

POLARIS



Newsletter of the London Centre, RASC

July 2019

Bending Light, A Bevy of Refractors.

When it comes to astronomical optics, the form that has been around the longest is the refractor. Galileo used a simple refractor to discover the phases of Venus, the mountains on the moon, the moons of Jupiter and spots on the Sun. Today's offerings follow the form but very little else.

I own several refractors, and when it comes to imaging nebulae, clusters and larger galaxies they are what I use. Also, when I need something quick and simple to take to a public star night I'll reach for a refractor. The way that the optics are laid out, objective at the front and eyepiece at the rear, makes them perfect, especially when young children are in the lineups. It's very simple to place the eyepiece in a position where just about anyone can 'get to it'. Refractors have no central obstruction and no 'vanes' that cause diffraction spikes around bright stars. This means that they deliver high-contrast images with black, silky backgrounds. Very nice.

The first telescope I'll discuss is my Stellarvue 80/9D. I've actually owned this scope twice (long story) and I don't regret either time. This is a fairly standard achromatic doublet; the 80mm f/9.4 objective having a double convex piece of crown glass and a concavo-convex piece of flint glass. The

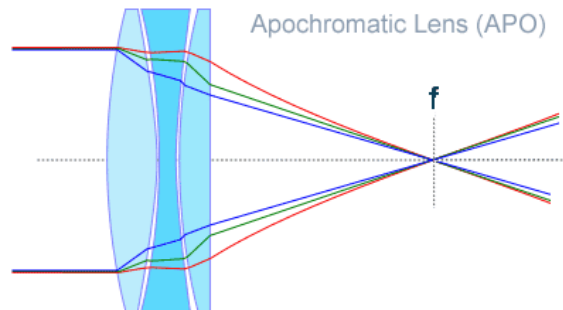
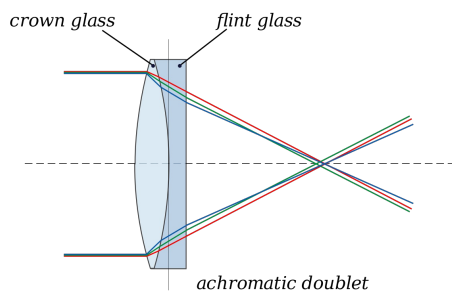


reason for the two types of glass is so that the chromatic aberration induced by the front element can be countered by the rear element. Achromatic means that two colours (generally red and blue) come to focus at the same point. The 80/9D uses a non-standard mating element (the flint) of a special lanthanum glass which helps the colour correction. This is the scope I'd use for planets and the moon.



Next in line is a Stellarvue SV70ED. This telescope, which I use mostly as a guide-scope, is wonderfully made. The tube is well baffled and the focuser is smooth and precise. It has a focal ratio of $f/6$ and gives wonderfully wide fields along with being quite well corrected. Stellarvue is the only maker that doesn't call their ED doublet's 'apochromatic (APO)'. The mating element in most of today's ED doublets uses a type of glass called FPL-53 which is 'extra low dispersion', hence the ED. While these are all very well corrected for secondary colour, they're NOT apochromatic. There being no rules to say otherwise, the ED apochromat has made its way into the nomenclature and everyone (but Stellarvue) uses it.

As I mentioned above, achromatic objectives use two elements and let two colours come to the same focus. A 'true' apochromatic objective can use two, three or more elements and has to at least bring three colours of light (red, green and blue) to the same focus. Any secondary spectrum (areas where the colours don't do this) should be in the infrared or ultraviolet.. where we don't see them.



This brings me to the third refractor. A 92mm $f/7.5$ apochromatic triplet of unknown pedigree and unknown build. I bought this at the Cherry Springs star party from a vendor who claimed that it came from Burgess (a well known optics shop) and was a 'bino-viewer prototype'. It had a very short tube and as he used it required two 2" extenders to bring to focus. The focuser was a single-speed, but well made, Crayford type. I bought it on a whim and started to work making it into something I could use. First thing needing to be done was to extend the tube. Dave Rubenhagen machined two aluminium rings that would screw onto the tube between the tube and the focuser and then cut a kevlar tube to bond into these that gave the tube an extra 105mm. This worked wonderfully, but I discovered that the optics had a horribly curved focal plane. I had purchased an AstroTech 2" field flattener at the Texas Star party for the above-mentioned SV70ED and gave it a try. The field was flat, but there was some



