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A Quick Start Guide to Binoculars

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If you are new to astronomy you may already be considering what to purchase for your first telescope. But what if I told you, you don't need a telescope to start your journey in astronomy? Yes, have you considered binoculars? Do not overlook binoculars. Start off with a good pair and they can last a lifetime. You do not need to invest in a telescope, eyepieces and a mount. In fact, with an ordinary pair of binoculars, astronomical observing is just a clear night away.

Beginning stargazers often overlook binoculars for astronomy, but experienced observers keep them close at hand. Compared to a telescope, binoculars for astronomy actually have certain advantages. Granted, they're smaller and give lower magnification. But they're lighter, much easier to take outside, use, and put away, and less expensive. They also give a much wider view than a telescope does, making celestial objects easier to find. They let you use both eyes, providing surer, more natural views. Moreover, with binoculars everything is right-side up and presented correctly, not upside down and/or mirror-reversed.

Understanding Your First Pair

Binoculars are primarily defined by:

1) Their magnification or "power" (the first number) and aperture,
2) The diameter or aperture of the large front lenses measured in millimeters (the second number), and
3) Apparent Field of View measured in degrees.

Typical combinations used by astronomers include: 8x56 Field 5.8°, 9x63 Field 5°, 10x50 Field 6.5°, 15x70 Field 4.4° or 20x80 Field 3.5° etc. These number are usually printed beside the eyepiece as shown in the picture above.

Magnification

The magnification is important for two reasons. Firstly, it enables you to make out detail that you would not normally be able to see. Secondly, increasing the magnification darkens the sky background, improving the contrast of some objects. Unless you observe under exceptionally dark skies, you should therefore consider the greatest practicable magnification.

Aperture

A larger aperture lets more light into the instrument, enabling you to see fainter objects. You should therefore consider the greatest practicable aperture (more on "practicable" later). It also theoretically increases the resolution of the binocular but, since the binocular will not be used at a magnification anything like enough to achieve maximum resolution, this is largely irrelevant.

If we increase the aperture, we increase the physical size and, more importantly, the weight, of the binocular (if we double the aperture of a lens, its weight will increase by approximately eight times). This makes it more difficult to hold steadily for long periods. If we increase the magnification, we magnify our "shake"; this makes it more difficult to observe satisfactorily and actually makes some objects invisible. We can ameliorate some of these effects by holding y holding the binocular in a more effective manner (see: http://binocularsky.com/binoc_hold.php), or by mounting them on a monopole, a tripod or better yet a paragon articulating mount (see: http://binocularsky.com/binoc_mount.php).

Second, high power narrows your field of view. The 5° field in typical 10x binoculars encompasses only half as much sky area as the 7° field in 7x glasses with similar eyepiece design. A wide field is a big help, especially for beginners trying to match what they see to patterns on a star atlas.

Third, high power magnifies optical aberrations and misalignments. If budget binoculars give stars annoyingly obvious spikes and flares, why magnify the problem? Fine performance even at moderately high power is one of the reasons why quality is crucial in binoculars intended for astronomy.

Field of View

The field of view (FOV) is a measurement that indicates the width of the view seen through the binoculars at a specified distance, it is most often represented in feet at

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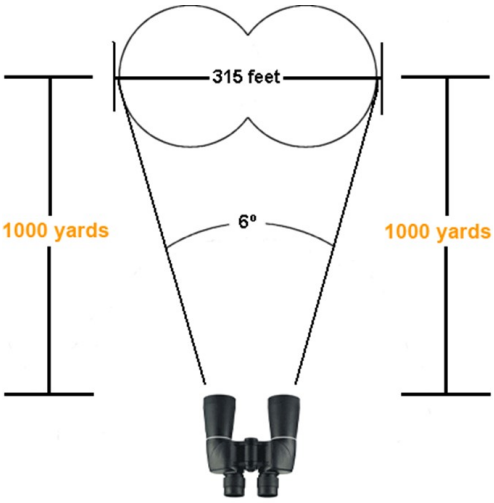
1,000 yards, but increasingly common is in meters at 1,000 meters.

