POLARIS

Royal Astronomical Society of Canada
London Centre Newsletter
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Building a Backyard Observatory

By: Norman McCall

Having first joined the RASC in January 2012, I purchased my first scope two years later in February 2014. Being in my early 60's learning astronomy has been quite the ride: collimation, Polaris alignment, one, two or three-star alignment, constellations, Deep Sky objects, new hardware, new software and firmware updates for equipment. Just where does it all end? Is this what this hobby is about?

Actually, when boiled down to it's basics, astronomy is simply about getting outside and using your scope to do observing.

However, for me the real challenge is finding the time to lug my equipment from the basement to the backyard, set it up, confirm collimation, complete a polar alignment, and start a GoTo observing session. Typically, it takes 40-50 minutes before I am ready to start an observing session. System teardown takes another 30 minutes. Combined with my work schedule, each session becomes such a big affair only on the weekend is there the necessary time.

Time to build my personal backyard observatory.

Design Factors

The main factors in building an observatory includes the following considerations:

- Budget: how much am I prepared to spend? And, what options are available given my budget.
- Needs: will be for visual or astrophotography or both? The answer will dictate the design parameters.
- Location: being a backyard observatory available space constrains my options.

What are My Options?

My design options included:

- A dome roof like a SkyPOD,
- A traditional roll off roof,
- A small storage shed with a scope mounted on a roll-out dolly, and
- A roll off shed and

My Criteria

My design criteria included the following:

- A budget of $4 to $5K
- A shed suitable for both visual and astrophotography,
- A scope mounted on a pier, aligned and ready to go.
- A shed with a warm room to enable use in cold winter nights,
- Space for up to 2 or 3 people, and
- Given the space available in my backyard, a shed no larger than 8 ft x 8 ft.

Design Analysis & Selection

SkyPOD Dome

Given that I live in the city, with a small backyard, while a Dome or SkyPOD package initially looked attractive, the issues with this solution were costs, the complications in rotating the roof, and the fact that its appearance could attract attention and lead to vandalism. Lastly, there was no easy way to incorporate a warm room.

Roll-off Roof

The next consideration was a traditional roll-off roof with the addition of a small warm room. This option required a lot of real estate and require almost 30% of

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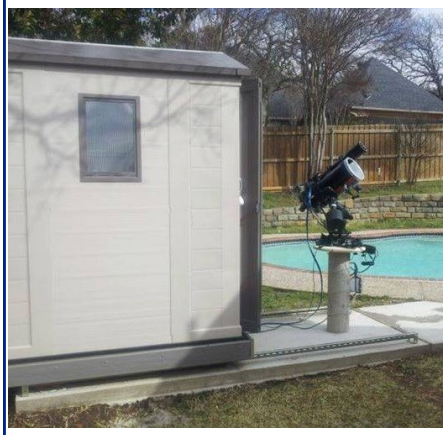
my backyard. Being a minimum of 14 ft x 8 ft and made of cedar wood would significantly exceed my budget.

Storage Shed & Roll-out Dolly

A storage shed with a telescope on a rolling dolly did not look attractive since it would be necessary to polar align each time it was used. This option did not look very attractive.

Roll-off Shed

My conclusion was to go with a pier mounted scope and a roll-off shed which could function as a warm room. Since security was an issue, I did not want to go with a low-cost "Rubbermaid" shed. Instead I located a Canadian made vinyl shed with 2" thick walls and solid handles suitable for locking.



Tracks Ideas

The design of the track for a roll-off shed is critical to success. Some sheds I saw used large rubber wheels in a constrained wooden or metal track. The down side of this design was that they tend to clog and stones, dirt or snow will cause significant friction and impediments.

Others designs I saw on the internet used steel wheels on round bars. This looked attractive, provided the steel bar well supported or thick enough so as not to bend. In my case, the maximum weight was estimated at between 800 and 1000 lbs. This presented an issue since heavy duty pipe would be required.

My idea was to use v-groove wheels riding on a 1.25" angle-bracket welded onto flat-bar to prevent warpage. Although more expensive, I selected stainless steel since cold-rolled steel would rust and aluminum would pit when sand or gravel were on the track.

