

POLARIS



Royal Astronomical Society of Canada
London Centre Newsletter
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Maps and Images of Solar System Objects

Patrick Whelan

I don't know about you, but I am suffering from astronomical photon-deprivation! It sure has been cloudy for an extended period of time. Darn El Nino!

One course of action is to work on astronomy projects in the house or workshop. I cleaned the corrector plate on my 10" Schmidt-newt this winter. I am trying to convert my 10" f7.5 solid tube telescope to some kind of structure that will break down and get into a vehicle. Truly, I am not having much luck with this last project.

Another course of action is reading. There are a few good astronomy magazines and lots of online sites (including telescope manufacturers) to keep you busy until the clouds break. If you look for astrophysics related sites instead of just amateur astronomy sites you can spend countless days keeping up with news and research.

One other rather new area to look into when online is cartography and imaging of the planets and other solar system objects. There has been so much data received from spacecraft over the years the maps of objects you can find are incredible!

The United States Geologic Survey has great maps of the Earth. They have also partnered with NASA to bring us great maps of objects in space!

(planetarymapping.wr.usgs.gov/)

What do they have? Venus, Mars, Moon, Europa, Ganymede, Io and Vesta. There are multiple layers used and you can turn those layers on and off to see other data overlaid on the maps. Another USGS website is: www.mapaplanet.org/. Even more solar system objects to view. Check it out!

The Lunar Reconnaissance Orbiter returned a huge amount of data. (wms.lroc.asu.edu/lroc/) You can view and zoom in and out and investigate all parts of the Moon. If you like anaglyph (red/blue) 3D images go look around at: lroc.sese.asu.edu/images. Absolutely beautiful!

Mars has seen so many spacecraft over the years. Here is a great site that NASA has for maps: mars.nasa.gov/maps/explore-mars-map/fullscreen/ For 3D images: mars.nasa.gov/mars3d/

The spacecraft Messenger imaged 100% of Mercury. It mapped the planet for four years and then impacted the surface at 3:26 p.m. EDT on April 30, 2015. To see the Messenger images go to: messenger.jhuapl.edu/the_mission/mosaics.html

Aside from planets, the NASA Dawn mission went to two targets: the giant protoplanet Vesta and then Ceres. It is the first mission to visit two targets and did so because it used ion thrusters. Check out the images here:

www.nasa.gov/mission_pages/dawn/main/index.html

The most recent and popular non-planet in the news has been Pluto. The New Horizons probe is still sending images back from Pluto and also from Jupiter which it used for a gravity assist to get to Pluto. There are always new images as it will take another eight months or more to send them all back to earth. www.nasa.gov/mission_pages/newhorizons/main/index.html

How about Jupiter and Saturn? Cassini is currently at Saturn and we get new images all the time:

www.nasa.gov/mission_pages/cassini/main/index.html. Ju-

piter doesn't have a current spacecraft but New Horizons was there and Voyager 1 and 2 imaged it as well. For old Voyager news and images: voyager.jpl.nasa.gov/mission/index.html. For New Horizons images go to www.nasa.gov/mission_pages/newhorizons/news/jupiter_images.html and there is a link at the end that should become active once New Horizons starts sending more Jupiter images!

Voyager 2 is the only spacecraft to visit Uranus and Neptune. Check out the images here:

voyager.jpl.nasa.gov/imagesvideo/imagesbyvoyager.html

One other great site for images is Hubblesite. Not just of planets but for so much more. I include this site for completeness. For all the images in reverse chronological order: hubblesite.org/newscenter/archive/. Breathtaking and amazing.

There are so many other sites. Search the European Space Agency website (www.esa.int/ESA) and find images from the comet they landed on and so much more. China is a force to be reckoned with. They had a spacecraft orbiting and imaging the moon as well as a lunar lander. They have released many true colour high resolution images. The press has indicated the Chinese site is difficult to navigate, so the Planetary Society downloaded hundreds of images and put them on their own site: <http://www.planetary.org/blogs/emily-lakdawalla/2016/01281656-fun-with-a-new-data-set-change.html>. Wow!