'blue goo' around bright stars. I checked the specs for the flattener and found that it wanted 57mm between the flange and the sensor. My Nikon had 55mm. A home-made 2" spacer was inserted and now the stars were round, tack-sharp and with no colour. A keeper for sure. The only fly in this scope's ointment is that I have to use a t-ring/adaptor with it. The Nikon f-mount doesn't like these and the raw images show vignetting and some artifacts caused by light

hitting the threads in the adaptor. Oh well, I crop those out. And changed the focuser to a Scope-stuff model with dual speeds.

The last telescope in the list is a purpose-built astrograph (telescope for imaging). The AstroTech 65mm ED Quadruplet. This f/6.5 telescope has an ED triplet (centre element uses FPL-53) and a single, highly-curved ED flattening element. It has a 2", dual-speed rack-and-pinion focuser that is a pleasure to use. With my Nikon D810A it gives a true field of 4.75 x 3.25 degrees. It has a smoothly rotating camera holder and vignettes very little with the full-frame camera.



That's my bevy of refractors. There are a few others lying about but they're mostly finders of some form or small guide-scopes. These are the ones that go with me to do battle with the night.

TTFN

RASC London Centre Library
Books of the Month
July 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 July 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. c2008.

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

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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

Cronyn Observatory Public Nights & Special Events, June 15th—July 6th, 2019

By Robert Duff

Cronyn Observatory Public Night, Saturday, June 15th, 2019

Cloudy damp weather greeted 16 visitors (including 3 children) to Western University's Cronyn Observatory Summer Public Night, Saturday, June 15th, 2019, 8:30 p.m. Professor Jan Cami gave his digital slide presentation "*Multi-messenger astronomy: what have we learned from gravitational wave detections?*" and fielded questions. This was done on the large TV screen newly installed in the lecture room. RASC member Bob Duff greeted and counted visitors using 2 hand tally counters—provided by fellow RASC member Lynn Jones—one to count all visitors and one for youth (children, high school or younger). There were some 10 visitors in the lecture room for Jan's presentation. People went upstairs into the dome and downstairs for demonstrations and tours of the history room.

RASC London Centre was represented by Henry Leparskas, Everett Clark, Bob Duff and Heather MacIsaac. Lynn Jones rearranged the chairs in the lecture room, which had been set up for convocation, greeted the first 10 visitors, visited the dome briefly and listened to Jan's slide presentation. Graduate student Aameek Sidhu was telescope operator for the big 25.4cm refractor in the dome, which remained closed due to the damp weather. Bob selected the 32mm Erfle eyepiece (137X) for demonstration with the 25.4cm refractor. Heather and Everett set up the observatory's 8-inch (20.3cm) Schmidt-Cassegrain (12.5mm Ortho eyepiece, 160X) on the dome floor so as to view out the door to the observation deck.

Bob swapped in the 20mm Plossl eyepiece (100X), for a better view, and directed the 20.3cm Schmidt-Cassegrain towards the TV screen in the Western Student Recreation Centre windows. Bob gave one undergraduate student, interested in volunteering at the Cronyn, a tour of the big 25.4cm refractor in the dome and explained how the 20.3cm Schmidt-Cassegrain worked. Bob also hauled out the RASC London Centre's home-built 30.5cm Dobsonian from the storage room to show him how a Newtonian reflector telescope worked. Heather MacIsaac gave informal tours of the dome to several visitors, explaining the big 25.4cm refractor worked. Visitors viewed the TV screen in the Western Student

Recreation Centre windows through the 20.3cm Schmidt-Cassegrain. Ameer later came upstairs into the dome, after listening to Jan's slide presentation, to give informal tours of the big 25.4cm refractor—rotating, but not opening, the dome for demonstration.

Downstairs in the “*Black Room*” undergraduate student Meet Panchal did the the “*Transit Demonstration*,” with the “*Transit Demo*” model, showing how the transit detection method worked for finding extra-solar planets, and 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 showed visitors 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. The “*1967 Period Room*,” recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation—Canada 150, was also open. The “*W. G. Colgrove Workshop Period Room*” was closed for renovations. The 3 “*Period Rooms*” were designed by RASC London Centre member Mark Tovey.

