parents about programs in astronomy, I promoted our website as a place to find out more of what we have to offer as well as SFU's StarryNights program that our President, Howard Trotter, provides. I think Howard will be getting more enquires in the near future.

I also had the usual enquiries about astrology. I gave my answers firmly but politely. I had a fairly lengthy discussion with a particular gentleman about astrology. It soon became obvious to him that he wasn't going to get me to drink the kool-aid, and we parted company with a handshake and a smile.

I kept the telescope trained on the Sun all afternoon, even as the Sun passed behind a tree. Eventually, the Sun got down into the muck on the western horizon so I had to switch to my 6" (150mm) Maksutov in preparation for the coming darkness. I aimed it at the crescent moon, barely visible through the hazy blue sky. Fortunately, the atmosphere was putting on a show of its own that afternoon. The sunlight was refracting into some of the most beautiful light shows I have witnessed in some time.

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in mind: RASC Vancouver's many activities, including this one, are only possible thanks to the generosity of our members, and to the proceeds from astounding bequests by two donors: Paul Sykes, and Martha Ellen Pearse.

Paul Skyes was a UBC physics professor and RASC Vancouver member who made a bequest that we have used in part to establish an annual memorial lecture in his name. We know little of Martha Ellen Pearse; her connection to RASC Vancouver remains a mystery. We have used a portion of her bequest to establish an award in her name for

the annual science fair competition in British Columbia. Proceeds from investments of the Paul Sykes and Martha Ellen Pearse legacy funds also allow us to fulfill our mandate to engage the public in astronomy in many other forms, to an extent that is truly remarkable.

RASC Vancouver has also been fortunate to receive other donations of funds, sometimes anonymously, as well as astronomy equipment and library materials. Where possible, the equipment is incorporated into our telescope loaner program, to help make access to this equipment possible, particularly for new members.

As a registered charity, we are able to provide donors with tax receipts. Donations can be made in person, by mail, or by using CanadaHelps.org or the RASC National Office. Funds can be designated for specific projects, such as our observatory or for other purposes. We are grateful for all the support we have received and thank all of those who have contributed in the past.

So here's to a great Astronomy Day, and may you never lose touch with your "inner" astronomer! ✨

Dr. Howard Trotter
President, RASC Vancouver
Professor of Physics, SFU

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tances to stars. The next nearest star, Alpha Centauri, is 4.37 light years away—wow, and that is the closest star. This star is not visible to those of us living in the Northern Hemisphere; you have to travel south of the equator to see this star. The nearest star visible to us in the Northern Hemisphere is Barnard's Star, about 6 light years away. However, it is very faint and difficult to see.

So if you cannot easily see the nearest star to us, what and how far can you see? That depends on how bright it is. Very bright objects are

visible farther away. So what is the most distant object that you can see unaided? That is generally conceded to be the Andromeda Galaxy at 2.5 million light years away. That means that the light you see tonight looking at Andromeda is 2.5 million years old! That light left Andromeda for Earth long before human civilization existed. Difficult to comprehend, right? Something that far away can be seen without a telescope but the nearest star requires a telescope! The difference in brightness is equally hard to comprehend.

If, as we hope, the weather allows

for some observing on Astronomy Day, please come to our telescopes and see for yourselves. Ask as many questions as you want and we will try to answer them to the best of our knowledge. Also feel free to come to our club, The Royal Astronomical Society of Canada (better known as the RASC) on the second Tuesday of the month at the H. R. MacMillan Space Centre where we have talks by various astronomers and astrophysicists and amateur astronomers. The meetings are open to the public without charge. I hope to see you there soon. ✨

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It kept everyone looking up while we waited for darkness.

It took until about an hour after sunset before there was enough contrast to see the lunar craters with any sort of clarity. Fortunately, it was enough to give quite a few people their "Galileo moment." One young lady let out a cry of "Holy S**t"

which brought a few chuckles from the surrounding crowd. Most met the sight with ooohs and aaahs. This continued on until close to 9:30 when the crowds finally tapered off enough to allow me to pack up and head home for supper and a pot of coffee.

I also had a fair number of the Save-On staff drop by for a look during their breaks. Jim Shaw dropped

by a few times to make sure I was getting along OK, which was much appreciated. Also, a very nice lady brought out a sample drink of Sun-Rype fruit juice for me, which was delicious and much appreciated. A heartfelt thanks to the management and staff of the store for allowing me to bring the marvels of the sky to so many of their customers. ✨

Proud To Serve Vancouver's Astronomical Community



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