Moon Phases



February 15 2016



February 22 2016



March 1 2016



March 9 2016

January Meeting

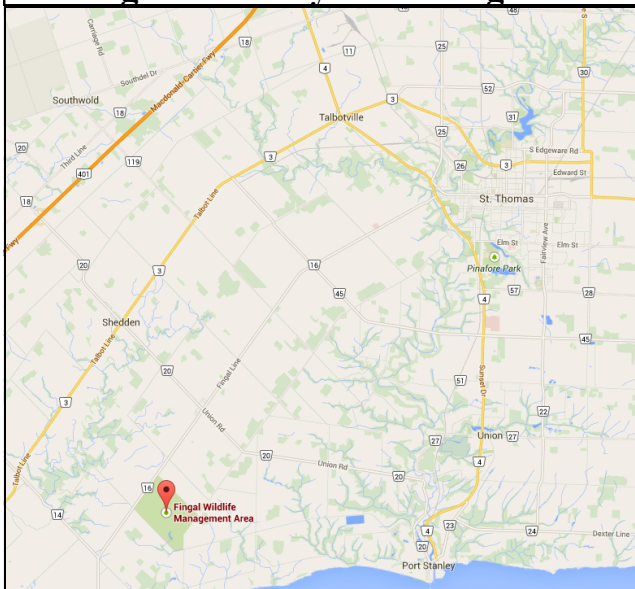
Our scheduled speaker
for this month is our esteemed member

David Clark.

His topic will be:

Impact Detections of Temporarily
Captured Natural Satellites

Fingal Dark Sky Observing Site



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London RASC Website: <http://www.rasclondon.ca/>
London RASC Forums: <http://forums.rasclondon.ca/>

Sky Events for Late February and early March

February 22 Double shadow transit on Jupiter
 February 24 Zodiacal light visible in west for next two weeks
 February 24 Jupiter 1.7N of Moon
 February 26 Double shadow transit on Jupiter
 February 29 Double shadow transit on Jupiter
 March 4 Double shadow transit on Jupiter
 March 7 Venus 3.0S of Moon
 March 8 Double shadow transit on Jupiter
 March 9 Double shadow transit on Jupiter
 March 11 Double shadow transit on Jupiter
 March 13 Daylight Saving Time Begins
 March 14 Aldeberan 0.3S of Moon
 March 15 Double shadow transit on Jupiter
 March 16 Double shadow transit on Jupiter
 March 18 Double shadow transit on Jupiter



Mercury well placed in the morning sky
 Venus is a brilliant object in the dawn sky
 Mars rises in Libra around 1:00am
 Jupiter rises in the east in early evening
 Saturn is well placed in the dawn sky
 Uranus low in the western evening sky in Pisces. Sets mid-evening
 Neptune vanishes into the evening twilight



R.A.S.C. London Centre Library Books of the Month February 2016 By Robert Duff

As always, these “Books of the Month” are available for loan to members, to be returned at the following monthly meeting. The books for February 2016 are as follows:

Foundations of Astronomy, by Michael A. Seeds. – 7th Edition, c2003.

The Infinite Journey: Eyewitness Accounts of NASA and the Age of Space, written by William E. Burrows. New York: Discovery Books, c2000. – (Discovery Books)

365 Starry Nights: an Introduction to Astronomy for Every Night of the Year, text and illustrations by Chet Raymo. c1982.

For a complete listing of our library collection please go to the Main Menu on the left side of the RASC London Centre Web site main page and click on Club Library: <http://www.rasclondon.ca/joomla34/library-and-rentals>

If there is a particular book or video you wish to borrow, please feel free to contact me by telephone at (519) 439-7504 or by e-mail at rduff@sympatico.ca

Cronyn Observatory Exploring the Stars Events & Public Night, January 14th—February 10th, 2016

By Robert Duff

Exploring the Stars, 1st Dutton Brownies and Guides, January 14th, 2016

Mostly cloudy skies greeted 15 visitors (10 children and 5 adults / leaders) from the 1st Dutton Brownies and Guides for Exploring the Stars at Western University’s Cronyn Observatory, Thursday, January 14th, 2016, 6:00 p.m. Graduate student

Laura Lenkic presented the digital slide presentation “The Girl Guide Astronomy Badge” and fielded questions. Laura followed this with the activity “Telescope Kits,” with the children assembling simple telescopes from small reusable kits.