Towards the end of the evening Henry invited a family upstairs to the dome and some children got to “walk on the Moon and Mars” by stepping on the 2 round wood and clear plastic display cases containing tiny “*Moon Rock*” and “*Mars Rock*” meteorite samples. Ameer, Heather and Everett closed down the dome by around 10:40 p.m. since there were no more visitors. The observatory was closed by 11:00 p.m. shortly after the last visitors left the historic “*1940s Period Room*.”

Cronyn Observatory Public Night, Saturday, June 22nd, 2019

Mostly clear skies greeted 107 visitors (including 25 youth) to Western University's Cronyn Observatory Summer Public Night, Saturday, June 22nd, 2019, 8:30—11:00 p.m. Professor Els Peeters made 2 presentations of her digital slide presentation “*Revealing the Universe with the James Webb Space Telescope*” and fielded questions. This was done on the large TV screen newly installed in the lecture room. Undergraduate student Samaunus Safa was “crowd manager,” along with RASC member Lynn Jones, greeting and directing visitors into the lecture room, dome or downstairs for demonstrations and history room tours. RASC member Bob Duff gave Samaunus 2 hand tally counters—provided by Lynn Jones—one to count all visitors and one for youth (children, high school or younger). The lecture room was full by the end of the first slide presentation, which began at 8:30 p.m., and there were around 10 people for the second slide presentation at 9:30 p.m. Samaunus counted 71 visitors (including 20 youth) by 9:30 p.m. There were 107 visitors (including 25 youth) counted by the end of the evening.

Professor Jan Cami was telescope operator in the dome and directed the big 25.4cm refractor (17mm Nagler eyepiece, 258X) towards Jupiter using hour angle and declination coordinates provided by Everett from the planetarium software “*Stellarium*” on the computer. This was at 9:00 p.m. with Jupiter 7 degrees above the southeastern horizon. Sunset was at 9:08 p.m. and Jupiter was not visible in the still daylight sky. Jupiter became visible as it rose in the deepening twilight sky with the Great Red Spot visible on the central meridian through the big 25.4cm refractor.

RASC London Centre was represented by Henry Leparskas, Paul Kerans, Bob Duff, Everett Clark, Mike Roffey Steve Imrie, Heather MacIsaac, Lynn Jones, Peter Jedicke, and Mohammed Mubeen—who arrived around 9:30 p.m. and took pictures. Mike helped Paul set up his Celestron 9.25-inch (23.5cm) Schmidt-Cassegrain with a Vixen SXD2 mount on the observation deck. Steve set up the RASC London Centre's home-built 30.5cm Dobsonian and Heather set up her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain. Paul showed visitors Jupiter, M57, M13, M81, M82 and Saturn through his 23.5cm Schmidt-Cassegrain (21mm Ethos eyepiece, 112X). Heather showed Jupiter through her 90mm Maksutov (Vixen 22mm Lanthanum LVW eyepiece, 57X). Steve showed Jupiter, Mizar and Alcor, the Ring Nebula (M57) and Saturn through the 30.5cm Dobsonian (18mm Radian eyepiece, 83X).

Downstairs in the “*Black Room*” graduate student Chris Fox did the the “*Transit Demonstration*,” with the “*Transit Demo*” model, showing how the transit detection method worked for finding extra-solar planets, and 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 showed visitors 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. The “*1967 Period Room*,” recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation—Canada 150, and the “*W. G. Colgrove Workshop Period Room*” were also open. The 3 “*Period Rooms*” were designed by RASC London Centre member Mark Tovey.

There was a lineup in the dome to view through the 25.4cm refractor and later in the evening Jan invited 4 children to “walk on the Moon and Mars” by stepping on the 2 round wood and clear plastic display cases containing tiny “*Moon Rock*” and “*Mars Rock*” meteorite samples. Pictures were taken through the 25.4cm refractor using a smartphone adapter brought out by Jan from the eyepiece storage room. The dome was closed down around 11:45 p.m. after an excellent evening of slide presentations, demonstrations, history room tours and observing through telescopes.

