NOVA
NEWSLETTER OF THE VANCOUVER CENTRE RASC
VOLUME 2016 ISSUE 4 JULY AUGUST 2016

Canada Day in Maple Ridge 2016

by Leigh Cummings

For the third year in a row, RASC – Vancouver Centre was invited to take part in the Canada Day celebrations held in Maple Ridge's Memorial Peace Park. In the two years previous, the sky had been clear and the air hot, however this year our weather luck ran out. It started out with a tiny sprinkle while we were setting up our tent and tables but then settled into an overcast but mainly dry day. The one advantage of the cloudy cooler weather was that the crowds were bigger. The disadvantage for us was obvious.

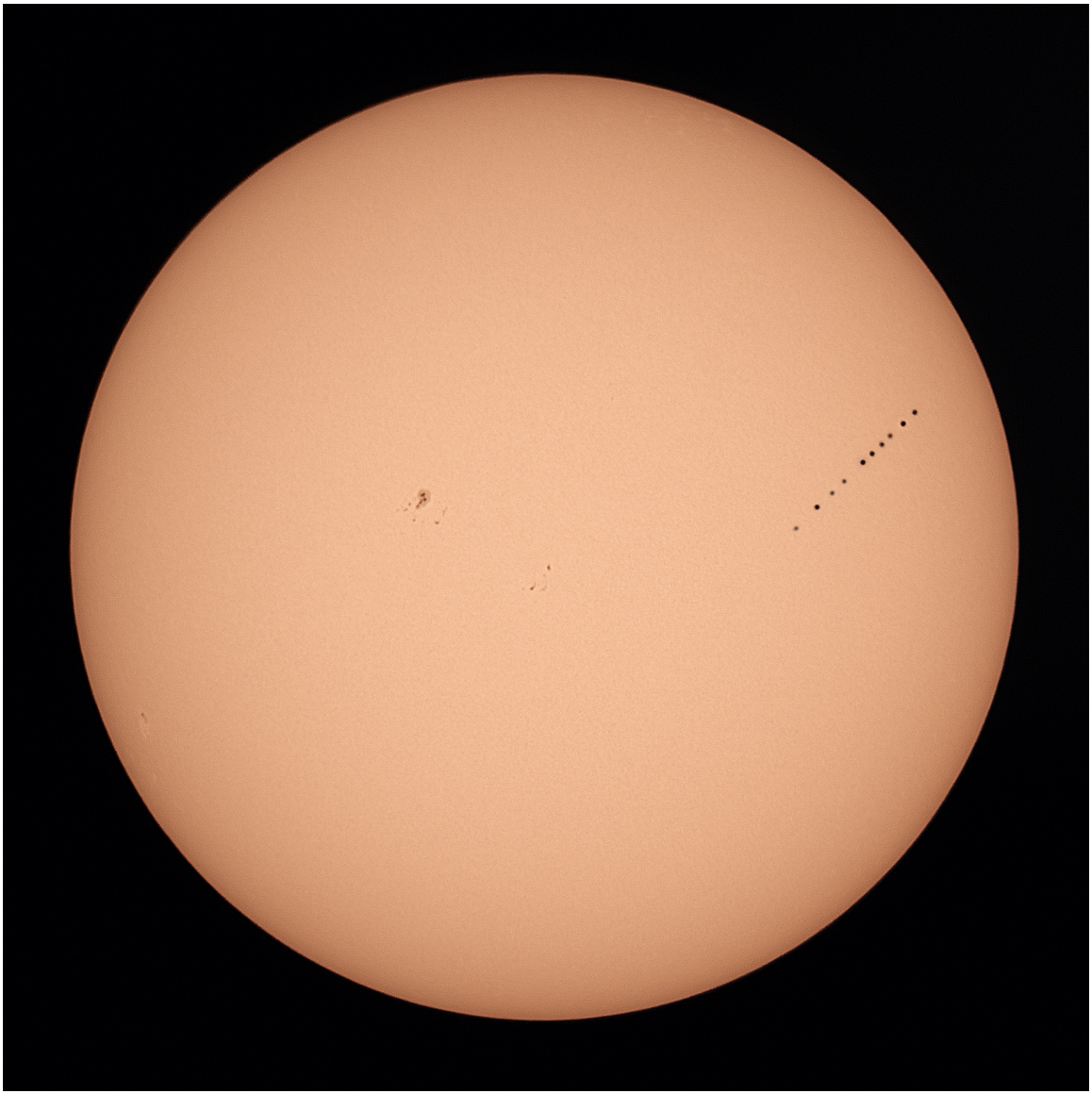
As usual we had a good turnout of volunteers despite the weather. Terry McComas, Karl Miller, William Fearon, Kyle Dally and I brought telescopes while we had Titania Yan, Suzanna Nagy, Bruce Hutchison and Jennifer Kirkey at our tables and taking turns relieving those at telescopes. William was the only one that got any eye time on the Sun, if you can call seeing a fuzzy glow "observing." Terry put his telescope to use viewing the wind vane on top of the bandstand. It gave the kids something to look at besides us. Titania and Suzanna were very busy handing out brochures and star wheels and maybe a few sundials. Jennifer spent a fair amount of time with the Sun Spotter that we had set up on a table. Karl, Kyle and I kept busy chatting with anyone who took an interest in our telescopes and displays. I thank all of you for putting in a full day under a grey sky. ✸