RASC London Centre was represented by Everett Clark, Paul Kerans and Bob Duff. When everybody arrived upstairs in the dome, Bob gave a brief talk about the Cronyn Observatory’s big 25.4cm refractor. With the dome opened and the big 25.4cm refractor (32mm Erfle eyepiece, 137X) directed towards the southwest, Everett and Bob supervised as the children and adults lined up to view the 5-day-past-new crescent

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Moon appearing briefly through clouds in the mostly cloudy sky. On the roof patio outside the dome, Paul showed them the Moon through the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X). Paul also showed them an iron meteorite along with samples of Moon and Mars meteorites in small display cases. The visitors left the dome by around 7:20 p.m. and the observatory was closed down by 7:35 p.m., after a very enjoyable evening learning about astronomy.

Exploring the Stars, London Waldorf School, Grade 6, January 18th, 2016

Mostly cloudy skies greeted 28 visitors (14 children and 14 adults) from the London Waldorf School, Grade 6 class, for Exploring the Stars at Western University's Cronyn Observatory, Monday, January 18th, 2016, 6:30 p.m. Graduate student Dilini Subasinghe presented the digital slide presentation "The Earth & Moon" and fielded questions. Dilini followed this with the activity "Constellations," distributing 19 "Star Finder" planispheres and showing the visitors how to assemble them with transparent adhesive tape. She then showed the visitors the slide "Reading a Star Finder," followed by several constellations slides to help them learn how to use the planispheres. RASC London Centre member Paul Kerans also made a presentation on meteorites, showing the visitors 2 iron / nickel meteorites along with samples of Moon and Mars meteorites in small display cases for their inspection.

RASC London Centre was represented by Paul Kerans and Bob Duff. Paul directed the big 25.4cm refractor in the dome towards the Moon, visible through hazy clouds, and also set up the London Centre's 25.4cm Dobsonian on the roof patio. When everybody arrived upstairs in the dome, Bob gave a talk about the Cronyn Observatory and the big 25.4cm refractor. The visitors enjoyed views of the 2-day-past-first quarter gibbous Moon visible through hazy clouds in the big 25.4cm refractor (32mm Erfle eyepiece, 137X) and 25.4cm Dobsonian (17mm Nagler eyepiece, 66X). Paul also showed them the Orion Nebula (M42) through the 25.4cm Dobsonian (66X). The visitors were gone by around 8:10 p.m. after an enjoyable evening of astronomy despite the hazy clouds.

Exploring the Stars, 97th Cub Scouts of London, January 19th, 2016

Mostly cloudy skies greeted 34 visitors (21 children and 13 adults / leaders) from the 97th Cub Scouts of London for Exploring the Stars at Western University's Cronyn Observatory, Tuesday, January 19th, 2016, 7:00 p.m. Graduate student Kendra Kellogg presented the digital slide presentation "The Cub Scout Astronomy Badge" and fielded questions. Kendra followed this with the activity "Telescope Kits," with the Cubs assembling 18 simple telescopes from small reusable kits. RASC London Centre member Paul Kerans brought 2 iron / nickel meteorites, which he showed to some of the visitors.

RASC London Centre was represented by Everett Clark, Paul Kerans and Bob Duff. When everybody arrived upstairs Bob gave a talk on the history of the Cronyn Observatory and some of

the technical aspects of the big 25.4cm refractor. Bob also explained how a reflector telescope worked pointing to the Schmidt camera and Cassegrain reflector, piggy-backed on the 25.4cm refractor, and to the London Centre's 25.4cm Dobsonian, which Paul had set up inside the dome door and directed towards the wind turbine on the Engineering building. Bob also explained the Standard and Sidereal Time clocks on the east wall. Cloudy skies with possible snow ruled out opening the dome. Bob supervised as the Cubs lined up to view the wind turbine through the 25.4cm Dobsonian (17mm Nagler eyepiece, 66X).

The visitors took about 12 of the "Getting Started in Astronomy" (RASC, SkyNews [2015]) pamphlets that had been set out on the table for them and Paul handed out one "Star Finder" planisphere. The visitors were gone by 8:35 p.m. after an enjoyable and informative evening learning about telescopes and astronomy.