Asteroid Day at the Cronyn Observatory, Saturday, June 29th, 2019

Clear skies greeted some 60 visitors (including an estimated 10—12 youth) to Western University's Cronyn Observatory for Asteroid Day, Saturday, June 29th, 2018, 5:30—8:30 p.m. (followed by a regular Saturday Public Night, 8:30—11:00 p.m.). This special event was hosted by Western University's Centre for Planetary Science and Exploration (CPSX) in collaboration with the Department of Physics and Astronomy and the Department of Earth Sciences. Asteroid Day (June 30th) is held each year on the anniversary of the 1908 Tunguska impact event in Siberia—the largest in recent history—and is a global awareness campaign bringing people around the world together to learn about asteroids and how to protect future generations from cosmic impacts. The event organizers were Professor Jan Cami and Dr. Parshati Patel, Outreach Program Coordinator for Western's Centre for Planetary Science and Exploration.

Activities (5:30—8:30 p.m.) included a (1) Meteorite Clinic; (2) Meteorites Display; (3) Virtual Reality Station; (4) Asteroid Mining; and (5) Solar Observing. There were digital slide presentations (6:30—

8:30 p.m.) by (1) Dr. Paul Wiegert, "*Asteroids: deadly danger or imminent catastrophe? (or maybe neither!)*"; and (2) Dr. Mark Tovey, "*W.G. Colgrove and the Dresden Meteorite.*" These were presented using the large TV screen newly installed in the lecture room. Geoscience Collections Curator Alysha McNeil supervised the Meteorite Clinic and Meteorites Display, which was set up on a table, inside the lecture room door on the left side. Downstairs in the "*Black Room*" undergraduate students Alyssa Coelho and Dana Beaton supervised the Virtual Reality Station and Asteroid Mining activities, respectively.

Extensive interviews with big cameras were done by 90th Parallel Productions for Crave / Bell Media. They interviewed Professor Paul Wiegert for a documentary on the existential threat posed by asteroids and videoed his slide presentation. They also visited the dome, for an early evening view of Jupiter through the 25.4cm refractor, and briefly toured the observation deck where telescopes were directed at Jupiter. CTV News London was also on hand to interview Professor Jan Cami on the observation deck for a newscast that later appeared on television.

RASC London Centre was represented by Henry Leparskas, Heather MacIsaac, Peter Jedicke, Everett Clark, Mark Tovey, Paul Kerans, Mohammed Mubeen and Bob Duff—who arrived around 7:00 p.m. Henry and Jan set up telescopes on the observation deck for solar observing. Visitors were able to view the Sun through the observatory's Coronado 90mm H-alpha solar telescope (CEMAX 12mm eyepiece, 66.7X) and Meade 8-inch (20.3cm) Schmidt-Cassegrain (26mm Plossl eyepiece, 77X) with a Kendrick Astro Baader film solar filter. Heather MacIsaac showed people the Sun through her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (32mm Plossl eyepiece, 39X) with a Kendrick Astro Baader film solar filter. There were no sunspots visible but visitors were able to see one prominence on the edge of the Sun through the Coronado 90mm H-alpha solar telescope.

Peter Jedicke gave a tour of the "*1940s Period Room.*" Henry and Mohammed took pictures of the event with their cameras. Asteroid Day gave way to the regular Cronyn Observatory Saturday Public Night with Paul Wiegert and Mark Tovey making additional evening presentations of their Asteroid Day slide talks.

Cronyn Observatory Public Night, Saturday, June 29th, 2019

Clear skies greeted 116 visitors (including 38 youth) to Western University's Cronyn Observatory Summer Public Night, Saturday, June 29th, 2019, 8:30—11:00 p.m. This was following the Asteroid Day event, 5:30—8:30 p.m. Dr. Paul Wiegert made 2 presentations of his digital slide presentation "*Asteroids: deadly danger or imminent catastrophe? (or maybe neither!)*," and he was followed by Dr. Mark Tovey, who gave 2 presentations his "*W.G. Colgrove and the Dresden Meteorite.*" Presented using the large TV screen newly installed in the lecture room, these presentations had been done earlier in the afternoon for Asteroid Day.

Undergraduate student Samaunus Safa was "crowd manager," greeting and directing visitors. RASC member Bob Duff gave Samaunus 2 hand tally counters—provided by RASC member Lynn Jones—one to count all visitors and one for youth (children, high school or younger). There were 116 visitors

(including 38 youth) counted by the end of the evening.