The track rest on a stack of 2x4's 15' in length. Being in contact with the ground, Western Cedar was chosen since unlike pressure treaded wood, cedar resist moisture, rot, and ants.

Shed Construction

The floor consisted of 2"x6" pressure treated wood joists. The floor is insulated and has plywood on the top and bottom for strength and to keep the vermin out. Extra

wood joists are used on the sides to distribute the weight to the wheel.

The shed assembly was a breeze and required a small bit of levelling of the track (and hence the floor) to ensure the doors closed properly.

Electrical & Network Connections

Two PCV conduits were used for the electrical and network connections. One circuit powers the computer, lights and equipment. Another circuit is dedicated to electrical heat. There are two red and one white LED light on independent dimmers. The computer runs WIN 10 PRO.

My SkyThrall Observatory!

What Might I have Done Differently?

Another option worth considering would be to use a cement foundation with viewing area with the telescope mounted on a track which rolls through the door of the shed.

This design would still have met the criteria for a warm room and an aligned and ready to go scope. Since it eliminated the need for a heavy wooden floor, and may have saved a money and construction time. However, I think I'll save this idea for my next shed!

Sky Events for Late October and early November

Oct. 21 Orionid meteors peak
Oct. 24 Venus at greatest heliocentric lat. N
Oct. 24 Saturn 3° S of Moon
Oct. 25 Moon at apogee
Oct. 27 Moon First Quarter
Oct. 30 Neptune 0.9° N of Moon
Nov. 4 Full Moon
Nov. 6 Aldebaran 0.8° S of Mars
Nov. 10 Moon Last Quarter
Nov. 13 Venus 0.4° n of Jupiter
Nov. 15 Mars 3° S of Moon

Planets
Mercury: Well placed throughout November.
Venus: Still prominent in the dawn sky.
Mars: Gradually pulls away from the Sun in the morning sky.
Jupiter: Will have close conjunction with Venus on Nov. 13th just 14° from Sun. Can be seen in daylight hours with a telescope.
Saturn: Vanishing into evening twilight.
Uranus: Well places in evening sky among stars of Pieces
Neptune: Well placed in evening sky, setting near midnight.

R.A.S.C. London Centre Library — Books of the Month, October 2017

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 October 2017 are as follows:

The Backyard Astronomer's Guide, by Terence Dickinson & Alan Dyer. Revised Edition. 2002.
Foundations of Astronomy, by Michael A. Seeds. – 7th Edition, c2003.
365 Starry Nights: an Introduction to Astronomy for Every Night of the Year, text and illustrations by Chet Raymo. c1982.
For a complete listing of our 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 a particular book or video you wish to borrow, please feel free to contact me by telephone at (519) 439-7504 or by

Cronyn Observatory Special Events & Public Night, September 16th—30th, 2017

By: Robert Duff

Doors Open London at the Cronyn Observatory, Saturday, September 16th, 2017

Hazy, partly cloudy skies greeted 450 visitors to the Doors Open London at the Cronyn Observatory, Saturday, September 16th, 2017, 2:00—10:00 p.m. Doors Open London is a celebration of the London's history, heritage and culture, with events across the city, running September 16th—17th, 2017. Professor Jan Cami coordinated the event at the Cronyn Observatory with 128 people counted by 4:49 p.m., 163 at 6:06 p.m. and 450 by 10:00 p.m.

Graduate students Viraja Khatu and Amanda DeSouza welcomed visitors for solar observing in the afternoon. RASC London Centre was represented by Henry Leparskas, Everett Clark, Mark Tovey, Edith Tovey, Peter Jedicke and youth member Jacob Renders, who departed early, before Bob Duff arriving at 3:30 p.m. Bob departed around 6:24 p.m. and Dale Armstrong arrived later, for the evening.