JULY 14 **SFU**
Dr. Stanley Greenspoon of RASC Vancouver on exoplanets and extraterrestrial life, followed by a telescope info session and sale. SHW10081 SFU

NO MEETING IN AUGUST

SEPTEMBER 8 **SFU**
Michelle Kunimoto of UBC on her recent discovery of 4 new exoplanets. Room TBA
SFU

Members' Gallery



Mercury Transit by Gordon Farrell

A stack of images of the May 9th transit of Mercury, showing its progress from 8:37am to 10:00am. The size and sharpness of Mercury varies due to the varying sky conditions (there were clouds passing through) and accompanying changes in exposure time. Shot from Kitsilano using a Canon 40D at prime focus on a Celestron G5 with a white-light glass filter. Final image created from 701 images processed in Registax and cleaned up in Photoshop.

President's Message

by Suzanna Nagy

Welcome to Summer in Metro Vancouver. Due to the long days and even longer twilights, your RASC Vancouver Centre is taking a short break from organizing evening public observing events. However, this does not mean that your Council isn't working as hard as ever behind the scenes. We have two projects on the go right now that will directly impact our membership in the coming months.

The first project is the design and installation of custom shelving to house our library which has been sitting in storage for the last four years. With approval from SFU, custom shelving is being installed in the Trottier Observatory. Vancouver Centre's library of books, DVDs, and star maps will finally be able to be accessed by our membership again. The custom shelving is being created by Master Carpenter, Rob Tymrick of Why Knot Wood Creations. The shelving has been custom designed to fit into the curvature of the round Observatory with locking doors to ensure the security of our collection. Borrowing from the library will commence as of our September meeting.

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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 $78.00 per year ($45.00 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.

2015 Vancouver Centre Officers

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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

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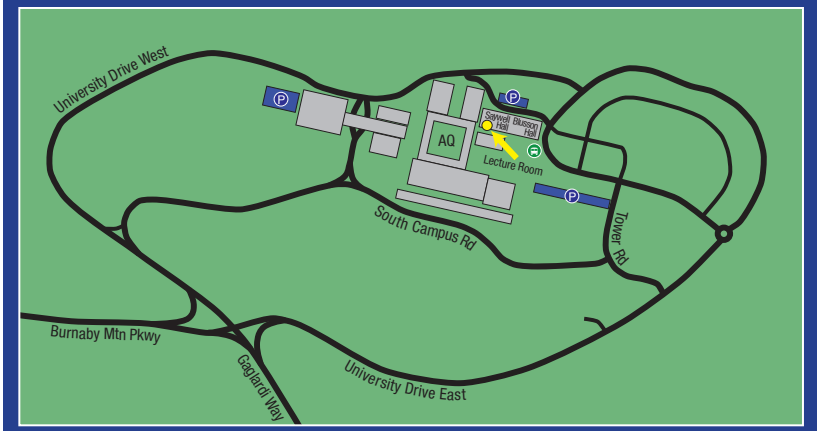
Map to Meeting Site



SFU

Our June and July meetings are in room SWH 10081 of Saywell Hall, indicated by the arrow on the map.

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

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From then on, after every meeting, members of the RASC Vancouver Centre can enter the Observatory and speak with our librarian, Mr. William Fearon, as to what is available for loan. Access to our library is a benefit of membership.