RASC London Centre was represented by members who showed up for Asteroid Day earlier, in the afternoon, including Henry Leparskas, Heather MacIsaac, Peter Jedicke, Everett Clark, Mark Tovey, Paul Kerans, Mohammed Mubeen and Bob Duff. They were joined by Steve Imrie early in the evening and by Norm McCall who arrived around 9:15 p.m.

The observatory's Coronado 90mm H-alpha solar telescope was removed from the observation deck along with the Kendrick Astro Baader film solar filter from the Meade 8-inch (20.3cm) Schmidt-Cassegrain. Steve Imrie set up the RASC London Centre's home-built 30.5cm Dobsonian (18mm Radian eyepiece, 83X) and showed visitors Jupiter, Saturn, the Ring Nebula M57 and the yellow and blue double star Albireo. Everett Clark showed visitors Jupiter through the observatory's 20.3cm Schmidt-Cassegrain, using the 26mm Plossl eyepiece (77X), which was soon taken over by Bob Duff who swapped in the 20mm Plossl eyepiece (100X) for a better view. Heather MacIsaac showed people Jupiter and Saturn through her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (Vixen 22mm Lanthanum LVW eyepiece, 57X). Paul Kerans showed visitors Jupiter, Saturn, globular cluster M13, the Ring Nebula M57, and galaxies M81 and M82, through his Celestron 9.25-inch (23.5cm) Schmidt-Cassegrain (21mm Ethos eyepiece, 112X) set up on a Vixen SXD2 mount.

The interviews conducted by 90th Parallel Productions for Crave / Bell Media in the afternoon were followed video recording and observing of Jupiter through the big 25.4cm refractor in the dome, hosted by Professor Jan Cami and graduate student Keegan Marr as telescope operator. Keegan was assisted by RASC member Everett Clark and they showed visitors Jupiter and Saturn through the 25.4cm refractor for the rest of the evening. They began viewing Jupiter with the 17mm Nagler (258X) and then swapped in the 52mm Erfle (84X) and did the same with Saturn. They finally returned to Jupiter, using the 12.5mm Ortho eyepiece (351X) for a good view of the Great Red Spot through the 25.4cm refractor.

Downstairs in the "*Black Room*" Professor Jan Cami gave demonstrations of the "*Transit Demonstration*," with the "*Transit Demo*" model—showing how the transit detection method worked for finding extra-solar planets, and 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.

Peter Jedicke arrived at 5:30 p.m. in the afternoon for the Asteroid Day event, answered questions in the lecture room, gave one "*Spectroscopy Demonstration*" in the "*Black Room*" and then answered questions for the rest of the evening in the "*1940s Period Room*." Henry Leparskas and Mohammed Mubeen took pictures of the event with their cameras. Henry had been at the Cronyn since 4:30 p.m., helping set up the 90mm Coronado H-alpha solar telescope and bringing out the 20.3cm Schmidt-Cassegrain for afternoon solar (and later evening) observing. He remained until closing at 11:00 p.m., taking pictures and giving 2 brief history talks to people lined up to view through the big 25.4cm refractor in the dome.

Indigenous Services Mini-University, Special Event at the Cronyn Observatory, July 2nd, 2019

Cloudy skies with rain showers greeted 33 visitors, including 27 youth of the Otter Group (ages 12—14) from the Indigenous Services Mini-University, for a Special Event at Western University's Cronyn Observatory, Tuesday, July 2nd, 2019, 9:00 p.m. Professor Jan Cami presented his digital slide presentation "*The Search for Earth 2.0*" and fielded questions. This was done on the large TV screen newly installed in the lecture room. The visitors were then divided into 2 groups, with one going downstairs for demonstrations in the "*Black Room*" and the other going upstairs for a tour of the dome.