Everett and Henry set up solar filtered telescopes on the observation deck outside the dome. Amanda, Viraja and Bob took turns operating the observatory's 90mm Coronado H-Alpha Solar Telescope (Sky-Watcher EQ5 mount), using the CEMAX 18mm (44X) and 12mm (67X) eyepieces, to show solar prominences on the Sun. Everett and Jacob, and later Amanda and Viraja, operated the Meade 20.3cm Schmidt-Cassegrain, fitted with a *Kendrick* Baader film solar filter, using the 26mm (77X) and 20mm (100X) Plossl eyepieces, to show a pair of sunspots near the centre of the Sun's disk. Viraja also operated the London Centre's 60mm Coronado H-Alpha Solar Telescope set up on the observatory's Orion equatorial mount.

Henry Leparskas made 2 presentations his digital slide presentation on *the "History of the Cronyn Observatory"* in the afternoon, and one presentation in the evening, with the lecture room fairly full. After his evening slide presentation, Henry went upstairs into the dome to join Viraja, Dale and Everett for star gazing. Viraja, with assistance from Everett and Henry, directed the big 25.4cm refractor in the dome to show visitors the stars Vega, Albireo (17mm Nagler eyepiece, 258X) and the double star Mizar and nearby Alcor (Meade 28mm Super Wide Angle eyepiece, 157X). On the observation deck outside the dome, Dale Armstrong operated the observatory's Meade 20.3cm Schmidt-Cassegrain from dusk until closing, showing visitors Saturn (12.5mm Ortho eyepiece, 160X). Dale reported that it was a steady night with great seeing. Henry set up the London Centre's home-built 30.5cm

Dobsonian and showed visitors the Ring Nebula (M57) and, at the very end of the evening, globular cluster M13, using the 32mm Erfle (47X) and 18mm Radian (83X) eyepieces.

Downstairs in the *"Black Room"* Professor Jan Cami gave 6 demonstrations of the *"Transit Demo"* model—showing how the transit detection method worked for finding extra-solar planets—and the *"Spectroscopy Demo,"* with the visitors putting on *diffraction grating* glasses to view the spectra of 4 gas discharge lamps set out on the table, 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, and the *"1967 Period Room,"* a recreation of the early control room of the Elginfield Observatory, in celebration of the 150th anniversary of Confederation—Canada 150. Both "*Period Rooms"* were designed by Mark Tovey.

Visitors remained longer than the planned 10:00 p.m. closing time with Jan closing the front door at 10:15 p.m. Everybody was gone from the Cronyn Observatory by 11:15 p.m. after an enjoyable evening of stargazing and learning about the history of astronomy at Western University.

Science Literacy Week at the Cronyn Observatory, Saturday, September 23rd, 2017

Generally clear skies greeted some 90 visitors for the Science Literacy Week celebration at Western University's Cronyn Observatory, Saturday, September 23rd, 2017, 5:00—9:00 p.m. Science Literacy Week was a week-long celebration across Canada, September 18th—24th, 2017, showcasing the excellence of Canadian science. The event was hosted by Western University's Centre for Planetary Science and Exploration (CPSX) in partnership with the Department of Physics and Astronomy, The Planetary Society—London Chapter and RASC London Centre.

Scheduled activities for children and adults included the (1) Space Science Challenge: 5:30 p.m. for students in grade-7 and under; 6:00 p.m. for students in grade-8 and above; and 6:30 p.m. for adults; (2) Stargazing through the big 25.4cm refractor in the dome and amateur telescopes; (3) Hands on Activities, 5:00—8:00 p.m.; (4) Edible Rock Analysis; (5) *"Spectroscopy Demo"*; (6) Arts and Crafts for children; (7) Historical Displays and Artifacts in the *"Period Room"*; Space-themed Book Display; and (8) Raffle Draw (with lots of prizes) at 7:00 p.m., following Space Science Challenge.

The event organizer was Western University PhD graduate in astronomy, Parshati Patel, who is Outreach Program Coordinator for Western's Centre for Planetary Science and Exploration (CPSX). Astronomy graduate student Viraja Khatu, who created the Space Science Challenge, worked with Parshati on this and the Raffle Draw. The Planetary Society—London Chapter, Outreach Coordinator Kayle Hansen was at the welcome table.