The second project is a complete overhaul of our Telescope Loaner Program. Currently, the telescopes we have are a mix of numerous equipment donations from the past decade or more. With age and use, many of the telescopes in our Loaner Program no longer work properly or have become damaged. Council has expressed concerns that loaning out a telescope in poor repair would only result in a new enthusiast becoming frustrated and disappointed with the hobby. Your Telescope Director, Mr. Michael Levy, has spent many hours of his personal time assessing what should be kept, what needs to be scrapped, and what can be sold to someone with an interest in tackling a telescope repair project. The funds raised from the sale will be used to purchase new telescopes of a variety of sizes and styles, i.e. Dobsonians, refractors, and simple GO-TOs as well as eyepieces to match. Look for further announcements in the coming months. Access to our Telescope Loaner Program is a benefit of membership.

As always, a heartfelt thank you to all members of Council that work so hard on their own time to ensure your experience as a member of Vancouver Centre is fulfilling and fun. ✸

Clear skies,
Suzanna Nagy
President

Deep Sky Star Party hosted by RASC Sunshine Coast

The Sunshine Coast Centre of RASC has invited members of RASC Vancouver Centre to the Deep Sky Star Party they are hosting on the weekend of July 30/31, just after the new moon. Visiting RASC members can be billeted in town or camp on site at the SCC Observatory, located at Sechelt Airport.

Admission is by donation but pre-registration is required. To register, and for further information, including maps and directions, please contact the SCC President at cuhulain@telus.net. More information about the SCC Centre and their programs can be found at http://www.coast-astronomy.ca/ ✸

The Cow that Jumped over the Moon: Calcium in the Cosmos

by Bill Burnyeat

Moocow, moo, moo....moo..... moo. I reach over, open the window and pull the curtains up so I can look outside. A sizeable brown cow, ornamented with white feet and a pale head, is standing on the lawn, and trying to get my attention. It's the cow that jumped over the Moon.

Everyone has heard of Newton, Copernicus and Galileo, but the equally renowned cow that jumped over the Moon gets no space in the usual histories of astronomy. This cow is perpetually orbiting in questionable company, being associated with a cat and a fiddle and a dish that runs away with a spoon for unknown and possibly salacious purposes. This seems like a silly nursery rhyme and puts the scientifically minded off. The tendency of the educated is to become huffy. That's a shame, for the cow has much to teach us.

As you might expect, the astronomically-inclined cow is big on dairy products and is a particular fan of the chemical element calcium, which, as youngsters we were told, lurked spirit-like inside milk. This may be true for all I know, but I was prone to write off as uninteresting things I was told before the age of 20, or maybe it was 40; anyway, I tended to not give a lot of attention to the contents of my infant milk glass.

It turns out that I was a bit hasty in writing off calcium as the concern of dull and health-obsessed people. This alkaline earth metal plays quite an important role in our knowledge of astronomy; it turns up in unexpected places and helps us better understand the cosmos. Calcium was especially big in the early days of the spectrograph. The cow gets impatient at this point, urging me to get right into the physics without preamble but in case anyone feels they might be left behind, a little background to all this might serve.

Calcium is not a majority component of the universe—that role goes to hydrogen—yet calcium was one of the first elements identified in the spectrum. Joseph von Fraunhofer (1787-1826) noted dark lines in the solar spectrum, lines which at first were attributed to the glass itself, or maybe nature setting handy boundaries between hues, but eventually, when more care was taken, with better glass and a small slit supplying the light, it became clear that the solar spectrum was crossed by large numbers of dark stripes. Fraunhofer gave these lines letters of the alphabet and they were soon seen by others as a permanent feature of the sun beam. In the laboratory, an emission due to sodium, the D line, had attracted notice but progress was delayed by the presence of sodium as an impurity in samples thought to be sodium-free.

This lack of certainty in the chemical supply shows up as a critical turn in *The Strange Case of Dr. Jekyll and Mr. Hyde*. In the story, Jekyll obtains a "certain salt" as the last ingredient needed for the cocktail that changes himself into Hyde. Eventually, his supply runs low and he tries to obtain more but the new salt is somehow different.

"I drank it, and it was without efficiency... I am now persuaded that my first supply was impure, and that it was that unknown impurity which lent efficacy to the draught." (R.L. Stevenson, 1886).