Exploring the Stars, 97th Scouts of London, January 21st, 2016

Mostly cloudy skies greeted 15 visitors (8 children and 7 adults / leaders) from the 97th Scouts of London for Exploring the Stars at Western University's Cronyn Observatory, Thursday, January 21st, 2016, 7:00 p.m. Graduate student Shannon Hicks presented the digital slide presentation "Life in the Universe" and fielded questions. Shannon followed this with the activity "Transit Demo," and invited the Scouts to the table at the front of the room where she had set up the "Transit Demo" model of an extra-solar planetary system on a turntable with an electrically lighted "sun" in the middle. A photodiode was clamped to a laboratory stand and linked to a laptop computer, which displayed the dipping light curve as the model planet revolved around and in front of the lighted model sun. The lecture room was darkened with the lights turned off for this very impressive demonstration of how the transit detection method worked for finding extra-solar planets.

RASC London Centre was represented by Everett Clark, Paul Kerans and Bob Duff. When everybody arrived upstairs Bob gave a talk on the history of the Cronyn Observatory and some of the technical aspects of the big 25.4cm refractor. Bob also explained the Standard and Sidereal Time clocks on the east wall. Shannon and Everett showed the Scouts the 5-day-past-first quarter gibbous Moon visible through hazy clouds in the 25.4cm refractor, using the 32mm Erfle eyepiece (137X), with Everett swapping in the 28mm Meade Super Wide Angle eyepiece (157X) towards the end of the evening. On the roof patio outside the dome Bob showed the visitors the Moon through the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X). Paul set up his Nikon 10 X 50mm binoculars on his Orion Parallelogram Mount and tripod along with a reclining folding chair and invited the Scouts to view the Moon.

The visitors took about 4 of the "Getting Started in Astronomy" (RASC, SkyNews [2015]) pamphlets and several "Moon Gazers' Guide" cards and "Secrets of the Night Sky" (CSA) sky charts, as well as the small 7cm X 9cm "International Year of Astronomy 2009" cards featuring images of the planets and other celestial objects from the educational materials laid out on the

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table beside the computer in the dome by Everett and Paul. The visitors asked many questions and were gone by around 9:00 p.m. after expressing their thanks for a very enjoyable evening of astronomy.

Cronyn Observatory Public Night, Monday, January 25th, 2016

Mostly cloudy skies and damp weather greeted some 24 visitors to Western University's Cronyn Observatory Public Night, Monday, January 25th, 2016, 7:00 p.m. They were welcomed by graduate student Kendra Kellogg and, since there was no slide presentation that evening, were directed upstairs into the dome.

RASC London Centre was represented by Paul Kerans, Steve Gauthier, Everett Clark, Bob Duff and Peter Jedicke. Graduate student Shannon Hicks was telescope operator for the evening and directed the big 25.4cm refractor (32mm Erfle eyepiece, 137X) in the dome to show visitors a flashing red light on communications tower in south London.

Bob talked to some of the visitors and spent part of the evening showing a few people the wind turbine on the Engineering building through the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X), which had been set up on the roof patio outside the dome. Paul set up his Nikon 10 X 50mm binoculars on his Orion Parallelogram Mount and tripod on the roof patio to show visitors views of the Western Sports and Recreation Centre.

Steve showed visitors the astronomy software programs on the dome computer including "Starry Night Pro," "Celestia" and "Stellarium." Everett distributed 2 "Star Finder" planispheres and 2 "Moon Gazers' Guide" cards to interested visitors. The visitors were gone by around 8:40 p.m. and the observatory was closed down after an enjoyable evening learning about astronomy, despite the cloudy, damp weather.

Exploring the Stars, 36th London Guides, January 27th, 2016

Cloudy skies greeted 28 visitors (22 children and 6 adults / leaders) from the 36th London Guides for Exploring the Stars at Western University's Cronyn Observatory, Wednesday, January 27th, 2016, 7:00 p.m. Graduate student Laura Lenkic presented the digital slide presentation "The Girl Guide Astronomy Badge" and fielded questions. Laura followed this with the activity "Telescope Kits," with the Guides assembling 14 simple telescopes from small reusable kits. Laura used one telescope for demonstration and the girls tested their newly assembled telescopes by viewing a slide of a snowman projected on the screen.

