

POLARIS



Newsletter of the London Centre, RASC

September 2019

Juno to Jupiter

On August 5, 2011 a high tech spacecraft called Juno lifted off from Cape Canaveral atop an Atlas V booster on its way to Jupiter. After a return to Earth for a gravitational assist it entered a polar orbit around Jupiter on July 5, 2016 and began calibrating the instruments that will allow Juno to probe Jupiter's composition, magnetic field and polar magnetosphere along, water in the atmosphere, mass distribution and deep winds

The Juno spacecraft is built on a hexagonal bus and breaks the 'rules' for outer solar-system probes by not using nuclear generators, but by using three large solar panels that extend out at 120 degrees bringing the dimensions out to 20.1 x 4.6 metres. Two of the solar panels are in three-panel arrays while the third has the outer panel replaced by the magnetometer. Solar panels were chosen to help stabilize the spacecraft as it rotates. Several of the onboard instruments look out between the panels as Juno orbits Jupiter, always keeping the panels pointed at the sun. At Earth, the panels deliver 12-14kW of power... at Jupiter they deliver about 400W.



Juno will orbit Jupiter in a highly elliptical orbit with a 4200km perijove and a 8,100,00 km apojove. Originally Juno was supposed to be dropped into a lower orbit but problems with the helium distribution system that the main-engine burn that would have dropped it down was cancelled.

The original mission (after modification do to the helium problems) was to last 12 orbits with many of the sensors not expected to make it more than 8 orbits due to the intense radiation around the planet. The science phase of the mission was to last 4 years but has not been extended out to 2021.

Instruments

Microwave Radiometer (MWR)

This is comprised of six flat antenna arrays placed on the sides of the spacecraft between the solar arrays. It scans the planet as the spacecraft rotates and measures 6 frequencies in the microwave range: 600 MHz, 1.2, 2.4, 4.8, 9.6 and 22 GHz. These allow Juno to probe the atmosphere of Jupiter at six depths looking for water and ammonia as deep as 500-600km.

Jovian Infrared Auroral Mapper (JIRAM)

This spectrometer/mapper works in the near infrared between 2 and 5 micrometers to survey the upper layers of the atmosphere from 50 to 70 km. By looking at the heat generated by the atmosphere this can determine how water clouds flow beneath the surface. It should last 8 orbits.

Magnetometer (MAG)

Riding out at the end of one of the solar arrays this flux-gate magnetometer measures Jupiter's magnetic field lines along with an Advanced Stellar Compass that monitors the orientation of the sensor.

Gravity Science (GS)

This measures gravity using Ka and X band radar to map the distribution of mass inside the planet. By knowing the probe's exact position it can measure any accelerations or perturbations in its orbit caused by mass concentrations in the atmosphere.

Jovian Energetic Particle Detector Instrument (JEDI)

This sensor will measure the distribution, energy and velocity of ions and electrons at low energies (13eV to 20KeV). Three sensors ride on the spacecraft top plate to allow a higher frequency of observation.

Radio and Plasma Wave Sensor (WAVES)

This identifies regions of auroral currents by measuring radio and plasma spectra in the auroral region.

Ultraviolet Spectrograph (UVS)

This records the wavelength, position and arrival time of UV photos as it's slit views the planet on each of the spacecraft's rotations.

JunoCam (JCM)

Visible light telescope and camera for public education and outreach. Later in the mission it was used to study Jupiter's clouds, especially at the poles. Expected to last 8 orbits it is still in commission.

Juno has currently completed 22 orbits and will have completed 35 by end of mission at which time it



will be deorbited into Jupiter's atmosphere where it will burn up to mitigate debris and contamination following NASA's Planetary Protection Guidelines.

Findings

- The structure of zones and belts at the cloud tops extends deep down.
- Symmetric clusters of storms at the poles.
- Lightning in Jupiter's clouds is mainly at the poles.
- Jupiter's gravity pulls more from the northern hemisphere than the southern.
- Jupiter's magnetic field is about twice as strong as previously thought and is slightly lopsided.
- Jupiter may have 2 to 9 times more oxygen than the sun. Oxygen is needed for water.
- Jupiter's atmosphere has a Meteorological Layer about 1000km deep with a radiative zone down deep and a convective zone from 600 to 100km below the cloud tops.
- Below the Meteorological Layer is a layer of metallic hydrogen and below that is possibly a core of rock and ice.
- Jupiters polar auroras have 10-30 times more energy than expected and give off light mostly in the ultraviolet.

RASC London Centre Library

Books of the Month

September 2019

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 September 2019 are as follows:

Clyde Tombaugh: Discoverer of Planet Pluto, by David H. Levy. – Cambridge, Mass.: Sky Publishing Corp., c2006.