The horrible result is that the superficially nice Jekyll is no longer able to change back from the ill-bred Mr. Hyde. Purity of supply was not the

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Membership has its Privileges!

New members, did you know? The Vancouver Centre has several telescopes available for loan free of charge! We have telescopes ranging from 60mm to 10" in 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 active! 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 or contact the Observing Chair at observing@rasc-vancouver.com.

Upcoming Events

July
23 – Solar event at Campbell Valley Regional Park in Langley (weather-permitting)
30 - 31 – RASC Sunshine Coast star party
30 - Aug 7 – Mt. Kobau Star Party

August
13 – Perseid meteor shower at Aldergrove Regional Park
20 – Starry Night as Deas Island Regional Park
27 - Sep 4 – Merritt Star Quest

December
8 – AGM

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only conundrum facing the early spectroscopic investigator. Since there was hardly any theory as to how atoms might behave at high temperatures (or any other temperature, really), the cause of the black lines remained enigmatic. Yet they were there and came to be given letters. The first step in science is often to develop a nomenclature, so that we can create a new field by drawing bounds by words about the newborn subject, channelling uncoordinated perceptions into defined topics.

In particular, two dark lines close together and in the purple part of the visible light came to be called H and K. These lines are the signature of singly-ionized calcium. The lines are the most prominent in the Sun even though calcium is a very rare ingredient in any astronomical body.

To make things a bit more clear, maybe we should define what calcium is and how it is detected. In high school classrooms, students are often set to make models of atoms by gluing Styrofoam balls together making an atomic nucleus and surrounding it by electrons represented by other balls held up by bent pipe cleaners representing the electron orbits. It encourages the notion that atoms are thus constituted; little globes flying about like little planets in orbit about their star.

It comes as a surprise to the model makers to learn that the people at university physics departments don't think of the atom in this way. What the atom is turns out to be a series of observations and experiments and these form relationships amongst themselves in which the bits of the model fall away. This was first noticed as long ago as the 1930s by Arthur Eddington but since his attempts to untangle the wheat from the chaff led to a discussion of "group theory," a branch of math that studies symmetries of various kinds; readers turned away just as they would later run hollering from the plays of Samuel Beckett and the novels of Robbe-Grillet. The classroom, is perennially under the sway of the timid and idea resistant, and so the Styrofoam remains. The atom escapes our ability to describe it in a cozy model based on analogies with our experience of macroscopic phenomenon.

The cow that jumped over the Moon is fond of pointing this out since human knowledge, so says the cow, is not nearly as well-founded as human expectations.

Where do these lines come from? To understand how the light shows the element we have to delve into quantum theory, just a bit. Consider a walker. This stroller goes along a flat road. Naturally, the walker puts one foot in front of the other to move forward. The steps might be all the same length or there might be small changes, as in avoiding a puddle the walker talks a long stride. Now the pedestrian has finished and comes home. The destination ends up a flight of stairs. Now, the situation is subtly different. Each step on a staircase is of the same rise. One can pace off one step or two, or, with a jump, three steps. But one cannot make one-and-a-half steps or risk have one's foot sitting suspended in the air, the preface to a nasty fall.

More than a century ago, it was realized that the world of the very small must operate like a stairway, in a series of very small and discrete steps. The world is not continuous at the smallest level. This is why the light given off by an ionized product releases light at a specific wavelength and in always the same way. This came to be called "quantum" behaviour from a Latin word meaning "how much" and so changes in the very small are always fixed in magnitude and thus when a photon of light is absorbed or emitted, it a is always at the same place in the spectrum.

Not all elements give clues to themselves readily. Much depends on the position on the periodic table of the elements. Elements like sodium, that have one electron in an outer orbit are able to lose this particle easily and form an ion, or an atom that has lost

one or more of its electrons. Calcium is also favoured by the geometry of its electron cloud. If it loses an electron it is no longer Ca, but (Ca II), the two sticks mean it is a singly-ionized atom. If two electrons are missing then its (Ca III). In an actual situation, differing proportions of each plus normal unexcited calcium can exist. The proportions are a function of, amongst other things, the temperature of the gas. Thus, we have a test for not only the composition of an astronomical object but also the temperature of the body.