RASC London Centre member Bob Duff opened the dome and directed the big 25.4cm refractor (32mm Erfle eyepiece, 137X) towards the flashing white and red lights on the communications tower in south London. Bob also set up the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X) on the roof patio outside the dome, directing it towards the wind turbine on the Engineering building. When everybody arrived upstairs Bob gave a talk on the history of the Cronyn Observatory and some of

the technical aspects of the big 25.4cm refractor. Bob also explained how a reflector telescope worked, using his green laser pointer to show them the Schmidt camera and Cassegrain reflector, piggy-backed on the 25.4cm refractor. He explained the difference between a refractor and reflector telescope and mentioned the 25.4cm Dobsonian set up on the roof patio.

At Bob's suggestion the Guide leaders divided the girls into 2 groups with one going outside to view the wind turbine through the 25.4cm Dobsonian (17mm Nagler eyepiece, 66X), supervised by Laura. Bob supervised from near the top of the observing ladder as Guides in the second group climbed the steps to view the flashing white and red lights on the communications tower in south London through the 25.4cm refractor (32mm Erfle eyepiece, 137X). Both groups had the opportunity to view through both telescopes before the evening ended at 9:00 p.m. The Guides were very appreciative of this very enjoyable and informative evening learning about telescopes and astronomy.

Exploring the Stars, London 66th, Beaver Scout Group, February 2nd, 2016

Cloudy skies and rain greeted 19 visitors (9 children and 10 adults / leaders) from the London 66th Beaver Scout Group for Exploring the Stars at Western University's Cronyn Observatory, Tuesday, February 2nd, 2016, 6:30 p.m. Graduate student Kendra Kellogg presented the digital slide presentation "Constellations" and fielded questions. Kendra followed this with the activity "Constellations," distributing 19 "Star Finder" planispheres and showing the visitors how to assemble and use them with transparent adhesive tape. She then showed the visitors the slide "Reading a Star Finder" followed by several constellations slides from the astronomy software program "Stellarium" to help them learn how to use the planispheres.

RASC London Centre was represented by Everett Clark and Paul Kerans, later joined by Bob Duff. When everybody arrived upstairs Paul gave a brief talk on the history of the Cronyn Observatory and some of the technical aspects of the big 25.4cm refractor. Bob gave a brief explanation of the Standard and Sidereal Time clocks on the east wall when he arrived later. Since it was raining, the dome remained closed. Paul had set up the London Centre's 25.4cm Dobsonian telescope (17mm Nagler eyepiece, 66X) inside the dome so as to view out the door and Everett, and later Bob, supervised as the visitors viewed a compressed gas canister with gauges visible in the window of the nearby Engineering building to the south. The visitors took about 7 of the "Getting Started in Astronomy" (RASC, SkyNews [2015]) pamphlets available to them.

After everybody had come back downstairs from the dome Kendra presented another digital slide presentation, which was the second half of "The Scout / Guide Astronomy Badge"—having to do with the solar system—and fielded questions. Everybody was gone by around 8:00 p.m. after a very enjoyable evening of astronomy, despite the cloudy sky and rain.

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Exploring the Stars, Masonville 77th, Beaver Scouts, February 3rd, 2016

Mostly clear sky with occasional cloudy periods greeted 32 visitors (19 children and 13 adults / leaders) from the Masonville 77th Beaver Scouts for Exploring the Stars at Western University's Cronyn Observatory, Wednesday, February 3rd, 2016, 6:00 p.m. Graduate student Shannon Hicks made the digital slide presentation "The Scout Astronomy Badge" and fielded questions. Shannon followed this with the activity "Crater Experiment," inviting the children to the table she had set up at the front of the room where she had placed a pan filled with flour and chocolate powder. She demonstrated how meteor craters were formed on the Moon by dropping various size balls into the pan and then invited the children to line up in front of the table and take turns dropping balls into the pan to make their own meteor craters.

