

# NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC  
VOLUME 2012 SPECIAL ISSUE ASTRONOMY DAY 2012



## Free Lectures in the Lower Level Auditorium

**H.R. MacMillan Space Centre**

<b>12:00</b>	Howard Trottier	<b>Do-it-Yourself Expanding Universe</b>
<b>12:30</b>	Scott McGillivray	<b>Satellite Sagas</b>
<b>1:00</b>	Mark Eburne	<b>Light: Black to White and Colours Between</b>
<b>1:30</b>	Rohit Grover	<b>Astronomy Without Telescopes</b>
<b>2:00</b>	Ted Stroman	<b>The Apollo Missions</b>
<b>2:30</b>	Ciara Morgan-Feir	<b>Solar Eclipses and the Transit of Venus on June 5</b>
<b>3:00</b>	Suzanna Nagy	<b>Mars and the Death of Spirit</b>
<b>3:30</b>	Harvey Dueck	<b>Hot Stuff: What to Wear as You Cruise the Universe</b>

## Evening Lecture at SFU

**Burnaby Campus, Room C9001, south concourse of the Academic Quadrangle**

<b>8:00</b>	John Nemy	<b>“Island In The Stars,” a tour the night sky from the Milky Way to the edge of the universe. Followed by “The Stargazers,” a visual and musical presentation of the best of amateur astronomy today.</b>
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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.

# Activities and Displays by Location

## H.R. MacMillan Space Centre

### Main Level (no admission required)

Lobby	Craft – Rays of the Sun
Lobby	Jim Bernath – Physics/Astronomy interactive display
Lobby	Book sale/give-away
Gallery entrance	Vancouver Telescope

### Main Level (with admission to Space Centre)

Cosmic Courtyard	Craft – Moon mobile
Cosmic Courtyard	Ted Stroman – The Apollo missions display

### Lower Level (no admission required)

Auditorium	Lecture series (see page 1 for schedule)
Auditorium area	Light pollution display
Auditorium area	RASC membership and astronomy give-aways
Auditorium area	Children's activity table

### Upper Level (no admission required)

Hubble Gallery	Solar system display
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### Outside (no admission required)

GMS Observatory	Solar telescopes (weather permitting)
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## Simon Fraser University

C9001	John Nemy lecture
Lawn East of AQ	9pm: Star party (weather permitting)

## 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 constella-

tions.

Constellations were patterns of stars that the ancient people saw many things in, such as animals, heros, 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

continued on page 5

# President's Message

Welcome to International Astronomy Day 2012 – RASC Vancouver edition!

If you are new to RASC Vancouver, that's RASC, as in the Royal Astronomical Society of Canada, a national organization of more than 4,000 astronomy enthusiasts; and Vancouver, as in one of the largest of the RASC's 29 local centres in cities and towns from coast to coast.

If you are new to International Astronomy Day, this is a worldwide celebration of all things astronomical, traditionally held between mid-April and mid-May, on the Saturday closest to a first-quarter Moon. Astronomy Day started in California in 1973, and has since grown enormously, with hundreds of astronomy clubs, observatories, planetariums and other like-minded

organizations participating.

This year, the RASC Vancouver is pulling out all the stops to mount an ambitious two-part program of Astronomy Day events, in the afternoon and in the evening, at two locations, and in concert with four partners! From noon-4PM we are at the HR MacMillan Space Centre, which is kindly providing us with logistical support for our afternoon program (all of our activities are free of charge). The Space Centre also has a wide range of activities to offer (by admission). Then we take a break and regroup at 8PM at the Simon Fraser University campus in Burnaby. Also joining us at the Space Centre is our long-time sponsor the Vancouver Telescope Centre, and in the evening we will have some door prizes courtesy of our newest

sponsor, Canadian Telescopes.

If you've arrived at the Space Centre, we're got a lot for you to do! Our goal is for you to directly experience the cosmos in a multitude of fashions, and to that end, we've set up solar telescopes equipped with special filters (and appropriate safeguards) that can provide dazzling displays of solar prominences and other solar activity (weather permitting!), along with hands-on activities for kids of all ages, informative displays, thought-provoking lectures, and a book sale, all running in parallel, outdoors and inside the Space Centre. And be sure to take a close look at the people around you: they are all here to experience the cosmos too! And one of the most enjoyable parts of

continued on page 4

## About RASC

The RASC Vancouver Centre meets at 7:30 PM on the second Thursday of every month at various locations in Metro Vancouver. 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 on page 5.

## 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.

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 room P8445.2 of the Physics wing of the Shrum Science Centre at SFU. Please contact a council member for directions.

## On the Internet

<http://rasc-vancouver.com> or  
<http://www.rasc.ca/vancouver>  
<http://astronomy.meetup.com/131/>

 @RASCvancouver

## Mailing Address

RASC Vancouver Centre  
PO Box 19115  
2302 West 4th Ave.  
Vancouver, B.C.  
V6K 4R8

continued from page 3

Astronomy Day is the opportunity to socialize with kindred spirits!

After you head home for dinner, I hope you will rejoin us at 8PM at SFU for a lecture by an engaging speaker, John Nemy, who has a two-part presentation, starting with a talk entitled *Island In The Stars*, giving us a tour of the night sky from the Milky Way to the edge of the universe! John will follow that with *The Stargazers*, a visual and musical presentation of the best of amateur astronomy today! Prepare to be entertained and inspired!