In Search of Time: Journeys Along a Curious Dimension, by Dan Falk. – Toronto: McClelland & Stewart, c2008.

Universe on a T-shirt: the Quest for the Theory of Everything, by Dan Falk. – Toronto: Viking Canada, c2002.

For a complete listing of our RASC London Centre Library collection please click on the **Library** menu at the top of the RASC London Centre main Web page: <http://rasclondon.ca/>

If there is anything you wish to borrow from the Library, please feel free to contact me by telephone at (519) 439-7504 or by e-mail at rduff@sympatico.ca

Slide Presentation, Mount Hope Centre for Long Term Care, Sunday, September 8th, 2019

Written by Robert Duff, as Reported by Peter Jedicke

RASC London Centre member Peter Jedicke gave his digital slide presentation “*Our Wonderful Heavens*” to 18 people at Mount Hope Centre for Long Term Care in London on Sunday, September 8th, 2019, 10:30 a.m. Peter answered questions after his presentation and the event lasted about one hour.

Cronyn Observatory Public Nights & Special Events, August 9th—31st, 2019

By Robert Duff

Boys & Girls Club of London, Solar Observing at the Cronyn Observatory, August 9th, 2019

Clear skies, becoming partly cloudy, greeted 51 visitors (41 children and 7 staff, 2 leaders and 1 volunteer—including 1 adult) from the Boys & Girls Club of London for Solar Observing at Western University’s Cronyn Observatory, Friday, August 9th, 2019, 10:00—11:45 a.m. The children were ages 6—12. Professor Jan Cami presented the digital slide presentation on “*Astronomy and Space Research at Western*” and fielded questions. This was done on the large TV screen newly installed in the lecture room. The children were then divided into 2 groups, with one group going downstairs for the “*Spectroscopy Demonstration*” in the “*Black Room*” and a tour of the “*1940s Period Room*,” and the other remaining in the lecture room for the “*Transit Demonstration*.” The 2 groups later changed places and eventually arrived in the dome.

Jan gave 2 demonstrations—one to each group—of the “*Transit Demonstration*” model, showing how the transit detection method worked for finding extra-solar planets, set up at the front of the lecture room. Downstairs in the “*Black Room*” RASC member Henry Leparskas showed the 2 groups the Apollo 11 display from the Moon Landing 50th Anniversary event held on July 20th, 2019. He then gave 2 demonstrations—one to each group—of the “*Spectroscopy Demonstration*,” with the children putting on *diffraction grating* glasses to view the spectra of 4 gas discharge lamps, including hydrogen, helium, neon and mercury. Henry gave each group a tour of the “*1940s Period Room*,” a recreation of Dr. H. R. Kingston’s 1940 office, with his brass refractor and the *Sotellunium*—a mechanical eclipse demonstration model built by W. G. Colgrove—on display. He showed them the 3D printer replica of the Dresden meteorite and invited them to sign the guest book. The “*1940s Period Room*” were designed by RASC London Centre member Mark Tovey.

RASC London Centre was represented by Henry Leparskas, Heather MacIsaac and Bob Duff. On the observation deck, Heather set up her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (32mm Plossl eyepiece, 39X), with a Kendrick Astro Baader film solar filter. Henry set up the observatory's Meade 8-inch (20.3cm) Schmidt-Cassegrain (26mm Plossl eyepiece, 77X) with the Kendrick Astro Baader film Solar Filter and Heather directed it towards the Sun. The Coronado 90mm H-Alpha Solar Telescope was also set up on its Sky-Watcher EQ5 mount. As the children arrived upstairs in the dome, Bob gave each of the 2 groups a talk on the history and technical aspects of the big 25.4cm refractor, using the 32mm Erfle eyepiece (137X) for demonstration. He also explained to the second group the 2 clocks on the east wall of the dome and the difference between Standard and Sidereal Time.

Graduate student Hadi Papei showed the children the Sun through the Coronado 90mm H-Alpha Solar Telescope (CEMAX 12mm eyepiece, 67X). There was a tiny prominence visible at about the 12 o'clock position on the Sun's edge. There were no sunspots visible and the Sun appeared as a featureless white disk through the Baader film filters on the 20.3cm Schmidt-Cassegrain, operated by Bob, and Heather's 90mm Maksutov-Cassegrain.

The children and their leaders from the Boys & Girls Club of London were gone by around 11:45 a.m. after an enjoyable and interesting morning learning about astronomy and space research at Western, demonstrations of spectroscopy and the transit method for finding exoplanets, history room tours and observing the Sun through solar filtered telescopes.

