

Celebrating the CAO!

E.C. Carr Observatory of the
Royal Astronomical Society
of Canada - Toronto Centre

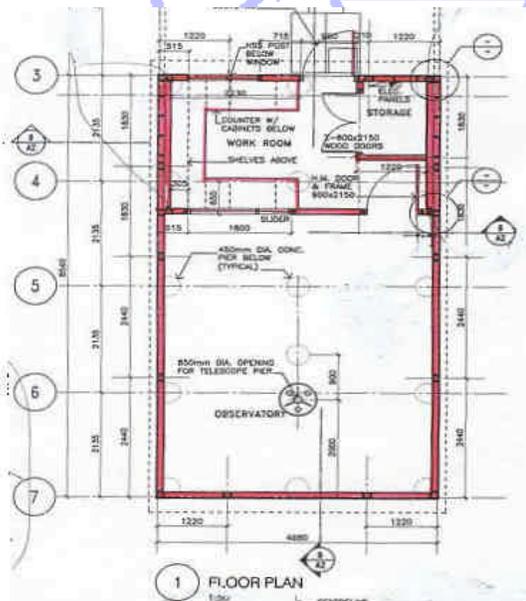
For many years the members of the Toronto Centre had dreamed of having access to a permanent dark sky observing site. In late 1997, through the generosity and vision of Mr. E. Clifton Carr of Thornbury, that dream became reality. RASC member Cliff Carr and his wife Linda donated a 44 acre site located at the top of the Blue Mountains to the Toronto Centre. In addition to providing unobstructed views, the property came with a contemporary 3-bedroom residence for the exclusive use of members and guests who wish to stay overnight. Only partly finished when donated, the property has been improved and added upon by the membership so that it can now comfortably accommodate a dozen or more overnight guests.

Most of the property is actively worked through an arrangement with a neighbouring farmer. Between 5 and 6 acres of lawn are maintained, for use as camping and observing space.

The gently rolling property extends about 550 m (1/3 mile) south of the observatory, and the nearest neighbours on the next concession road are 1.75 km (about 1 mile) away. The view to the west is across the Beaver Valley, and to the north, is down towards Thornbury, the Bruce Peninsula, and out across Georgian Bay, about 700 feet (210 m) lower. The wooded Niagara Escarpment rises about another 25 m beyond the east property line. Access to the site is along a little-used concession road affording privacy to the users of the observatory. In honour of the Centre's benefactor, the site has been named the E.C. Carr Astronomical Observatory (CAO).



DEVELOPMENT OF THE FIRST OBSERVATORY BUILDING



In early 1999, members of the Toronto Centre enthusiastically began the planning of the initial observatory building. Various designs were considered: domed, roll-off roof and split roll-off, to name a few. With an eye to economy of materials, and in anticipation of the observatory seeing some use for public education, a roll-off roof observatory of 16' x 28' was chosen. When a design consensus was achieved, the Centre next had to negotiate the planning process. Because the property borders the Bruce Trail, we were obliged to seek the approval, first of the Niagara Escarpment Commission, and later the Thornbury Building and Planning Department. Ultimately, they approved the construction of one 450 sq. ft. observatory building. It was anticipated that a structure of this size would allow perhaps 5 scopes to be set up in the observatory space (19' x 15'). Adjacent to the observatory was to be a workroom / storage room of about 9' x 15'. Early in the design stage it was learned that Cliff Carr would donate a 0.4m LX200 for installation in the facility. The design took this into account when establishing headroom clearance, and the central pier location.

As the initial design ideas were being tossed around,

it was assumed that most of this project would be constructed by the members, and, consequently, it was expected that it would be a wood-framed structure with the roof rolling on some form of steel rails. However, by a stroke of luck, the Centre received an offer from Steelgate Security Products of Mississauga to donate a complete steel frame. Not only did this allow the construction to proceed much more quickly, but also the strength inherent in the steel structure provided a simplified, rigid frame, and increased headroom. This spaciousness is most evident in the observatory space when the roof is closed. The strength of the structure is welcomed when the winds howl off Georgian Bay.



The E.C. Carr Astronomical Observatory



In the fall of 1999 the location for the observatory building was laid out, with the proposed concrete floor slab aligned with Polaris. Initially two dozen 16" concrete piers were set 4 feet into the ground by a local contractor. A number of buried electrical conduits were extended from the residence and then distributed to various future outlet locations within the observatory footprint. A local contractor then completed the concrete floor slab. This initial work was left to weather through the winter with no noticeable ill effects.

On July 14th, 2000, the structural steel frame, consisting mostly of 88 mm x 88 mm (3½" x 3½") welded steel tubes, having been prefabricated in Mississauga by

Steelgate, was delivered to the site. Triangular steel roof frames, attached to upright posts forming the upper part of the walls provide 2.4 m (8'-4") headroom and are spaced about 2.2 m (7 feet) apart. The entire roof structure (28 ft. x 16 ft) rides on 6 sets of steel wheels, running on steel tracks set about 2m (6 ft) above the floor. The steel support tracks extend 7m (20ft) north of the observatory building.