Angular Field of View

The angular field of is the angle expressed in degrees between the left and right extremes of the FOV and the center of the objective lenses of your binocular as shown in the diagram above. So, in the example represented in the diagram, the field of view of theses binoculars is 315 feet at 1,000 yards and the angle is 6° Typically, the FOV vary from about 10° (the size of the Big Dipper's bowl, or the size of your fist held at arm's length) for wide-angle models, to a mere 2° (the width of your thumb at arm's length) for high-power models. Most of the time, though, the field of view is about 5° to 8° wide: about as much sky as is covered by a golf ball or squash ball held at arm's length. Typically, as the magnification increases, the FOV decreases.



Apparent field of view (AFOV)

Some binocular manufacturers list their field of view as the Apparent field of view, this is the value of the angular field of view multiplied by the magnification of the binoculars (Apparent field of view = Magnification x angular field of view). So, for example, if the binoculars had a magnification of 8x, the apparent field of view would be 8 x 6 = 56°. This value allows for a comparison of binoculars with different magnifications.

Exit Pupil

The diameter of the circle of light which exits the binoculars is called the exit pupil of the binocular. Ideally the exit pupil should match the eye pupil which in low-light conditions is approximately 7 millimeters. The exit pupil is calculated by dividing the magnification of the binocular into the diameter of the objective lenses. So, the SkyMaster 9x63 have 7 millimeters which shows they are optimized for nighttime viewing.

Therefore, with all else being equal, the larger the exit pupil diameter, the more amount of light will be delivered to your eye. It is therefore an important aspect when comparing the theoretical brightness of two optical instruments and something to consider when choosing binoculars, especially for use in poor light conditions like at dawn or dusk or for astronomical observation.

Nighttime Viewing

It should be noted when it comes to determining how much binoculars will show in the night sky, power counts *exactly as much as aperture*.

Roy L. Bishop, former editor of the annual *Observer's Handbook* of the Royal Astronomical Society of Canada (RASC), analyzed what's important in celestial binoculars, especially under today's light-polluted skies, and came up with an all-purpose "visibility factor." A binocular's night-sky performance, it turns out, is most accurately rated in a very simple manner. Just multiply the aperture times the power. That's the visibility factor.

A pair of 7 x 50s, for instance, gets a rating of 350. This means 7 x 50s actually, perform a little less well for astronomy than smaller 10 x 40s, which get a visibility rating of 400. Such a claim flies in the face of decades of conventional wisdom. "But," noted Bishop, "it agrees with my own experience." (Note: this however does not factor in weight considerations and ease of use.)

High Power Trade-offs

High power in binoculars does have its drawbacks. The first and worst is that it magnifies the wiggling of your hands. For this reason, 10x50 is about the limit for hand-held observing and 15x70 for short periods. While the shake you get when hand-holding a binocular is not usually obtrusive on large objects (e.g. Orion Nebula, Andromeda Galaxy), it is infuriating on double stars that test the binocular (e.g. Albireo or δ Cephei for a 10×50).

Variable Power Binoculars

Finally, don't imagine that you can get the best of all worlds by buying variable-power zoom binoculars. Such instruments are expensive compromises at best and sloppy kludges at worst. They never seem to perform as well as glasses that were designed for a specific power from the outset.

Using Binoculars

Typically, one uses binoculars by blocking the right side and focussing the left side with a distant object using the main focussing control (wheel in the middle). Then one blocks the left side and focusses on the same object with the right side by turning its eyepiece. The binoculars are then adjusted for both your eyes and you can then use the main focussing wheel for other objects.

Sometimes when binoculars are not properly collimated (mirrors misaligned or not accurately distanced from each other) you may see doubled images. You then have to adjust the binoculars themselves. Some have small screws that can serve the purpose. With a cheaper pair that I bought at Lee Valley (8x40) I had that problem with no screw adjustment possible. However, the front part of each side could be unscrewed and by unscrewing the left side just slightly I could get collimation (single image). It sure beat returning them or throwing them out.