The demonstrations in the "*Black Room*" were done by graduate student Hadi Papei, for the first group, and by Jan Cami for the second group. These included the "*Transit Demonstration*," with the "*Transit Demo*" model, showing how the transit detection method worked for finding extra-solar planets, and 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 was represented by Bob Duff and Peter Jedicke. They set up the observatory's Meade 8-inch (20.3cm) Schmidt-Cassegrain inside the dome so as to view out the door to the observation deck. Bob then installed the 20mm Plossl eyepiece (100X) and directed the 20.3cm Schmidt-Cassegrain towards the communications tower in south London. They also hauled out the London Centre's 25.4cm Dobsonian, with Bob installing the 17mm Nagler eyepiece (66X) and Peter directing it towards the tower.

When the first group arrived upstairs in the dome, Bob gave a talk on the history and technical aspects of the big 25.4cm refractor, using the 32mm Erfle eyepiece (137X) for demonstration. He pointing out the Schmidt camera and Cassegrain reflector telescope piggy-backed on the 25.4cm refractor and explaining the difference between a refractor and reflector telescope. He briefly rotated, but did not open, the dome to show how it worked. He also showed them the 2 clocks on the east wall of the dome and explained the difference between Standard and Sidereal Time. Peter gave a similar talk to the second group, when they arrived in the dome. Peter and Bob also explained how the 25.4cm Dobsonian and the 20.3cm Schmidt-Cassegrain worked as reflector telescopes. The visitors lined up to view through the 25.4cm Dobsonian and the 20.3cm Schmidt-Cassegrain and asked questions.

The visitors were gone by 10:30 p.m. after an interesting evening learning about the search for exoplanets, spectroscopy and how telescopes worked, despite the cloudy, rainy sky.

Cronyn Observatory Public Night, Saturday, July 6th, 2019

Partly to mostly cloudy skies greeted 73 visitors (including 10 youth) to Western University's Cronyn Observatory Summer Public Night, Saturday, July 6th, 2019, 8:30 p.m. Graduate student Ameek Sidhu made 2 presentations of her digital slide presentation "*The Spitzer Space Telescope – Observing the Universe in the Infrared*" on the large TV screen newly installed in the lecture room. Undergraduate student Callum Dewsnap was "crowd manager," greeting and directing visitors into the lecture room,

dome or downstairs for demonstrations and history room tours. RASC member Bob Duff gave Callum 2 hand tally counters, one to count all visitors and one for youth (children, high school or younger). Bob counted 38 visitors in the lecture room at 8:45 p.m. Callum counted 73 visitors (including 10 youth) by the end of the evening.

Graduate student Mark Froncisz was telescope operator in the dome and directed the big 25.4cm refractor (52mm Erfle eyepiece, 84X) to show a few people the communications tower in south London early in the evening. He later directed the 25.4cm refractor towards the 4-days-past new crescent Moon when it appeared from behind the clouds, swapping in the 17mm Nagler eyepiece (258X) for a better view.

RASC London Centre was represented by Bob Duff, Everett Clark, Steve Imrie, Heather MacIsaac, Fraser McCrossan, Norm McCall, Peter Jedicke and Mark Tovey. Steve Imrie set up the RASC London Centre's home-built 30.5cm Dobsonian (18mm Radian eyepiece, 83X) and showed visitors the wind turbine on the Engineering building and the Moon when it appeared from behind the clouds. Heather MacIsaac showed people the communications tower and the Moon through her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (Vixen 22mm Lanthanum LVW eyepiece, 57X). Fraser McCrossan set up his William Optics Megrez 80 APO refractor (Celestron NexStar SE mount) and showed visitor a TV screen, visible in an Engineering building window; the wind turbine, using Hyperion 17mm eyepiece (28X); and the Moon, using a Speers-WALER 10mm eyepiece (48X) and a Hyperion 5mm eyepiece adapted to 4mm (120X) with a fine tuning ring.

Downstairs in the "*Black Room*" undergraduate student Sofia Pasquini gave demonstrations of the "*Transit Demonstration*," with the "*Transit Demo*" model—showing how the transit detection method worked for finding extra-solar planets, and 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.

Peter Jedicke showed visitors 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. Mark Tovey showed visitors 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*" remained closed. The 3 "*Period Rooms*" were designed by RASC London Centre member Mark Tovey.

Mark Froncisz closed the dome around 10:25 p.m. as the last visitors left. There were still visitors in the downstairs history rooms and Peter, Mark, Heather, Everett and Bob left the Cronyn Observatory when it was finally closed down around 11:00 p.m.