This is just the start of the wealth that the spectrum provides. The pressure, temperature, speed of motion and distance of the body are all derived from the message in the beam spread out into little rainbows. Since all these variables interlock and confirm each other, the spectroscopists are people who really know what they are talking about. Without the spectrograph we would be confined to the visual appearance of things and astronomy would have made only baby steps rather than giant strides since the middle of the 19th Century.

For example, if a body is moving radially away from us, the placement of the H and K lines is shifted. The table shows that the amount is small for low speeds but rapidly picks up and is very noticeable for large speeds. The units are in nanometers.

Thus, for the calcium (Ca II) H and K lines:

Radial vel.	Ca K	Ca H
0 km/s	393.3	396.8
100 km/s	393.4	396.9
1000 km/s	394.6	398.1
10,000 km/s	406.4	410.0

The table shows that as speed increases, the lines migrate towards an increase in apparent wavelength. This is the so-called red shift, although for calcium the lines remain in the violet and blue but the point is they get more towards the red the faster the body is retreating.

Sometimes it is not motion but the lack of motion that can give clues about the cosmos. In 1904, Hartmann was examining the spectra of Mintaka, the bright, northernmost star of the trio that make Orion's belt. The lines in the calcium showed no motion unlike the other lines which underwent displacements due to the rotation of the star. It must be remembered that Mintaka is a giant star thousands of times more luminous than the Sun. For the backyard observer (I digress to insert a commercial for the small telescope user, even at the risk of the cow censoring my irrelevant digression), a ninth-magnitude star sits near bright Mintaka and the pair can easily be seen in a 2-inch refractor. The calcium remained uninvolved in Mintaka's mighty rotation. It could only mean the calcium was somewhere between the telescope and the star. It could not be in the Earth's atmosphere, so the calcium was in space somewhere between the Earth and the distant star. After this many other luminous stars were studied and the same stationary lines seen. Space is not empty but contains a thin gas; interstellar matter. Although tenuous, the huge distances between ourselves and the brightest stars allow the signature to build up and reveal the gas in the void. Calcium gave the clue.

The ease of finding calcium gave this element more status in astronomical literature than would be assigned today. In her astronomy articles for the *New York Evening Sun*, Isabel Martin Lewis (collected as *Splendors of the Sky* in 1920) has an article entitled "Calcium Gas in the Milky Way." The nova of 1918 in Aquilae had furnished the bright object against which the intermediate cloud of gas was seen as an accessory to the nova's spectrum. It was seen that in the case of very bright stars, the interstellar calcium shows itself much as a flashlight shows fog in its beam in a dark night. The calcium seemed to be everywhere and Ms. Lewis speculates on the purpose of calcium in the building of stars. She seems to imply a mysterious star-making feature in calcium just as calcium is a bone-building element in life, and she wonders at the connection. Today we would say she has this backwards. The stars precede the calcium, which is manufactured in their fiery furnaces.

The ease with which calcium can be detected led to its early identification as a paramount element of the cosmos. The interest came from a suggestion that the strength of the lines and the frequency with which they occur ought to be a measure of the proportions of the elements in the mix. On this measure, with the strong H and K lines of calcium, matched with the more than 2000 lines identified with iron, it seemed that the Sun might be composed mainly of these two elements.

On the next page is a portion of a table from *The Sun*, by Young, 1895, p87.

There are two things the table is meant to tell us. It seems the Sun must be similar to an iron-nickel meteor in composition. Also, the position of hy-

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drogen does not lend itself it indicating any special status. Hydrogen does not even occur in the second column until the 22nd place.

Elements in the Sun, arranged according to the number and intensity of their dark lines in the solar spectrum:

	Intensity	Number
1.	Calcium	Iron
2.	Iron	Nickel
3.	Hydrogen	Titanium
4.	Sodium	Manganese
5.	Nickel	Chromium
6.	Magnesium	Cobalt
7.	Cobalt	Carbon
8.	Silicon	Vanadium
9.	Aluminium	Zirconium
10.	Titanium	Cerium
11.	Chromium	Calcium
12.	Strontium	Neodymium

This table dovetailed well with the theory of the day which supposed that the solar system was made from a homogenous mix and that the earthly ratios of elements ought to be the case in the Sun and the planets. Only later, and after a protracted debate, was the relatively minor amounts of these elements recognized. The Sun is about 90% hydrogen and all the other members of the table make less than one per cent of the solar mix.