Celestron SkyMaster DX 9x63 Binoculars

The SkyMaster DX 9x63 (model 72032) represent a good lightweight pair of binoculars for the typical astronomer. With a magnification of 9x and a primary objective of 63 millimeters, they have a visibility rating of (9x65) 567 and a decent 5° angular FOV make these binoculars a good choice for binocular astronomy and low-light field use. Available on Amazon for under $200 Canadian, they represent a great value.

Summary

Although you don't need to spend a lot for binoculars, one should note binoculars have: two eyepieces, two objectives, two different focusing mechanisms, prisms and housing, and other bits of tubing. Realistically, what sort of quality is it reasonable to expect for the equivalent cost of one eyepiece (in the case of the 15×70)? Clearly, a budget of $200 is quite reasonable. While a low-cost set may look attractive, from my experience, a low-cost set will find little use due to disappointingly low-quality views.

Sky Events for Late June and Early July

June 20: Moon First Quarter
June 21: Solstice
June 27: Saturn at opposition
June 28: Full Moon
July 1: Mars 5° S of Moon
July 12: Mercury 0.7° S of Beehive Cluster (M44)
July 13: New Moon
July 15: Regulus 1.8° S of Moon
July 19: Moon First Quarter

Planets
Mercury: Is fading & dropping in declination making it more difficult to see.
Venus: Remains well placed in the evening sky but dropping over the course of the month.
Mars: Achieved closest approach to earth on 31st. since 2003.
Jupiter: Well placed in the evening sky throughout the month.
Saturn: Now in the evening sky but low for Northern Hemisphere observers.
Uranus: Visible in the morning sky among the stars of Pisces.
Neptune: Visible in the overnight and morning hours in Aquarius.

R.A.S.C. London Centre Library — Books of the Month, June 2018

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 June 2018 are as follows:

- *The Backyard Astronomer's Guide,* by Terence Dickinson & Alan Dyer. Revised Edition. 2002.
- *365 Starry Nights: an Introduction to Astronomy for Every Night of the Year,* text and illustrations by Chet Raymo. c1982.
- *Universe on a T-shirt: the Quest for the Theory of Everything*, by Dan Falk. c2002.

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Exploring the Stars, Special Events & Cronyn Observatory Public Nights, & Special Events, May 12th — June 2nd

By Robert Duff

Exploring the Stars, Space Invaders, Friday, May 11th, 2018

Cloudy skies and rain greeted 20 visitors of the group Space Invaders, including 11 adults and 9 children (ages 6—14), for Exploring the Stars at Western University's Cronyn Observatory, Friday, May 11th, 2018, 8:00 p.m. Graduate student Shannon Hicks presented the digital slide presentation *"Our Solar System,"* and fielded questions.

RASC London member Bob Duff set up the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X) and the observatory's Meade 8-inch (20.3cm) Schmidt-Cassegrain (20mm Plossl eyepiece, 100X) telescopes inside the dome, which remained closed due to rain. When everybody 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 explained the Schmidt camera and Cassegrain reflector telescope piggy-backed on the main telescope. He also showed them the 2 clocks on the east wall of the dome and explained the difference between Standard and Sidereal Time. Bob also explained the 25.4cm Dobsonian and the difference between a reflector and refractor telescope, and briefly showed them the 20.3cm Schmidt-Cassegrain telescope.

Shannon then brought the group back downstairs into the lecture room where she did the *"Crater Experiment"* activity, placing 2 pans filled with flour and topped with chocolate powder on a table and inviting the children to drop various size balls into the pans to demonstrate impact cratering. The visitors were gone by around 9:45 p.m. after an enjoyable evening learning about astronomy and telescopes, despite the cloudy, rainy weather.