THE MEMBERS CONTRIBUTE



Over the following summer months, making full use of the skills of members of Toronto Centre, the exterior walls of the observatory were constructed, using 2 x 4 studs and 19mm (¾") and 13mm (½") plywood cladding. The walls were bolted to the structural steel frame. Closely spaced electrical receptacles were installed in the walls of the observatory and provisions were made for data ports.

A warm-up / computer room (16' x 9') with its own insulated roof and walls, was built at the north end of the observatory. Much of the material used in the building was donated by Toronto area contractors. The Toronto Centre gratefully acknowledges the generosity of these suppliers, particularly Bondfield Construction Ltd. of Concord, Ontario. Through the substantial financial assistance of Bondfield, the Centre was able to obtain all of the materials used in the wall construction as well as numerous other components.

As the summer of 2001 drew to a close, the stage was reached where the roof was to be installed. Ironically, this proved to be the first Saturday when foul weather threatened to interfere. However, work proceeded, and the steel roof deck was welded in place during a moderate rain. Fortunately, the sky cleared and, by that evening the roof was insulated and made waterproof.



Geoff Brown Observatory Development

The following day, the entire structure was wrapped in a flexible, rubberized membrane called "Blueskin". (The blue membrane was left exposed over the winter, with no detrimental effects.) The insulated walls and roof have proven most effective in maintaining a moderate temperature within the observatory. Even on the hottest summer days, with temperatures of 30° or 32° C, the observatory interior seldom gets warmer than 23° or 24° C, reducing to a minimum the "cooling down" period at the start of an evening observing session.

Initially, the roof was opened and closed by pulling on ropes. With the added weight of the roofing materials, the effort necessary for opening and closing increased significantly. This task was made easier with the installation of two boat-trailer winches.



While the side walls of the Observatory are about 6 feet high (a welcome feature when the wind is blowing in the colder months), the south wall incorporates a panel that is hinged at 5 feet, to better facilitate observing towards the south, particularly for those members who wish to set up their newtonians and dobbs.

By October 2000, the time had come to mount the Meade 16" LX200. This instrument, along with its 4" Televue guidescope, was graciously donated to the Centre by Cliff Carr. Some fine tuning of the steel mounting pier, to reduce vibrations, was required.



FINISHING

In the early part of the summer of 2001, another local contractor was hired to install the prefinished, white, metal roof (chosen for its high reflectivity, thus reducing solar gain) and soft grey-coloured vinyl siding. The siding was chosen to match that used on the house. The membership again responded to a request for help, and the area around the new observatory was graded and seeded, and a generous paved patio was prepared in the area between the rails for the roll off roof.

Adjacent to the "observatory" space is the heated workroom. Through the generosity of member Paul Neal, this room was outfitted with a matching



pair of computers and astronomy software. These are networked and connected to the LX200, allowing observers to guide the 16" scope by means of either computer, and will allow the preparation and processing of CCD images in the future.

As a final touch, the powered roof retraction system was completed in October 2001. Much of the equipment for this feature was designed and fabricated through the generosity of member Charles Darrow and his company, Rod-Ends Mechanical of Mississauga. Now the roof may be opened or closed in less than two minutes, with the simple push of a button.

On July 21st, 2001, the dedication, official opening, and the "First Light Ceremony" took place, with about 80 members, family and friends in attendance. The Toronto Centre has been blessed with what surely must be one of the finest amateur astronomy observatories in existence today, all located in a stunning setting, under a rich, dark sky.

USING THE CAO

The CAO is a truly marvellous facility and it is open to all Toronto Centre members in good standing. Rates for the 2002 season are as follows:

Annual Pass	\$50.00
Family Pass	\$100.00
Overnight	\$10.00 (Indoor) \$5.00 (Camping)

To book a reservation contact the CAO Site Management Committee under "CAO Bookings" on the Toronto Centre web site.

OUR BENEFACTOR: CLIFF CARR



No story of the CAO would be complete without acknowledging the generosity and vision of E. Clifton Carr who graciously donated both the observatory site and its primary instrument to the Toronto Centre. Cliff, as he is known to his friends, is an unassuming man who is passionate about astronomy and the night sky.

Special Thanks

The Royal Astronomical Society of Canada, Toronto Centre extends its sincere thanks and appreciation to the following donors of goods and services needed to ensure the success of this project.

Benefactors

Mr. And Mrs. E . Clifton Carr
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Contributor **Geoff Brown** is an architect by day and astronomer by night. Geoff's outstanding design skills and dedication to this project were recognized by the Toronto Centre in 2001 when the first observatory at the CAO was named in his honour.

Photographs by Geoff Brown & Denis Grey