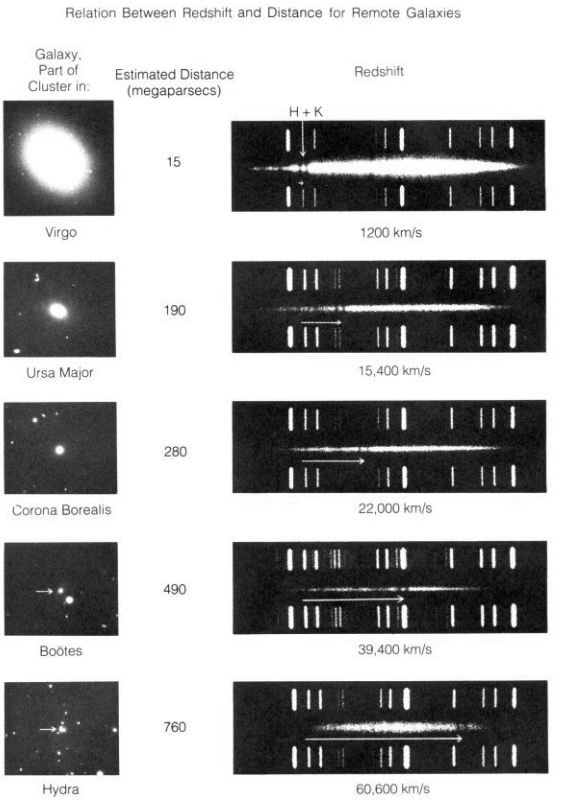
It's not only the flight of the lines that gives us fresh insights into the stars. Consider the elliptical galaxies. These aggregates of huge numbers of stars are amply set out with stars similar to the Sun, and therefore show the calcium lines. Here, things are different. Rather than sharp and well defined lines, these lines are broad and fuzzy. The stars in the galaxy are moving about with motions, but not just any value of their flight can be maintained. Let's suppose most stars are moving with speeds of between 100 km/s to 200 km/s. Since there are huge numbers of stars, each speed between this limit has representatives moving with that velocity. The result is a series of dark lines all superimposed close to each other and the line becomes a strip. Astronomers seek the average which allows them to calculate the mass of the galaxy. It's a neat trick and all a consequence of calcium in the cosmos.

Below is once again the calcium signature which gives the range of distant galaxies. The H and K lines are indicated by the top arrow pointing down. Then, as each successive object is more distant than the last, the arrow locating the (Ca II) is further and further towards the right side. The little thumbnail on the left shows the object and how it is tinier as the line moves right, which is just as we should expect with increasing distance.

I can see the cow that jumped over the Moon nodding in approval, which tells me I have a convincing argument in favour of the importance of his pet calcium.

The story of calcium is not often told because of imagined difficulty in the work of the spectral analysis. This the pet beef of the cow but, the complaint laid to rest, I can send this item to our editor free from worry that the cow will feel left out.

It's getting dark here at the farm and the cow that jumped over the Moon is wandering slowing towards the barn. I follow closely for, as clever as the cow is, opening and closing the barn door is beyond a cow's skill set. That's my job. Coming back, I notice in the twilight Jupiter coming out and the stars slowly revealing themselves, little points of light but containing the message brought from the atom, as small as it is, like a letter from the stars opened and read by those in the know about calcium in the cosmos. ✸



Mercury Transit

by Elena Popovici

On May 9, RASC Vancouver organized an outreach event for the Mercury transit. Four RASC Vancouver hosts (three council members and one volunteer) welcomed 170-200 people over four hours in the public plaza at 200 Granville St, Vancouver. We had three scopes: two with mylar filters, one with an H-alpha filter, one pair of binoculars with a mylar filter, and eclipse glasses. Several other council members stopped by at various times and provided backup support.

We set up right in front of the office tower in which *The Vancouver Sun* and *The Province* newspapers are located. Several reporters came down and interviewed us for two *Vancouver Sun* articles: one article with video and another article with photos.

Overall, we judge this event to be a success, with many "wow" moments and repeat customers. Some members of the public stopped by multiple times to see Mercury's progress. From our conversations with those present, many people had never even looked at the sun through eclipse glasses before, much less solar telescopes. ✸

http://vancouversun.com/news/local-news/rare-chance-to-see-planet-mercury-cross-paths-with-the-sun-early-monday

http://vancouversun.com/news/local-news/mercury-transit-of-the-sun-draws-vancouver-astronomy-fans

News from the Education Chairs

by Leigh Cummings

A science fair in late May, a Cub Scout camp in early June and a visit to a showcase evening for a Vancouver secondary school has kept us busy since my last report.