Downstairs in the *"Black Room"* undergraduate student Dana Beaton presided over the Edible Rock Analysis, next to the Space-themed Book Display. Astronomy graduate student Dan Hatfield did the *"Spectroscopy Demo."* The Hands-on Activities were conducted downstairs. Visitors could also browse through the Historical Displays and Artifacts were in the adjacent *"Period Room."*

Graduate student Jeff Vankerkhove was telescope operator in the dome. RASC London Centre was represented by Everett Clark, Peter Jedicke, Steve Gauthier, Steve Imrie, Henry Leparskas and Bob Duff. There was late afternoon solar observing on the observation deck outside the dome. Everett set up the observatory's 90mm Coronado H-Alpha Solar Telescope (SkyWatcher EQ5 mount) and took turns along with Jeff, Steve and Peter, showing visitors the Sun, using the CEMAX 25mm (32X) & 18mm (44X) eyepieces.

Jeff Vankerkhove operated the big 25.4cm refractor in the dome for the evening, showing visitors the 3-day-past-new crescent Moon (Meade 28mm Super Wide Angle eyepiece, 157X) and Saturn (17mm Nagler eyepiece, 258X). Steve Imrie operated the London Centre's home-built 30.5cm Dobsonian showing visitors the Moon, the wind turbine on the Engineering building, and then Saturn, using the 17mm Nagler eyepiece (88X). Swapping in the 18mm Radian eyepiece (83X), Steve showed them M57, M31, Mizar and Alcor, M13 and Albireo through the 30.5cm Dobsonian. Everett Clark set up the observatory's Orion AstroView 6 (15cm) Newtonian equatorial reflector and Bob Duff supervised for a while as visitors viewed the Moon and Saturn, using the 25mm (30X) and 10mm (75X) Plossl eyepieces, respectively.

RASC London members were still observing when Bob left the observatory around 10:20 p.m., long after the official closing time of 9:00 p.m. for this event.

Cronyn Observatory Public Night, Saturday, September 30th, 2017

Clear skies greeted some 95 visitors to Western University's Cronyn Observatory Public Night, Saturday, September 30th, 2017, 8:00 p.m. Graduate student Viraja Khatu made her digital slide presentation *"Light: The Information Carrier in Space"* and fielded questions. RASC London Centre member Henry Leparskas counted more than 75 visitors, for an estimated total of 95 visitors.

Graduate student Amanda DeSouza operated the big 25.4cm refractor in the dome and, after a brief view of the 3-day-past-first quarter gibbous Moon, showed visitors Saturn and the "Double-Double" star system, Epsilon Lyrae, using the (17mm Nagler eyepiece (258X). RASC London Centre was represented by Everett Clark, Henry Leparskas, Steve Imrie, Peter Jedicke and youth member Jacob Renders with his father.

There were 2 amateur telescopes set up on the observation deck outside the dome. Jacob Renders and his father operated the observatory's Meade 20.3cm Schmidt-Cassegrain showing visitors the Moon and Saturn. Steve Imrie operated the London Centre's home-built 30.5 Dobsonian showing visitors the Andromeda Galaxy (M31), using the 20mm (75X) and then 25mm (60X) Plossl eyepieces. Since these short focal length eyepieces were difficult to focus in the 30.5cm Dobsonian, Steve swapped in one of the observatory's 2-inch diameter eyepieces, probably the 54mm Erfle (29X), to show visitors the Ring Nebula (M57), Albireo, Saturn and the "Double-Double" star system Epsilon Lyrae.

Peter Jedicke recalls that the sky was clear but moonlit and dome seeing was not very good. There was a family who brought a small "department store" refractor, which they spent some time learning how to use before leaving early. The downstairs *"Black Room"* and *"Period Rooms"* remained closed for the evening. The observatory was closed shortly after 10:00 p.m. but observing with the big refractor in the dome continued until 10:45 p.m.

Polaris On-Line

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http://rasclondon.ca/ click on the pull-down menu Polaris and select Polaris 2017.