Day Camp, Solar Observing at the Cronyn Observatory, August 9th, 2019

Partly cloudy skies greeted 10 visitors (5 children and 5 leaders—including 1 adult), from a day camp for Solar Observing at Western University's Cronyn Observatory, Friday, August 9th, 2019, 1:30—3:00 p.m. The children were ages 7—10. Professor Jan Cami presented the digital slide presentation on "*Astronomy and Space Research at Western*" and fielded questions. This was done on the large TV screen newly installed in the lecture room. Jan then demonstrated the "*Transit Demonstration*" model, showing how the transit detection method worked for finding extra-solar planets, set up at the front of the lecture room.

Downstairs in the "*Black Room*" RASC member Henry Leparskas showed the children the Apollo 11 display from the Moon Landing 50th Anniversary event held on July 20th, 2019. He then showed them the "*Spectroscopy Demonstration*," with the children putting on *diffraction grating* glasses to view the spectra of 4 gas discharge lamps, including hydrogen, helium, neon and mercury. Henry gave them a tour of the "*1940s Period Room*," a recreation of Dr. H. R. Kingston's 1940 office, with his brass refractor and the *Sotellunium*—a mechanical eclipse demonstration model built by W. G. Colgrove—on display. He showed them the 3D printer replica of the Dresden meteorite and invited them to sign the guest book. The "*1940s Period Room*" were designed by RASC London Centre member Mark Tovey.

RASC London Centre was represented by Henry Leparskas, Heather MacIsaac and Bob Duff. Heather's Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (32mm Plossl eyepiece, 39X) and the observatory's Meade 8-inch (20.3cm) Schmidt-Cassegrain (26mm Plossl eyepiece, 77X) were set up on

the observation deck, both with Kendrick Astro Baader film Solar Filters. The observatory's Coronado 90mm H-Alpha Solar Telescope was also set up on its Sky-Watcher EQ5 mount. Bob gave a talk to the visitors on some of the history of the observatory and technical aspects of the big 25.4cm refractor, using the Meade 28mm Super Wide Angle eyepiece (157X) for demonstration.

Graduate student Hadi Papei operated the Coronado 90mm H-Alpha Solar Telescope and also brought out some solar eclipse glasses as the children viewed the Sun through the telescopes. There were no sunspots visible and the Sun appeared as a featureless white disk through the Baader film filters on the 20.3cm Schmidt-Cassegrain, operated by Bob, and Heather's 90mm Maksutov-Cassegrain.

The children and their leaders from the day camp were gone by around 3:00 p.m. after an enjoyable and interesting afternoon learning about astronomy and space research at Western, demonstrations of spectroscopy and the transit method for finding exoplanets, a history room tour and observing the Sun through solar filtered telescopes.

Cronyn Observatory Public Night, Saturday, August 10th, 2019

Clear, later partly cloudy skies greeted some 218 visitors (including 76 youth) to Western University's Cronyn Observatory Summer Public Night, Saturday, August 10th, 2019, 8:30—11:00 p.m. Graduate student Collin Knight gave 3 presentations of his digital slide presentation "*Probing the Perseids*" and fielded questions. This was done on the large TV screen newly installed in the lecture room.

Undergraduate student Samaunus Safa was "crowd manager," greeting and directing visitors into the lecture room, dome or downstairs for demonstrations and history room tours. RASC London Centre members Peter Jedicke counted visitors and Henry Leparskas did the "*Transit Demonstration*" in the lecture room, showing how the transit detection method worked for finding extra-solar planets.

RASC London Centre was represented by Everett Clark, Henry Leparskas, Bob Duff, Heather MacIsaac, Steve Imrie, Frank Sowa, Peter Jedicke and Mark Tovey. Everett directed the big 25.4cm refractor (17mm Nagler eyepiece, 258X) in the dome towards the 3-day-past-first quarter gibbous Moon. Peter later directed the 25.4cm refractor towards Jupiter (258X).

On the observation deck, Bob Duff operated the observatory's Meade 8-inch (20.3cm) Schmidt-Cassegrain, showing visitors Jupiter, using the 20mm Plossl eyepiece (100X), and then swapped in the Tele Vue 13mm Plossl eyepiece (154X), followed by the 20mm Plossl (100X) eyepiece again. The Moon was also observed in the 20.3cm Schmidt-Cassegrain (100X). Heather MacIsaac set up her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain and showed visitors the Moon (Vixen 22mm Lanthanum LVW eyepiece, 57X) and Saturn (Vixen 17mm Lanthanum LVW eyepiece, 73.5X). Steve Imrie showed visitors the Moon, Jupiter and Saturn through the London Centre's home-built 30.5cm Dobsonian (18mm Radian eyepiece, 83X). Frank Sowa set up his Celestron NexStar 6SE 15cm Schmidt-Cassegrain (Tele Vue 10mm Ethos eyepiece, 150X) on the sidewalk area near the south side of the observatory and showed people Saturn.

