

NATIONAL NEWSLETTER

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Helen Sawyer Hogg Ph.D., C.C., Past President of the Royal Astronomical Society of Canada, the 1983 recipient of the Dorothea Klumpke-Roberts Award of the Astronomical Society of the Pacific.

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Congratulations to Dr. Hogg!

by Frederic L. Troyer
Toronto Centre

(We are pleased to announce to our members that Dr. Helen Hogg, a very well-known, and highly respected member of our Society, has received a major award. An active Life Member of the Toronto Centre who regularly contributes to the Centre's activities Dr. Hogg has been a Society member since 1934. We are sure all our members express their warm congratulations to her on this occasion. – Ed.)

One of Canada's leading astronomers, Dr. Helen Sawyer Hogg has just added another star to a glowing constellation of achievements – the Dorothea Klumpke-Roberts Award “for outstanding contributions to the public's understanding and appreciation of astronomy”. The award is based in large part on the astronomy column she wrote for the Toronto Star newspaper each Saturday for 30 years, until her retirement two years ago, and for her 1976 book, *The Stars Belong to Everyone*, a collection of some of the best of her 1,500 columns.

The announcement was made in San Francisco on April 15 by the Astronomical Society of the Pacific that its 1983 award will be made to Dr. Hogg at the society's meeting of professional and amateur astronomers in Hawaii this June. Previous winners of the prestigious Klumpke-Roberts award include Carl Sagan of the *Cosmos* television series, astronomers Sir Fred Hoyle and Bart J. Bok, British amateur astronomer and science writer Patrick Moore and U.S. science writers Isaac Asimov and Walter Sullivan.

During a long professional career – since 1935 at the University of Toronto where she now is professor emeritus of astronomy – she has published more than 150 scientific papers, most of them in her research specialty, the study of variable stars in globular clusters, and on the history of astronomy.

She taught astronomy for more than 35 years to large classes of university students, instilling in many

of them a sense of wonder in the heavens above. As she observed in her book, she feels the ability to enjoy the goings-on in the skies “is one of man’s greatest birthrights.” She laments that civilization’s bright lights and atmospheric pollution are making an enjoyment of the stars increasingly difficult, especially for city dwellers.

Dr. Hogg holds many honours, one of the most prized of which is that of Companion of the Order of Canada. Her five honorary degrees include one from the University of Toronto and she has been awarded several medals for her scientific work. In 1967 she received the distinguished Service Award of the Royal Astronomical Society of Canada.

In addition to teaching, research, and giving many lectures to non-scientific audiences, she has found time to serve on the boards and councils of many scientific and public service organizations. She has been National President of the Royal Astronomical Society of Canada (1957–59), the Canadian Astronomical Society, the Royal Canadian Institute and the American Association of Variable Star Observers.

Ten Laws of Astrophotography

by Clive Gibbons
Hamilton Centre

When one has been engaged in the pursuit of astrophotography for a number of years, one realizes the existence of several Great Truths which rule the discipline. These revelations usually present themselves towards the end of a particularly fruitless observing session. The veteran astrophotographer has no doubt experienced some or all of the following. To the novice let them be a warning ...

- 1 *Fosdick’s Law of Field Rotation*
The probability of finding a bright guidestar close to the object you wish to photograph is inversely proportional to the accuracy of your polar alignment.
- 2 *Simon’s Law of Impending Overcast*
If everything is going according to plan, you have 15 minutes before the sky clouds over.
- 3 *The Area Law of Reciprocal Probability*
The smaller the field of view of your photograph, the greater is the chance that a well-lit low-flying aircraft will fly through it.
- 4 *The First Law of Suburban Astrophotography*
Your emulsion will sky-fog in half the time it would take to properly record the object you wish to photograph.
- 5 *Digby’s Law of Inevitable Failure*
The chance that your photo will be in focus is directly proportional to the number of other factors which will ruin it anyway.
- 6 *The Law of Non-liability*
The probability that your slides will come back mounted and cut down the middle of each frame is directly proportional to the clarity of the directions you give the photofinisher to leave them uncut and unmounted.
- 7 *The Perfect Polar Alignment Delusion*
If your guidestar fails to drift in declination, you are hallucinating.
- 8 *The Social Interaction Principle*
The time it takes to set up your telescope is directly proportional to the number of people present to “help” you.
- 9 *Digby’s Second Law of Inevitable Failure*
The chance that you will forget your cable release at home is inversely proportional to the chance that you will forget your film at home, unless of course, you forget both.
- 10 *Newman’s Observation*
Murphy was an astrophotographer.