And finally, at 9PM, we will move you outdoors and into deep space, with a star party on the SFU campus (weather permitting—as always!). We will have a forest of telescopes

set up to give you views of many celestial treasures, which this year include Mars and Saturn, and “deep sky” beauties such as glittering star clusters and galaxies that are at mind-boggling remove in both time and space.

So why are we doing all this? For the same reason that you have joined us: 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. While for some, the urge to know the cosmos fades away

over time, if you have joined us for International Astronomy Day, then that passion continues to burn in you, and we hope that you will enjoy experiencing the cosmos with RASC Vancouver.

If you do enjoy Astronomy Day, I hope that you will keep this in mind: RASC Vancouver activities don't organize or fund themselves! We count on the support of our members, and I appeal to you to take the plunge and join us—together, we can do so much more of what we love!

On behalf of RASC Vancouver I would like to acknowledge the support that we have derived from the proceeds of two astounding bequests: one made by Paul Sykes,

continued on page 7

## Why Astronomy Outreach is Important

As an amateur astronomer, I have come a long way from just being an economics student and taking an astronomy course. During the past two years I have noticed a trend among the younger generation, with regards to their interest in space, etc. Why this is, I am not sure... Maybe because of the 2012 hoax everyone is more interested, or maybe because of the spectacular cycle the Sun is going through and producing wonders like the Aurora Borealis... When I first started volunteering with SFU and RASC, I was not aware of the tasks and how they are performed. However, as time went on I started to pick up on things. When it comes to outreach in any area, the basic goal is to educate the audience about the right facts. The right facts are essential for any growing generation; this not only

educates them but clears any sort of confusion which might result from sources which are literally wrong.

The Royal Astronomical Society of Canada (Vancouver Centre) is ensuring this. Every month, the RASC offers interesting and educational lectures which help children and sometimes even the older audience. Above all, however, the best is to actually talk to the members of the RASC and get the facts from them. As time goes on, more events will be organized by the RASC and I humbly request the reader to come and attend them.

Being an astronomer means you run into trouble with your equipment. Even though these “glitches” are small, they may have dramatic effects on your telescope, for example. A similar thing happened to me when

I was observing the star Betelgeuse and I instantly knew my collimation was off. I did own a collimator but it required two people since it didn't have a laser. After going on eBay, Amazon etc., I finally decided to visit one of our local telescope shops (see their ads on the back pages of this newsletter). After a quick introduction, the proprietor instantly knew what I needed. What amazed me the most was that the moment I had my collimator, he actually helped me and showed me how to work it. He gave me instructions, which are so essential when collimation is required. If any of the readers are interesting in purchasing a telescope, binoculars or even a book on Astronomy, I urge you to visit our local stores. With the right help, you will enjoy your hobby even more. ✨

by Rohit Grover

continued from page 2

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 late April 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 background. What were these wandering stars that the Greeks named “planets?” Astrolo-

gers 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

continued on page 6

## Membership has its Privileges!

New members, did you know? The Vancouver Centre has 8 telescopes available for loan free of charge! We have telescopes ranging from 60mm to 10” diameter. For more information see the Director of Telescopes after the members meeting. The loaner period is for one month, to be returned after the next meeting. Telescopes are not allowed to circulate outside of these meetings. You

can now reserve two different telescopes per year and use what is left at the end of the meeting anytime.

Your greatest opportunity as a member of the RASC is to take advantage of the company of other enthusiasts to increase your knowledge, enjoyment and skill in astronomy.

The best thing you can do to gain the most from your membership is to get ac-

tive! Take in the club meetings; engage other members with questions; come out to observing sessions (also known as “star parties”), and, by all means, volunteer to take part in our many public events.

For the usual observing sites and times, visit our website at <http://rasc-vancouver.com/observing-sites/> or contact the Observing Chair at [observing.rascvancouver@gmail.com](mailto:observing.rascvancouver@gmail.com).

# Upcoming Events

## April

28 – International Astronomy Day

## June

5 – Transit of Venus

## August

11 - 19 – Mt. Kobau Star Party

## September

8 - 15 – Merritt Star Quest

22 – International Observe the Moon Day

## December

8 – AGM

continued from page 5  
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://galileoandstein.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 triangulation) 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, num-

bers 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), half the base of the triangle to measure distances 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. How-

ever, 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 Thursday of the month where we have talks by various astronomers and astrophysicists and amateur astronomers. See our website or Meetup (addresses on page 3) for meeting locations. The meetings are open to the public without charge. I hope to see you there soon. ✨

continued from page 4  
and another by 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 initially knew little about Martha Ellen Pearse, and her connection to RASC Vancouver was a mystery. Recently however our librarian, William Fearon, discovered that her husband was the astrophysicist Dr. Joseph Algonon Pearse, Director of the Dominion Astrophysical Observatory from 1940-1951, and who for a time was also an Honorary President of RASC Vancouver. We have used a portion of the Pearse 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. Please look for full contact information elsewhere in this edition of NOVA.

So here's to a great Astronomy Day, and to experiencing more of the cosmos! ★

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



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