Science Rendezvous at Western University, Saturday, May 12th, 2018

Cloudy skies and rain, with clearing later in the afternoon greeted visitors to Science Rendezvous held at Western University's TD Stadium on Saturday, May 12th, 2018, 10:00 a.m.—4:00 p.m. This was the second time Western University participated in this nationwide event, bringing hands-on science, technology, engineering, art and math (STEAM) activities to children. Cronyn Observatory Director Professor Jan Cami was the main organizer of the event and chair of the Organizing Committee, with Postdoctoral Fellow Dilini Subasinghe as co-chair. Centre for Planetary Science and Space Exploration (CPSX) Outreach Program Coordinator and PhD graduate Parshati Patel coordinated the CPSX booths.

Graduate students Viraja Khatu and Shannon Hicks set up the Solar Observing booth with the help of RASC London Centre volunteers Everett Clark, Heather MacIsaac, Henry Leparskas and Norm McCall, later joined by Bob Duff around 1:45 p.m. Shannon left around 12 noon. Heather provided a canopy for the booth and set

up her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (32mm Plossl eyepiece, 39X). Norm McCall set up his Explore Scientific 152mm Maksutov-Newtonian Comet Hunter. Everett and Viraja set up the Cronyn Observatory's 8-inch (20.3cm) Schmidt-Cassegrain (20mm Plossl eyepiece, 100X). Since it was cloudy, all 3 telescopes were directed towards the large bird's nest on top of one of the floodlight towers overlooking the TD Stadium. Henry Leparskas was the event photographer and identified the birds as ospreys, a type of hawk. When the sky partially cleared to a few hazy clouds around 2:30 p.m., Heather installed a Kendrick Astro *Baader* film solar filter on her 90mm Maksutov-Cassegrain and Norm installed a similar solar filter on his 152mm Maksutov-Newtonian. There was one very small sunspot visible on the Sun through these telescopes.

Viraja and Bob also set up the Cronyn Observatory's 90mm Coronado H-Alpha Solar Telescope on the Sky-Watcher EQ5 mount, installing the CEMAX 25mm eyepiece (32X) which showed a couple of prominences on the Sun's edge and some mottling on the surface. Bob later swapped in the CEMAX 18mm eyepiece (44X) to show visitors a better view of the Sun. The battery supply soon failed and Bob had to constantly re-centre the Sun in the 90mm Coronado's field of view.

The Science Rendezvous event at Western's TD Stadium was over by around 4:10 p.m. The number of visitors was estimated to be around 800—1,000 people for the entire event, although cloudy skies for a good part of the day meant that only a relatively small number of people were able to view the Sun through the telescopes.

Cronyn Observatory Public Night, Saturday, May 12th, 2018

A hazy cloudy sky greeted some 40 visitors to Western University's Cronyn Observatory Summer Public Night, Saturday, May 12th, 2018, 8:30 p.m. Earth Sciences graduate student Liam Innis presented his digital slide presentation *"Asteroid Mining: Pipe Dream or Gold Rush?"* and fielded questions. There were 32 people in the lecture room at 8:55 p.m. and a total of some 40 visitors for the evening. Graduate student Ameek Sidhu did the *"Transit Demonstration"* and the *"Spectroscopy Demonstration"* downstairs in the *"Black Room."*

Professor Paul Wiegert was telescope operator for the big 25.4cm refractor in the dome. RASC London Centre was represented by Everett Clark, Heather MacIsaac, Dale Armstrong, Bob Duff and Mark Tovey. London Centre member Richard Gibbens was also there and listened to the slide presentation. Dale gave talk on the big 25.4cm refractor in the dome. On the observation deck outside the dome, Bob showed visitors the wind turbine on the Engineering building through the London Centre's 25.4cm Dobsonian, swapping in the 17mm Nagler eyepiece (66X) in place of the 52mm Erfle eyepiece (21.4X) for a better view. Dale showed a high school student volunteer how to use the observatory's 8-inch (20.3cm) Schmidt-Cassegrain (26mm Plossl eyepiece, 77X). Heather MacIsaac directed her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (32mm Plossl eyepiece, 39X) towards the communications tower in south London. The high school student volunteer was able to test her 3-power Barlow lens from her small telescope at home on Heather's 90mm Maksutov-Cassegrain, which produced a magnification of 108X with the 32mm Plossl eyepiece.