Reprinted from *Orbit*

Calgary Centre Celebrates Its 25th Anniversary

January 29, 1983 was a red-letter day for the Calgary Centre. Not only was it the 25th Anniversary of the Centre's beginning, but it was also the official opening of the Wilson Coulee Observatory. A warm, sunny day brought out many visitors and R.A.S.C. members to the Observatory site. The first official visitor to show up was Mayor Ralph Klein, who arrived an hour early to look things over and chat with the members. He showed great interest in the facilities and asked many questions, which greatly pleased the members who showed him around. There were about eighty people present by the time President Don Hladiuk began the proceedings. Don began by introducing several of the guests, including Mayor Klein, Jim Beatt (Deputy Mayor of Okotoks), Dr. Dundas (Chairman of the Strathcona-Tweedsmuir School), and Dr. Keith Cooper (Vice-President of Research at the University of Calgary).

Sandy Heard then welcomed everyone to the Strathcona-Tweedsmuir School in his capacity as Principal, and spoke of the past associations between the School and the Calgary Centre of the R.A.S.C. John Howell, a past president of the Calgary Centre, spoke of the Centre's past 25 years and its accomplishments, which included pushing for the construction of the Centennial Planetarium. He noted that he, Brian Clarke, Ken Pawson, Bob Nelson and Allan McQuarrie had all attended the first meeting held in 1958 in the Maclin Motors Auditorium, and all were present in the room. John ended by noting that Calgary is at the same latitude as the Salisbury Plain in England, and suggested that the Centre's next project could be the construction of a full-sized functional replica of Stonehenge.

Don Hladiuk then spoke about future projects for the Centre, including the Halley Watch and the Amateur Space Telescope. Perhaps spurred on by the Mayor's presence, Don also talked about light pollution and the need for public education about the waste of energy and the loss of a natural heritage our view of the stars. He ended by thanking the officials of Alberta, Calgary and Strathcona-Tweedsmuir School for their support in making the Wilson Coulee Observatory possible.

The last speech was by Mayor Klein, who noted that as Mayor he had discovered that Calgary had a little bit of everything, which made the city such a livable place to be. He thanked the R.A.S.C. members for their efforts in working on a project for Calgary, and at 2:35 pm, with the TV cameras rolling unveiled the dedication plaque for the Observatory.

The formalities over, Bob Allin presided over the wine and cold meats in the auditorium while other members conducted tours through the Observatory. All in all, it was a propitious start for our next 25 years.

Reprinted from *The Starseeker*

Calgary Centre: The Next 25 Years

by **Don Hladiuk**
Calgary Centre

On January 29, 1983 the R.A.S.C. Calgary Centre celebrated its twenty-fifth anniversary. Although the Centre has had many achievements in those 25 years, many people have asked me, "What lies ahead for the Calgary Centre?"

I suppose the first thing that comes to mind is the use of our new observatory. Calgary Centre members have acquired a new facility in which they can expand their knowledge and skills in the fields of astronomy and related sciences. To maximize this facility's use, we must set up solid observing projects for all levels of interest (from rookies and students to the professionals and semi-professionals). Whether it be lunar and asteroid occultations or counting meteors, all the data acquired are useful and important to astronomers. I would like to see all members enjoy the use of the observatory, even just to get away from the city lights and learn to identify the many beautiful constellations in the night sky.

The Calgary Centre should also be responsible for providing the general public with current accurate

information of local astronomical events. I propose the Centre should be involved in the following areas:

- 1 The Centre should continue to man the Planetarium observatory twice a month. Most people don't realize that in the mid-sixties our Centre made a strong push for Calgary's planetarium and perhaps was even instrumental in convincing the city of its importance to our culture. Also, the Planetarium has provided us with a club room in the basement, which has housed numerous meetings of council, the Observers's Group, the Youth Department, etc.
- 2 I would like to see our members visit classes in various schools throughout Calgary and share with the students our experience as amateur astronomers.
- 3 Our observatory should be made available for tours by students and adults who are interested in astronomy through courses provided by the Continuing Education Programme. Also groups like the Boy Scouts, Girl Guides, Cubs, etc. would benefit from visiting a real observatory and viewing the night sky away from the city lights.
- 4 Finally, the Calgary Centre should continue participating in events like Astronomy Day, shopping centre displays, Starnights, etc. so that the general public will have opportunities to share and enjoy our hobby of amateur astronomy.

All of the above points will help the public to understand better what we do, and may even encourage them to join our Centre.