Downstairs in the “*Black Room*” undergraduate student Meet Panchal showed visitors the Apollo 11 display from the Moon Landing 50th Anniversary event held on July 20th, 2019. He then gave demonstrations of the “*Spectroscopy Demonstration*,” with the visitors putting on *diffraction grating* glasses to view the spectra of 4 gas discharge lamps, including hydrogen, helium, neon and mercury. Henry Leparskas and later Mark Tovey gave tours of the “*1940s Period Room*,” a recreation of Dr. H. R. Kingston’s 1940 office, with his brass refractor and the *Sotellunium*—a mechanical eclipse demonstration model built by W. G. Colgrove—on display; and the “*1967 Period Room*,” recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation—Canada 150. The “*Period Rooms*” were designed by RASC London Centre member Mark Tovey.

The visitors were mostly gone by around 11:00 p.m. after an enjoyable and interesting evening learning about the Perseids meteor shower, demonstrations of spectroscopy and the transit method for finding exoplanets, tours of the history rooms and observing through telescopes.

Ivey Leadership Program at Cronyn Observatory, Sunday, August 11th, 2019

Partly cloudy skies greeted 57 visitors (including some 46 students, mostly Grade 10, but some others as well) from the Ivey Leadership Program for evening observing at Western University’s Cronyn Observatory, Sunday, August 11th, 2019, 8:00—10:30 p.m. Professor Jan Cami presented the digital slide presentation on “*Astronomy and Space Research at Western*” and fielded questions. This was done on the large TV screen newly installed in the lecture room. There were 58 visitors expected, including 46 students (mostly Grade 10, but some others as well). There were 57 visitors counted in the lecture room.

After the slide presentation the students were divided into 3 groups with one group going downstairs for the “*Spectroscopy Demonstration*” in the “*Black Room*,” another remaining upstairs for the “*Transit Demonstration*” in the lecture room and the third going upstairs into the dome. The groups were further subdivided into 6 groups to include tours of the “*1940s period Room*.” All the groups alternated between these activities and eventually arrived in the dome.

Jan gave 3 demonstrations—one to each group of students—of the “*Transit Demonstration*” model, showing how the transit detection method worked for finding extra-solar planets, set up at the front of the lecture room. Downstairs in the “*Black Room*” the 3 groups of student were further subdivided into 6 groups. RASC member Henry Leparskas showed the students the Apollo 11 display from the Moon Landing 50th Anniversary event held on July 20th, 2019. He then gave 6 demonstrations—one to each group of students—of the “*Spectroscopy Demonstration*,” with the visitors putting on *diffraction grating* glasses to view the spectra of 4 gas discharge lamps, including hydrogen, helium, neon and mercury.

RASC member Peter Jedicke gave tours of the “*1940s Period Room*,” a recreation of Dr. H. R. Kingston’s 1940 office, with his brass refractor and the *Sotellunium*—a mechanical eclipse demonstration model built by W. G. Colgrove—on display; and the “*1967 Period Room*,” recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation

—Canada 150. Peter invited them to sign the guest book. The “*Period Rooms*” were designed by RASC London Centre member Mark Tovey.

RASC London Centre was represented by Henry Leparskas, Bob Duff, Peter Jedicke and Heather MacIsaac. Henry opened the dome and set up all the telescopes—using celestial coordinates from the “*Stellarium*” software on the computer to locate Jupiter with the big 25.4cm refractor, using the setting circles—before going downstairs to do the “*Spectroscopy Demonstration*” in the “*Black Room*.” Since the sky was clouded out, Bob gave the first group of students a tour of the dome, including a brief history of the observatory and some of the technical aspects of the big 25.4cm refractor. The sky soon cleared to partly cloudy and there were no telescope talks given to the remaining groups. Graduate student Hadi Papei showed the second group of students Jupiter and the third group of students Saturn, through the 25.4cm refractor, using the 17mm Nagler eyepiece (258X).