Downstairs in the *"Black Room"* graduate student Ameek Sidhu did the *"Transit Demonstration"* activity, 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. Mark Tovey gave tours of the historic *"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 also showed them the *"1967 Period Room,"* recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation—Canada 150. Both "*Period Rooms"* were designed by RASC London Centre member Mark Tovey.

The visitors were gone by around 11:00 p.m. after an enjoyable evening learning about asteroid mining, astronomy, telescopes and the history of the observatory, despite the cloudy sky.

Cronyn Observatory Public Night and Special Event, Saturday, May 19th, 2018

Cloudy, later partly cloudy skies with some rain greeted 19 visitors to Western University's Cronyn Observatory Summer Public Night and Special Event, Saturday, May 19th, 2018, 8:30 p.m. The occasion was the opening of the W.G. Colgrove Exhibit in the basement of the observatory. RASC London Centre member Mark Tovey presented his digital slide presentation *"W. G. Colgrove: Astronomical Model-Maker Extraordinaire."* Graduate student Ben George was "crowd manager," greeting and counting 19 visitors for the evening.

Professor Jan Cami listened to Mark's slide presentation and then proceeded downstairs to the *"Black Room,"* where he gave 2 demonstrations each of the *"Transit Demonstration"*—using the *"Transit Demo"* model to show 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.

Mark gave a tour of the newly created *"W. G. Colgrove Exhibit"* and the historic *"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 also showed them the *"1967 Period Room,"* recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation—Canada 150. Both "*Period Rooms"* and the *"W. G. Colgrove Exhibit"* were designed by RASC London Centre member Mark Tovey.

RASC London Centre was well represented by Everett Clark, Henry Leparskas, Heather MacIsaac, Bob Duff and Dale Armstrong, as well as Mark Tovey. Unattached RASC member Paul Kerans was also there. There was also a high school student volunteer. Graduate student Viraja Khatu was telescope operator and directed the big 25.4cm refractor (32mm Erfle eyepiece, 137X) in the dome towards Venus. With some assistance from Dale and Bob, Viraja directed the 25.4cm refractor towards Jupiter which was periodically obscured by clouds in the southeast. Dale was able to get a brief glimpse of Jupiter through the 25.4cm refractor before it was obscured by clouds.

Everett set up the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X) on the observation deck and Paul directed it towards the 4-day-past-new crescent Moon. Jupiter was also viewed in the 25.4cm Dobsonian with the 17mm Nagler eyepiece (66X), with Bob swapping in the 12.5mm Ortho eyepiece (89X) for a better view.

Everett set up the observatory's Meade 8-inch (20.3cm) Schmidt-Casegrain (12.5mm Ortho eyepiece, 160X) inside the dome so as to view the communications tower in south London through the door to the observation deck. Heather MacIsaac also

set up her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (32mm Plossl eyepiece, 39X) so as to view the communications tower through the door to the observation deck. Jan and Everett invited visitors to "walk on the Moon and Mars" by stepping on small meteorite samples in plastic cases emplaced in round blocks of wood. These round wooden blocks, containing the Moon and Mars meteorite sample display cases, were made by Henry Leparskas with wood salvaged from the renovations to the darkroom in the dome, following the burst frozen water pipe and flood on January 9th, 2018.

Paul showed people his meteorites and invited them to walk on his Moon meteorite sample, enclosed in a plastic case and wooden block. Everett gave several visitors *"Star Finder"* planispheres. The visitors were gone by around 11:00 p.m. after an enjoyable evening learning some of the history of the observatory and viewing through telescopes, despite the partly cloudy sky.