The Calgary Centre is not only concerned with the study of the universe, but has some down-to-earth projects as well. For instance, southern Alberta is suffering from a severe case of light pollution. Due to recent rapid growth in places like Calgary and Okotoks, many new streetlights have been erected. With all this extra light bouncing into the sky, the beauty of the night sky can only be fully appreciated in a few isolated locations where the glow from cities can be escaped. By adopting the use of a more efficient lighting system (and using proper shielding), the light will be directed downwards and not up where it doesn't do any good. This would help reduce escalating energy costs and the savings could be funnelled into other projects. A campaign to help darken the sky will be started in the near future. Some cities in the U.S. have already passed bylaws to this effect.

I would like to thank members of the Calgary Centre, and especially those on Council over the last 3 years who have worked to get the observatory project completed. I would also like to thank Strathcona-Tweedsmuir School, WSCM Construction, Tele-Optics, Himer Homes, and anyone else I haven't mentioned, who have helped in making our dream come true.

In conclusion, the eighties will be an exciting decade in astronomy, with Voyager flybys of Uranus and Neptune, Comet Halley, the launching of the Space Telescope, and the continued use of the Space Shuttle. The Calgary Centre plans to be right in the middle of it all. We have already expressed our interest in participating in the International Halley Watch Programme and the receiving of images from the orbiting space telescope. All we need is the continued support from the people of Alberta to maintain the desire to explore the universe in which we live.

Reprinted from *The Starseeker*

Across the R.A.S.C.

by **Peter Jedicke**
Assistant Editor

TUCSON: Will it be selected as a new event for the 1984 Olympics? Will it soon be on TV, with teams across the continent, sporting multicoloured jerseys as they bring their telescopes and take the eyepiece field? What is "it"? It's the Messier Marathon, a one-night observing session that is to amateur astronomers what the Himalayas are to mountain climbers. Suggested in the March, 1982, issue of *Deep Sky Monthly* (now *Deep Sky Magazine*), it was taken up by 1980 Chant Medal winner David Levy. For more details see the article elsewhere in this issue. David also observed 34 other objects along the way; would someone care to challenge this record for a single night's observing? Write to David at Box 414, Route 7, Tucson, Arizona, 75206, for more details.

HAMILTON: For the first time ever, the Hamilton Centre's Board of Directors met in the Observatory building outside the city. Among topics of discussion were the refurbishment of the 13cm Marsh refractor which is presently in the Observatory's only dome. On March 26, the Centre co-hosted a meeting with The Hamilton Association at the Ewart Angus Theatre in the McMaster University Medical Centre.

NIAGARA FALLS: The Niagara Centre holds its meetings at 20 h on the third Thursday of each month at the Niagara Falls Public Library at Victoria Avenue and Morrison Street. Recently, the meetings moved into the luxurious Lamarsh Room, with wood panelling, paintings along three walls and a pyramid-style ceiling. Peter Jedicke of the London Centre spoke about the "Infrared Astronomy Satellite" on March 24, and Marvin Scott showed his excellent 8mm motion picture "Sky." Driving back to London, Peter and Tom Glinos observed an awesome green aurora from a back road outside Paris, Ontario.

MONTREAL: An attempt to observe the grazing occultation of 145 Sagittarii after midnight on the morning of April 5 was spoiled by overcast skies. An earlier graze was also missed for the same reason, so observers in the Centre are hoping for better luck on a third graze in the upcoming months.

CALGARY: The Calgary Centre is one of very few reported to have an organized "Youth Department," for younger members. The President of the section is Peter Goossens, and meetings are held on Saturdays, about twice a month, at the Planetarium. Sessions at the telescope were scheduled for the afternoons of March 19 and April 16.

VANCOUVER: Karl Miller of the Vancouver Centre reports that he was successful in obtaining television images of the much-heralded lunar eclipse of December 30, 1982. His standard closed circuit TV camera, which he describes as "not very light-sensitive," was coupled to a Celestron C90 with an apparent magnification on the 30cm colour monitor of about 120x. The camera and C90 were mounted on his C8, and a 35mm camera was affixed to the larger telescope. During the eclipse, already famed for its darkness, the TV camera was unable to show the moon in the umbra. Said Karl of his affront to astronomical purism: "It felt very nice to be able to retreat into a warm room with hot chocolate and cookies to sustain what would otherwise have been my flagging spirits." Notwithstanding that, he reports that he was outside looking at the real thing more often than not, and that afforded him the opportunity to comment on fog patches that "ended literally 1 metre above my head."

KITCHENER: The Kitchener/Waterloo Centre holds its meetings on the second Tuesday of each month in Room 2C8 of the Arts building at Wilfrid Laurier University, although there is some concern that the University may stop offering this room to the Centre. Ray Koenig is the President for 1983, and Rob Robotham is the new editor of the Centre Newsletter *Pulsar*.