On the evening of Wednesday, May 25th, William Fearon, Suzanna Nagy, Bill Burnyeat and I attended the Pleasantside Elementary School Science Fair in Port Moody. This has now become an annual event for us. Bill set up his portable planetarium in the gymnasium and, as usual, it was a big hit. It is especially handy at an elementary school at this time of year as the children cannot stay up late enough to see a dark sky. We had come prepared for daytime viewing with a club solar scope which I set up on my HEQ5 mount. Unfortunately, the viewing time was shortened by the tall trees that cut off the horizon a bit earlier than desired. William was able to find Jupiter against a blue sky which I am sure excited everyone who took a look.

This year I decided to give a short presentation in the school library. It was fairly well attended considering all the distractions that tugged at the kids attention. One of these was our own Suzanna with the Oreo cookie Moon phase learning and eating experience set up just outside the library. Grey-haired old guy giving talk or young woman with free cookies? Which learning experience would appeal to the 10 year old in you? I did have some of the parents enjoy the quiet of the library along with the pretty pictures in my presentation, so not all was lost.

I did not get to see all of the science projects on display, however, I did get to see one of their contests. Kids were asked to design and build a two storey structure from two pages of newspaper and a fixed amount of tape. The challenge was that their creation would either support a given amount of weight or withstand a given amount of wind (supplied by hair dryer). It was amazing to see some of the designs the kids came up with that passed the test.

It was a great fun night for us as well as the kids. As usual, we were made to feel most welcome by the students, parents, staff and Tara Glaim, who invites us each year.

On Friday, June 3rd, Terry McComas attended a Cub Scout camp at Camp Coyote in Surrey. Terry had the same problem of trying to show the cubs the night sky before their bedtime. He arrived around 9pm and found the camp to be a challenging site. It has a small clearing surrounded by a 100-foot-tall 2nd-growth forest, which is ideal for a camp in the forest but not so good for viewing the night sky. Terry managed to find a spot where he could aim his telescope at Jupiter. Jupiter has turned out to be a regular observing subject for public events surrounding the solstice.

Terry entertained the ten or so boys, a couple of girls and three leaders with the story of Galileo and how he used Jupiter and its moons to back up Co-

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pernicus' thoughts on heliocentricity. Terry is a great story teller so I am certain he kept them enthralled with his telling of Galileo's discoveries and the impact it had on Galileo's life and that of the world view. As with Terry's usual modest ways, he merely told me he was able to keep them awake. I'm sure he did much more than that. My thanks to Terry for taking on this event solo.

On Wednesday, June 15th I attended a STEM (Science, Technology, Engineering and Math) Appreciation Event at Templeton Secondary School in Vancouver. We were invited by Physics teacher Mike Hengeveld and I was very happy to represent our council at their event.

The evening started with a series of TEDx (Technology, Entertainment and Design) (junior version) talks given by students on the STEM program. These talks were titled:

Our Irrational Fear of Failure, a talk by Jasmine Long explaining how our mistakes and failures are just as important as our successes towards the advancements in knowledge and technology.

The Curriculum, "Good Enough," a talk by Tyler Tran about the need for school curricula to evolve with our society. For our young people to flourish in our future world we need to adapt to the changes it presents.

Project Based Learning: Passivity is Passé! This talk was given by our own junior RASC member, Francesca Crema. Her topic explained the advantages of allowing the students to challenge themselves with a project, research the material, and develop the skills necessary to proceed with the project. She spoke eloquently about how this helps to prepare students for the challenges they will face in the future society which is rapidly developing today.

Cramming: A Look Into the Night Before was a talk given by Laura Ngo that was both humorous and insightful into our own human behaviour. How many times have I found myself rushing to reach a deadline that I knew for some time was coming. We all do it, but why? Laura gave a good illustration of how the STEM projects force them to learn time management in order to reach their goals. An excellent talk that struck home with me.