On the observation deck, Bob Duff viewed the 4-day-past-first quarter gibbous Moon through the observatory’s Meade 8-inch (20.3cm) Schmidt-Cassegrain, using Peter’s K 40mm eyepiece (50X). Bob showed the students Jupiter, using the 20mm Plossl (100X) and Tele Vue 13mm Plossl (154X) eyepieces, and finally Saturn (Tele Vue 13mm Plossl eyepiece, 154X). Heather MacIsaac set up her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain, using a 32mm Plossl eyepiece (39X) to view the Moon. Heather showed Jupiter through her 90mm Maksutov-Cassegrain (Vixen 17mm Lanthanum LVW eyepiece, 73.5X) to the first 2 groups of students and Saturn to the third group as they arrived upstairs. Heather also showed students the Moon through the London Centre’s home-built 30.5cm Dobsonian (18mm Radian eyepiece, 83X), and tried using Peter Jedicke’s neutral density filter to reduce the Moon’s brightness to a more comfortable level. After giving the “*Period Room*” tours, Peter came upstairs and took over the 30.5cm Dobsonian to show the students Jupiter and its Galilean moons.

The students and their leaders were gone from the dome by 10:10 p.m. after an enjoyable and interesting evening learning about astronomy and space research at Western, demonstrations of spectroscopy and the transit method for finding exoplanets, history room tours and observing through telescopes. The observatory was closed around 10:30 p.m.

Summer Academic Writing Clinic (SAWC), Evening Observing at the Cronyn Observatory, August 14th, 2019

Clear skies greeted 17 visitors—including 16 students and 1 staff member—from the Summer Academic Writing Clinic (SAWC) for incoming first-year students, for evening observing at Western University’s Cronyn Observatory, Wednesday, August 14th, 2019, 8:30—10:30 p.m. Graduate student Hadi Papei presented the digital slide presentation on “*Astronomy and Space Research at Western*” and fielded questions. This was done on the large TV screen newly installed in the lecture room. He then demonstrated the “*Transit Demonstration*” model, showing how the transit detection method worked for finding extra-solar planets, set up at the front of the lecture room. The students then went downstairs, where they were divided into 2 groups for the “*Spectroscopy Demonstration*” in the “*Black Room*” and tours of the historic “*Period Rooms*.” The 2 groups later changed places.

Downstairs in the “*Black Room*” RASC member Henry Leparskas showed the students the Apollo 11 display from the Moon Landing 50th Anniversary event held on July 20th, 2019. He then gave 2 demonstrations—one to each group of students—of the “*Spectroscopy Demonstration*,” with the visitors putting on *diffraction grating* glasses to view the spectra of 4 gas discharge lamps, including hydrogen, helium, neon and mercury. RASC member Peter Jedicke gave 2 tours—one to each group of students—of the “*1940s Period Room*,” a recreation of Dr. H. R. Kingston’s 1940 office, with his brass refractor and the *Sotellunium*—a mechanical eclipse demonstration model built by W. G. Colgrove—on display; and the “*1967 Period Room*,” recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation—Canada 150. Peter invited them to sign the guest book. The “*Period Rooms*” were designed by RASC London Centre member Mark Tovey.

RASC London Centre was represented by Henry Leparskas, Heather MacIsaac, Bob Duff and Peter Jedicke. Henry made ready the big 25.4cm refractor in the dome—using celestial coordinates from the “*Stellarium*” software on the computer to locate Jupiter with the telescope’s setting circles—before going downstairs to do the “*Spectroscopy Demonstration*” in the “*Black Room*.” Bob was telescope operator and showed the students Jupiter (17mm Nagler eyepiece, 258X), the one-day-prior-to-full Moon (Meade 28mm Super Wide Angle eyepiece, 157X) and Saturn (258X) through the 25.4cm refractor. There was one student who tried to take a picture of the Moon through the eyepiece with a smartphone.

On the observation deck outside the dome, graduate student Hadi Papei showed students Jupiter, the Moon and Saturn through the RASC London Centre’s home-built 30.5cm Dobsonian (18mm Radian eyepiece, 83X). Heather MacIsaac showed the students Jupiter through her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (Vixen 22mm Lanthanum LVW eyepiece, 57X) and the Moon (32mm Plossl eyepiece, 39X). Bob, Heather and Peter shared operation of the observatory’s Meade 8-inch (20.3cm) Schmidt-Cassegrain. Heather directed the 20.3cm Schmidt-Cassegrain towards the Moon, low in the eastern sky, which made a fine sight in Peter’s University Optics K 40mm eyepiece (50X). Bob swapped in the Tele Vue 13mm Plossl eyepiece (154X) for a good view of Saturn and Peter later showed the students Jupiter (154X) in the 20.3cm Schmidt-Cassegrain.

The students were gone from the dome by around 10:30 p.m. after an enjoyable and interesting evening learning about astronomy and space research at Western, demonstrations of spectroscopy and the transit method for finding exoplanets, tours of the history rooms and observing through telescopes.