RASC London Centre was represented by Paul Kerans and Bob Duff. When everybody arrived upstairs Bob gave a talk on the history of the Cronyn Observatory and some of the technical aspects of the big 25.4cm refractor. Bob also explained the Standard and Sidereal Time clocks on the east wall. Shannon directed the big 25.4cm refractor (52mm Erfle eyepiece, 84X) in the dome to show visitors a flashing red light on the communications tower in south London. Bob operated the London Centre's 25.4cm Dobsonian telescope (17mm Nagler eyepiece, 66X), which Paul had set up on the roof patio outside the dome, and showed the visitors the wind turbine on the Engineering building, the double star Castor and the star Capella, between clouds, and then the Orion Nebula (M42) as the sky cleared. Paul also set up his Nikon 10 X 50mm binoculars on his Orion Parallelogram Mount and tripod on the roof patio to show visitors views of the Western Sports and Recreation Centre and M42.

Paul brought an iron / nickel meteorite, which he showed to the children, and a small chondrite meteorite, which he showed to the adults. The visitors were gone by around 8:00 p.m. after a very enjoyable evening of astronomy.

Exploring the Stars, 57th Brownies, February 9th, 2016

Cloudy skies and occasional snow flurries greeted 17 visitors (12 children and 5 adults, including 2 leaders) from the 57th Brownies for Exploring the Stars at Western University's Cronyn Observatory, Tuesday, February 9th, 2016, 6:00 p.m. Graduate student Kendra Kellogg presented the digital slide presentation "Our Solar System" and fielded questions. Kendra followed this with the activity "Telescope Kits," showing just a single slide on how a telescope worked, with the Brownies assembling 12 simple telescopes from small reusable kits.

Everybody went upstairs into the dome around 7:00 p.m. RASC London Centre was represented by Paul Kerans, Charlene Kerans and Everett Clark. Paul gave a talk on some of the history of the Cronyn Observatory and the workings of the big 25.4cm refractor. Since it was cloudy and snowing the dome remained closed. The London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X) was set up inside the dome door to the roof patio and Ever-

ett directed it so as to show the Brownies some bottles on a shelf in a top floor window of the Engineering building.

Paul brought 2 meteorites, an iron-nickel and a stony-iron meteorite, and made a small presentation. Charlene and Everett both fielded questions and helped with the telescopes. There were 2 "Star Finder" planispheres and 7 "Getting Started in Astronomy" (RASC, SkyNews [2015]) pamphlets distributed. The event began around 6:15 p.m. because of weather conditions and finished around 7:50 p.m., after a very enjoyable evening learning about astronomy and telescopes despite the cloudy, snowy weather.

Exploring the Stars, Private Group, February 10th, 2016

Cloudy, later partly clearing skies, greeted 7 adult visitors of a private group (celebrating a birthday party) for Exploring the Stars at Western University's Cronyn Observatory, Wednesday, February 10th, 2016, 7:00 p.m. Graduate student Shannon Hicks presented the digital slide presentation "Extra Solar Planets" and fielded questions. Shannon followed this with the activity "Transit Demo," using the "Transit Demo" model of an extra-solar planetary system. RASC London Centre member Paul Kerans also gave a talk on the meteorites he had brought with him, including an iron meteorite and a stony-iron meteorite, as well as samples of Moon and Mars meteorites in small display cases.

RASC London Centre was represented by Paul Kerans and Everett Clark. When everybody arrived upstairs in the dome, Shannon gave a talk on the big 25.4cm refractor. The sky partially cleared around 8:30 p.m. and Paul set up the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X) on the roof patio outside the dome and showed the visitors the Orion Nebula (M42). Paul also set up his Nikon 10 X 50mm binoculars on his Orion Parallelogram Mount and tripod inside the dome but did not have time to move it out on to the roof patio.

Shannon and Everett directed the big 25.4cm refractor (32mm Erfle eyepiece, 137X) in the dome to show the visitors the star Sirius. Shannon, Everett and Paul answered many questions from the enthusiastic visitors. There were 6 "Star Finder" planispheres and 3 "Getting Started in Astronomy" (RASC, SkyNews [2015]) pamphlets distributed. The event ended around 9:00 p.m. after a very enjoyable evening learning about extra solar planets and viewing through telescopes.