Exploring the Stars, 1st Mount Brydges Girl Guides, May 22nd, 2018

Cloudy skies greeted 12 visitors (8 children and 4 adults / leaders) from the 1st Mount Brydges Girl Guides for Exploring the Stars at Western University's Cronyn Observatory, Tuesday, May 22nd, 2018, 6:30 p.m. Graduate student Viraja Khatu presented the digital slide presentation *"The Scout / Guide Astronomy Badge,"* with the title slide *"The Basics,"* and fielded questions. Viraja followed this with the activity *"Kitchen Comet"* making a comet from dry ice and other materials.

Bringing the Guides downstairs into the *"Black Room,"* RASC London member Henry Leparskas 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 then gave them a tour of the newly created *"W. G. Colgrove Exhibit"* and the historic*"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 visitors signed the guest book. Both the *"W. G. Colgrove Exhibit"* and the *"1940s Period Room"* were designed by RASC London Centre member Mark Tovey.

RASC London Centre was represented by Henry Leparskas, Everett Clark and Bob Duff. Bob arrived later in the evening (following dinner celebrating his May 23rd birthday) and was let in by Henry through the back door to the *"1940s Period Room"* while showing the Guides the *"W. G. Colgrove Exhibit."* Henry introduced Bob as "The Ghost of Christmas Past" to the audible giggle of the Guides.

When everybody arrived upstairs in the dome, Bob gave a brief talk on some of the history of the observatory and technical aspects of the big 25.4cm refractor, also explaining the 2 clocks on the east wall and the difference between Standard and Sidereal Time. Viraja supervised as the Guides climbed the observing ladder to view the communications tower in south London through the 25.4cm refractor (32mm Erfle eyepiece, 137X). The Guides also viewed the wind turbine on the Engineering building through the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X), set up by Everett and Bob just inside the door to the observation deck.

The Guides had the opportunity to "walk on the Moon and Mars" by stepping on the round wooden oak display cases, containing the Moon and Mars meteorites, made by Henry Leparskas. Before they left around 8:30 p.m., they celebrated Bob's birthday, presenting him a box of Girl Guide cookies, with another going to Viraja. There was also a birthday card signed by Viraja and the RASC London volunteers.

Cronyn Observatory Public Night, Saturday, May 26th, 2018

Partly cloudy, later cloudy skies greeted 23 visitors to Western University's Cronyn Observatory Summer Public Night, Saturday, May 26th, 2018, 8:30 p.m. They were welcomed by undergraduate student Meet Panchal who counted 23 visitors by the end of the evening. Graduate student Ameek Sidhu presented the digital slide presentation *"NASA's New Horizons Mission to Pluto"* and fielded questions.

RASC London Centre was represented by Everett Clark, Bob Duff, Heather MacIsaac, Dale Armstrong and Mark Tovey, and Unattached RASC member Paul Kerans. Graduate student Collin Knight was telescope operator in the dome and Everett Clark assisted with directing the big 25.4cm refractor (Meade 28mm Super Wide Angle eyepiece, 157X) towards the 5-day-past -first-quarter gibbous Moon. The 25.4cm refractor was soon directed towards Venus in the western sky and finally towards the lights on the communications tower in south London after Venus was obscured by clouds.

Paul Kerans and Bob Duff set up the London Centre's home-built 30.5cm Dobsonian (17mm Nagler eyepiece, 88X) on the observation deck for a brief view of the Moon before it was obscured by clouds. Dale Armstrong set up the observatory's Meade 8-inch (20.3cm) Schmidt-Cassegrain (26mm Plossl eyepiece, 77X) and showed visitors the Moon and later the communications tower. Heather MacIsaac showed visitors the Venus and later the communications tower through her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (13mm Plossl eyepiece, 96X). There were also some visitors who brought a Celestron 114LCM computerized telescope (with a K25mm eyepiece), which they set up on the observation deck and received some technical advice from Everett and Paul.

With the sky clouded out, Paul showed visitors his meteorites and invited them to "walk on the Moon and Mars" by stepping on small meteorite samples in plastic cases emplaced in round wooden blocks made of oak. These round wooden Moon and Mars meteorite sample display cases were made by RASC London member Henry Leparskas, at the request of Professor Jan Cami, from a beautiful oak plank salvaged from the dome storeroom where the Dobsonian telescopes are stored.