Space Educators Institute at the Cronyn Observatory, August 15th, 2019

Partly cloudy skies greeted 10 visitors from the Space Educators Institute for solar observing at Western University’s Cronyn Observatory, Thursday, August 15th, 2019, 4:30—5:30 p.m. Dr. Parshati Patel, Outreach Program Coordinator for Western’s Centre for Planetary Science and Exploration (CPSX), and CPSX Outreach Assistant Coordinator, Dana Beaton, coordinated the event. There was no slide presentation, but graduate student Hadi Papei gave a brief talk about the “*Exploring the Stars*” program available to school groups during the fall and winter semesters. Hadi then demonstrated the “*Transit Demonstration*” model, showing how the transit detection method worked for finding extra-solar planets, set up at the front of the lecture room.

Downstairs in the “*Black Room*” the visitors were shown the Apollo 11 display from the Moon Landing 50th Anniversary event held on July 20th, 2019, and Parshati did the “*Spectroscopy Demonstration*,” with the visitors putting on *diffraction grating* glasses to view the spectra of 4 gas discharge lamps, including hydrogen, helium, neon and mercury. RASC London Centre member Peter Jedicke gave them a tour the “*1940s Period Room*,” a recreation of Dr. H. R. Kingston’s 1940 office, with his brass refractor and the *Sotellunium*—a mechanical eclipse demonstration model built by W. G. Colgrove—on display. He invited them to sign the guest book. The “*1940s Period Room*” was designed by RASC London Centre member Mark Tovey.

RASC London Centre was represented by Peter Jedicke, Heather MacIsaac and Bob Duff. On the observation deck, Heather and Bob set up the observatory’s Meade 8-inch (20.3cm) Schmidt-Cassegrain (26mm Plossl eyepiece, 77X), with the Kendrick Astro Baader film Solar Filter, and installed Peter’s K 40mm eyepiece (50X). Heather set up her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (32mm Plossl eyepiece, 39X), with a Kendrick Astro Baader film solar filter. Dana Beaton set up the observatory’s Coronado 90mm H-Alpha Solar Telescope was also set up on its Sky-Watcher EQ5 mount. Peter set up the observatory’s newly acquired Sunspotter.

There were just 9 of the 10 visitors who came upstairs into the dome. Parshati gave a talk on the history and technical aspects of the big 25.4cm refractor. She partially opened and rotated the dome to demonstrate how it worked and explained the 2 clocks on the east wall of the dome and the difference between Standard and Sidereal Time. Parshati supervised as the visitors viewed the Sun through the Coronado 90mm H-Alpha Solar Telescope (CEMAX 12mm eyepiece, 67X). There were no sunspots visible and the Sun appeared as a featureless white disk through the Baader film filters on the 20.3cm Schmidt-Cassegrain (K 40mm eyepiece, 50X), operated by Bob, and Heather’s 90mm Maksutov-Cassegrain (32mm Plossl eyepiece, 39X), and in the Sunspotter.

The visitors were gone by 5:30 p.m. after an enjoyable and interesting afternoon learning about educational programs for school groups, demonstrations of spectroscopy and the transit method for finding exoplanets, a history room tour and observing the Sun through solar filtered telescopes.

Cronyn Observatory Public Night, Saturday, August 17th, 2019

Partly cloudy skies greeted 143 visitors (including 51 youth) to Western University’s Cronyn Observatory Summer Public Night, Saturday, August 17th, 2019, 8:30—11:00 p.m. Graduate student Ameek Sidhu gave 3 presentations of her digital slide presentation “*The Interstellar Medium*” and fielded questions. This was done on the large TV screen newly installed in the lecture room. RASC member Peter Jedicke counted visitors for a total of 143 people (including 51 children) by the end of the evening.

RASC London Centre was represented by Bob Duff, Heather MacIsaac, Steve Imrie, Peter Jedicke, Mark Tovey and Edith Tovey. Graduate student Keegan Marr was telescope operator in the dome and directed the big 25.4cm refractor (32mm Erfle eyepiece, 137X) towards the communications tower in

south London, while the sky was still bright in the early evening. Heather MacIsaac set up the amateur telescopes on the observation deck including the observatory's Meade 8-inch (20.3cm) Schmidt-Cassegrain (K 40mm eyepiece, 50X) and her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (32mm Plossl eyepiece, 39X), directing both telescopes towards the communications tower. Steve Imrie took charge of RASC London's home-built 30.5cm Dobsonian (18mm Radian eyepiece, 83X), which was directed towards the wind turbine on the Engineering building.