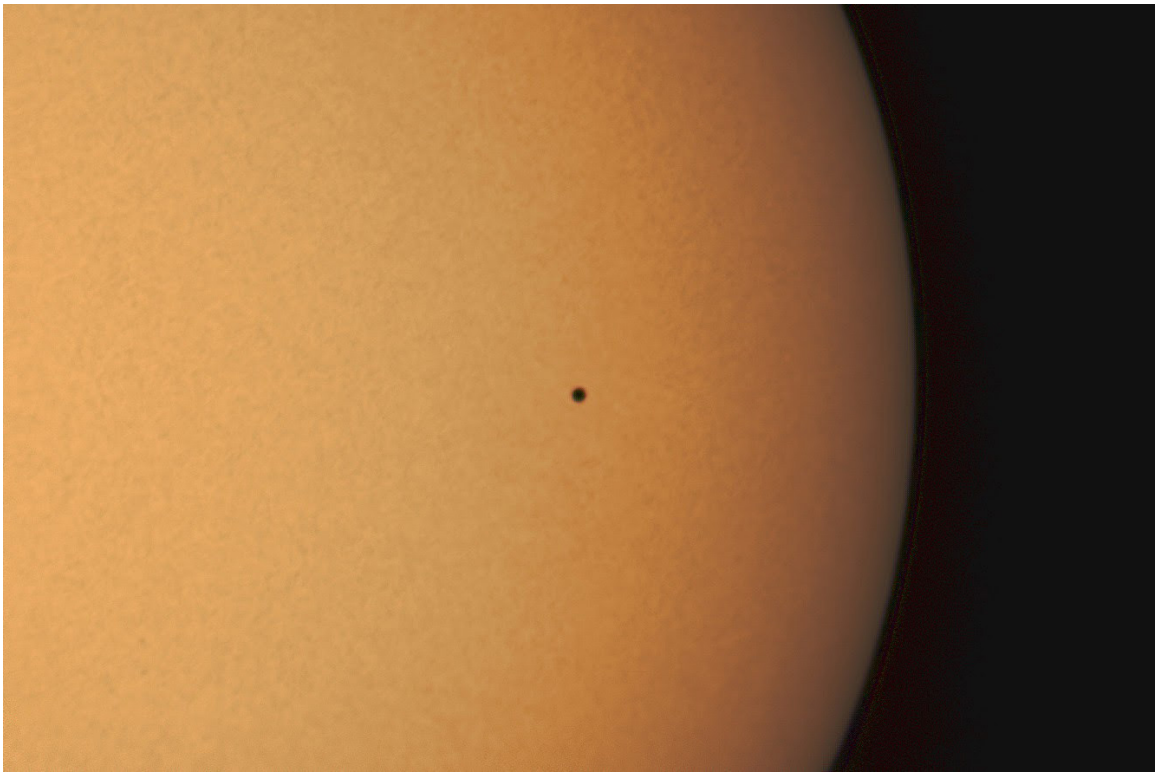
Cosmic Ray Detection in Project Based Learning. A fascinating overview of a project that would raise the eyebrows of many a science nerd. Natasha Roussopoulos and Philip Davies gave an entertaining and very informative talk about the project they were involved in. Too lengthy to describe in detail, however, I found it amazing the precision of the measurements they were making with this project and the math skills they had to learn to complete the project.

The Power of Choice was a presentation by the grade 8 STEM students that illustrated to me the excitement that this style of education stimulates in students, compared to the old staid method of merely learning facts and figures. Grade 8 was a very tough year for me in high school so, to see kids eager to get on with learning, touched me personally.

After the talks I got to wander around the displays of this school year's projects with teachers, parents and other students. I found every project fascinating and could see some interesting ideas for new technology brewing in these young minds. I hope our school system will nurture this education project as I think this is the future of education. ✸

This year's Astronomy Day youth telescope draw was won by Simon Agulnik, age 12, pictured with his prize at left. Congratulations, Simon, and thanks to Sky-Watcher for their donation of the telescope.

Members' Gallery



Mercury Transit by Ken Jackson

Taken from my backyard in Coquitlam with a Skywatcher ED100 Pro telescope and a ZWO ASI 224mc camera then processed using AutoStakkert, Registax and Gimp using a stack of 30 subframes. A time-lapse of the transit can be seen here.

Shadow Transit by Ken Jackson

A transit of Ganymede's shadow across Jupiter on March 30. Same equipment and software as above, this time using a stack of 700 subframes.