Mark Tovey showed visitors the newly created *"W. G. Colgrove Exhibit"* and the historic*"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 also showed them the *"1967 Period Room,"* recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation—Canada 150. Both "*Period Rooms"* and the *"W. G. Colgrove Exhibit"* were designed by RASC London Centre member Mark Tovey.

The visitors were gone by around 11:00 p.m. after an enjoyable evening with the slide presentation on the New Horizons mission to Pluto, a tour of the downstairs history room and viewing through telescopes, despite the mostly cloudy sky.

Cronyn Observatory Public Night, Saturday, June 2nd, 2018

Cloudy, later mostly clearing skies greeted 54 visitors to Western University's Cronyn Observatory Summer Public Night, Saturday, June 2nd, 2018, 8:30 p.m. Professor Stan Metchev made 2 presentations of his digital slide presentation *"How*

NASA's New Space Telescopes Could Soon Detect Extrasolar Life" and fielded questions. Graduate student Ameek Sidhu greeted visitors. She counted 30 visitors for the first slide presentation by 8:54 p.m. There were 11 visitors for the second slide presentation. Ameek counted 53 visitors by 10:27 p.m., with one more late arrival on the observation deck bringing the total to 54 visitors for the evening.

Graduate student Sebastian Bruzzone was telescope operator in the dome and directed the big 25.4cm refractor (Meade 28mm Super Wide Angle eyepiece, 157X) towards the communications tower in south London early in the evening. As the sky cleared Sebastian directed the 25.4cm refractor towards Jupiter, which made a splendid sight for visitors through the Meade 28mm SWA eyepiece (157X). He later redirected the 25.4cm refractor to show people Venus in the western sky. Sebastian also obtained very good views of Venus and Jupiter through the 25.4cm refractor, using the 18mm Radian eyepiece (244X).

RASC London Centre was represented by Everett Clark, Bob Duff, Heather MacIsaac, Dale Armstrong, Mark Tovey and youth member Jacob Renders, who was there with his mother. Bob set up the London Centre's 25.4cm Dobsonian (17mm Nagler Eyepiece, 66X) on the observation deck and directed it towards the wind turbine on the Engineering building, later showing visitors Jupiter and Venus. Jacob took pictures with his Nikon camera and also operated the 25.4cm Dobsonian later in the evening. Everett and Dale set up the observatory's Meade 8-inch (20.3cm) Schmidt-Cassegrain (26mm Plossl eyepiece, 77X), directing it towards the communications tower. Dale operated the 20.3cm Schmidt-Cassegrain for the evening, swapping in the 15mm Sky-Watcher UltraWide eyepiece together with the CE-MAX 2X Barlow lens (266X) to show visitors Jupiter. (The CE-MAX 2X Barlow lens was borrowed from the observatory's 90mm Coronado Solar Telescope.) Dale also showed visitors the binary star Izar (Epsilon Bootis) through the 20.3cm Schmidt-Cassegrain, using the 12.5mm Ortho eyepiece (160X). Heather directed her Celestron NexStar 90SLT 90mm Maksutov-Cassegrain (32mm Plossl eyepiece, 39X) towards the communications tower early in the evening but soon swapped in her 17mm Plossl eyepiece (73.5X) to show visitors Jupiter and Venus.

Mark Tovey showed visitors the newly created *"W. G. Colgrove Exhibit"* and the historic*"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 also showed them the *"1967 Period Room,"* recreating the early control room of the Elginfield Observatory to celebrate the 150th anniversary of Confederation—Canada 150. Both "*Period Rooms"* and the *"W. G. Colgrove Exhibit"* were designed by RASC London Centre member Mark Tovey.

The visitors were gone by 11:00 p.m. after and interesting and enjoyable evening at the Cronyn Observatory, with the slide presentation on how new space telescopes could detect extrasolar life, tours of the downstairs history rooms and viewing Jupiter and Venus through telescopes.