When the visitors came upstairs into the dome, Keegan Marr directed the 25.4cm refractor to show them Jupiter, using the Meade 28mm Super Wide Angle eyepiece (157X), later swapping in the 17mm Nagler eyepiece (258X). On the observation deck, Bob Duff showed visitors Jupiter through the 20.3cm Schmidt-Cassegrain, using the 20mm Plossl eyepiece (100X), later swapping in the Tele Vue 13mm Plossl (154X) for a better view. Bob also showed them Saturn and the star Arcturus through the 20.3cm Schmidt-Cassegrain (Tele Vue 13mm Plossl eyepiece (154X), and the 2-day-past-full waning gibbous Moon (K 40mm eyepiece, 50X)—as it rose in the eastern sky, late in the evening. Heather MacIsaac showed visitors Jupiter and Saturn through her 90mm Maksutov-Cassegrain, using a Vixen 17mm Lanthanum LVW eyepiece (73.5X). Steve Imrie showed visitors Jupiter, Saturn and the Moon through the 30.5cm Dobsonian (18mm Radian eyepiece, 83X).

Heather assisted one lady visitor who brought her Celestron NexStar 102 GT 102mm refractor. Since the Celestron computer software was the same as on Heather's Celestron NexStar 90SLT 90mm Maksutov-Cassegrain, she was able to help the visitor polar align her telescope and get it tracking on Jupiter, which gave good images with 25mm (40X) and 12.5mm (80X) eyepieces.

Downstairs in the "*Black Room*" visitors viewed the Apollo 11 display from the Moon Landing 50th Anniversary event held on July 20th, 2019. Undergraduate student Armin Buijs gave demonstrations of the "*Spectroscopy Demonstration*," with the visitors putting on *diffraction grating* glasses to view the spectra of 4 gas discharge lamps, including hydrogen, helium, neon and mercury. Mark Tovey gave tours of the "*1940s Period Room*," a recreation of Dr. H. R. Kingston's 1940 office, with his brass refractor and the *Sotellunium*—a mechanical eclipse demonstration model built by W. G. Colgrove—on display; and the "*1967 Period Room*," recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation—Canada 150. The "*Period Rooms*" were designed by RASC London Centre member Mark Tovey.

The visitors were mostly gone by around 11:00 p.m. after an enjoyable and interesting evening learning about the interstellar medium, demonstrations of spectroscopy, tours of the history rooms and observing through telescopes.

Space Explorers Academy at the Cronyn Observatory, Monday, August 19th, 2019

Written by Robert Duff, as Reported by Peter Jedicke

RASC London Centre member Peter Jedicke gave a digital slide presentation entitled "*Big Telescopes*"

to 12 visitors (8 youth and 4 staff members) from the Space Explorers Academy at Western University's Cronyn Observatory, Monday, August 19th, 2019, 1:30—2:30 p.m. After the slide show Peter and the Space Explorers Camp staff demonstrated the big 25.4cm refractor in the dome. Since the sky was mostly cloudy, CPSX Outreach Assistant Coordinator Dana Beaton showed the children how to view the Sun safely with solar eclipse glasses. The Space Explorers Academy is a 1-week summer camp for children ages 12—14, and is part of the Space Explorers Program, Centre for Planetary Science and Exploration (CPSX) at Western University.

Cronyn Observatory Public Night, Saturday, August 24th, 2019

Partly cloudy, later mostly cloudy skies greeted 126 visitors (including 47 youth) to Western University's Cronyn Observatory Summer Public Night, Saturday, August 24th, 2019, 8:30—11:00 p.m. Postdoctoral Associate Mohammad Reza Ghoreyshi gave 2 presentations his digital slide presentation "*Classification of the Stars*" and fielded questions. This was done on the large TV screen newly installed in the lecture room. Undergraduate student Samaunus Safa was "crowd manager," greeting, directing and counting visitors. There were 61 people (including 12 youth) counted in the lecture room by 8:40 p.m. with more arrivals for a total of 126 visitors (including 47 youth) for the evening.

RASC London Centre was represented by Heather MacIsaac, Henry Leparskas, Bob Duff and Steve Imrie. Graduate student Collin Knight was telescope operator in the dome and directed the big 25.4cm refractor (17mm Nagler eyepiece, 258X) to show visitors Saturn and later Jupiter—as the clouds cleared from east to west. On the observation deck, Bob Duff showed visitors Saturn through the observatory's 20.3cm Schmidt-Cassegrain, using the 20mm Plossl eyepiece (100X), and later the Tele Vue 13mm Plossl eyepiece (154X). Bob also showed them Jupiter and then Saturn again, combining the 20mm Plossl eyepiece with the Meade 2X Barlow lens (200X) for a better view of Saturn. Heather MacIsaac showed visitors Saturn and Jupiter through her 90mm Maksutov-Cassegrain, using a Vixen 17mm Lanthanum LVW eyepiece (73.5X). Steve Imrie showed visitors Saturn and Jupiter through the RASC London Centre's 30.5cm Dobsonian (18mm Radian eyepiece, 83X).

Downstairs in the "*Black Room*" undergraduate student Meet Panchal did the "*Spectroscopy Demonstration*," with the visitors putting on *diffraction grating* glasses to view the spectra of 4 gas discharge lamps, including hydrogen, helium, neon and mercury. Henry Leparskas gave tours of the "*1940s Period Room*," a recreation of Dr. H. R. Kingston's 1940 office, with his brass refractor and the *Sotellunium*—a mechanical eclipse demonstration model built by W. G. Colgrove—on display; and the "*1967 Period Room*," recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation—Canada 150. Henry also did a "*Spectroscopy Demonstration*." The "*Period Rooms*" were designed by RASC London Centre member Mark Tovey.

The visitors were mostly gone by around 11:00 p.m. after an enjoyable and interesting evening learning about the classification of stars, demonstrations of spectroscopy, tours of the history rooms and observing through telescopes.

Cronyn Observatory Public Night, Saturday, August 31st, 2019

Partly cloudy, later mostly cloudy skies greeted 177 visitors (including 61 youth) to Western University's Cronyn Observatory Summer Public Night, Saturday, August 31st, 2019, 8:30—11:00 p.m. Graduate student Arpan Das gave 2 presentations his digital slide presentation "*The Hunt for Supermassive Black Holes*" and fielded questions. This was done on the large TV screen newly installed in the lecture room. Undergraduate student Samaunus Safa was "crowd manager," greeting, directing and counting visitors. There were 177 people (including 61 youth) by 10:42 p.m. in the evening.

RASC London Centre was represented by Heather MacIsaac, Peter Jedicke, Henry Leparskas, Bob Duff, Steve Imrie, Everett Clark, Mark Tovey and Ian Franklin. Heather MacIsaac was telescope operator in the dome and directed the big 25.4cm refractor (17mm Nagler eyepiece, 258X) to show visitors Jupiter and Saturn—periodically visible between clouds. She also talked to visitors throughout the evening about the telescope and explained the 2 clocks on the east wall of the dome and the difference between Standard and Sidereal Time. Everett Clark assisted in the dome. Peter Jedicke gave a telescope talk on the history of the observatory to the huge crowd who came upstairs into the dome at the beginning of the night and acted as liaison throughout the evening.

On the observation deck, Bob Duff showed visitors Saturn through the observatory's Meade 8-inch (20.3cm) Schmidt-Cassegrain, first using the 20mm Plossl eyepiece (100X), and then combining the 26mm Plossl eyepiece with the Meade 2X Barlow lens for a magnification of 154X. The best view of Saturn through the 20.3cm Schmidt-Cassegrain was with the 20mm Plossl eyepiece combined with the 2X Barlow lens (200X). Bob also showed them Jupiter and the star Altair (100X), and directed the 20.3cm Schmidt-Cassegrain towards Vega, visible between clouds in the hazy sky overhead, to show them the nearby "Double-Double" star system Epsilon Lyrae—noticeably split at 200X. Steve Imrie showed visitors Saturn and Jupiter, and the stars Arcturus and Mizar and Alcor, through the RASC London Centre's 30.5cm Dobsonian (18mm Radian eyepiece, 83X).

Downstairs in the "*Black Room*" Henry Leparskas showed people the Apollo 11 display from the Moon Landing 50th Anniversary held on July 20th, 2019, and did the "*Spectroscopy Demonstration*," with the visitors putting on *diffraction grating* glasses to view the spectra of 4 gas discharge lamps, including hydrogen, helium, neon and mercury. Mark Tovey gave tours of the "*1940s Period Room*," a recreation of Dr. H. R. Kingston's 1940 office, with his brass refractor and the *Sotellunium*—a mechanical eclipse demonstration model built by W. G. Colgrove—on display; and the "*1967 Period Room*," recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation—Canada 150. The "*W. G. Colgrove Workshop Period Room*" was open for visitors' inspection. The 3 "*Period Rooms*" were designed by Mark Tovey.

The visitors were mostly gone by around 11:00 p.m. after an enjoyable and interesting evening learning about the hunt for supermassive black holes, demonstrations of spectroscopy, tours of the history rooms and observing through telescopes.