HALIFAX: The Library of the Halifax Centre is located at the Nova Scotia Museum, and Librarians L. Burgoyne and J.S. Wells are hoping that additional books will be donated in coming months by Centre members. The Museum was also the site of the Centre's meeting on March 18, when Randall Brooks and Walter Zukauskas discussed the history of astronomy and the Centre in Nova Scotia.

NOTE: This section is a regular feature of the *National Newsletter*, reporting on personalities and recent activities of interest to all R.A.S.C. members. Most items are gleaned from Centre newsletters, so Centres should be sure to send a copy regularly to the writer, in care of R.A.S.C. London Centre, P.O. Box 842, Station B, London, Ontario, Canada, N6A 4Z3. In addition to newsletters, each Centre should send brief reports, either in writing or by telephone, to the writer close to the deadline, which is June 1 for the August issue. Items may be telephoned evenings to (519) 433-2992, after the long-distance rates go down.

An Occultation by 690 Wratislavia

by Andrew Lowe
Calgary Centre

During the early morning of November 14, the asteroid 690 Wratislavia was predicted to occult a faint star in the constellation of Taurus for observers somewhere in North America. The nominal prediction, issued late in 1981, showed the path running east-to-west across the central location (as is the case for all such events).

My interest in this particular occultation came as a result of some updates to the asteroid's and star's positions in August, showing that the predicted path would be considerably further north. The revised prediction, which also appeared in the November *Sky and Telescope*, showed the path roughly straddling the Canada-U.S. border. I began to prepare to observe from Montana.

The plan, however, changed quickly when David Dunham of the International Occultation Timing Association phoned me late on November 10. He described how plates taken at Lick Observatory two nights earlier showed an even greater north shift placing the path about 100 miles north of Edmonton. It seemed like an ominous prediction; an occultation by 52 Europa two months earlier in the same area had been clouded out.

Nevertheless, I decided to try for it. Until recently, I had lived just east of Edmonton on an acreage. My observatory containing a 30 cm reflector was located there. I originally had planned to travel to the centre line and observe with my 10 cm Schmidt-Cassegrain, but the star to be occulted was just too faint to be seen with the small scope. I decided to observe with the 30cm, even though I was a full path diameter away from the centre line. I informed Dr. Doug Hube, at the University of Alberta, of the event and he promised to observe from the Devon Astrophysical Observatory, which is southwest of Edmonton.

Well, for once the skies were clear and it wasn't too cold considering the time of year. I checked the star field with the 30 cm and this time the star was easy to find. As well, the asteroid itself could be seen clearly as an extra "star". With four and one half hours to go, it had quite a way still to travel. I checked the short wave radio and the tape recorder and everything worked O.K.

Occasionally during the next few hours, I watched Wratislavia gradually approach the star. The greatest danger in missing an occultation is to observe the wrong star, but I was confident I had the right one as the two images gradually merged about 10 minutes before the predicted occultation time. Unfortunately, I had no power for the drive and so I had to keep the magnification quite low.

As W.W.V. announced 9:36 U.T.C. I started the tape recorder and began monitoring the star continuously. The predicted occultation midtime of 9:41.0 approached. As W.W.V. started to announce the 41st minute, I began to get very nervous. Not only that, but I had the radio so loud that it was quite distracting. I blinked, and when my eye opened, the star had gone. I shouted at the tape recorder. The faint asteroid was still visible. I was ready for the star's reappearance and it soon popped back into view. I shouted in the recorder once more, and the two important times were on the tape. I observed for another five minutes, then packed up the scope and replayed the tape. My reaction times for the disappearance and reappearance were estimated and subtracted from the times on the tape. The results:

disappearance	9h40m54.6s UTC
reappearance	9h41m07.8s UTC
duration	13.2 seconds

The next morning, I called Dr. Hube. He told me that the drive on the 50cm died on him shortly before the event. The star's disappearance could not be timed accurately, but the reappearance was at 9:41:11.5 UTC.

Unfortunately, we were only about 10 kilometers apart in the direction of the shadow's motion, so that an accurate determination of the size or shape of the asteroid was not possible. My duration, however, does give a minimum diameter for Wratislavia of 156 ± 4 km (the expected diameter from indirect measurements is 175 km).

In retrospect, we were exceptionally lucky in seeing the event. In fact, if we had travelled to the predicted centre line, we would have missed the show.

For every person who sees an asteroid occultation, there are probably a hundred others who were not

lucky enough to be in the shadow path. Probably the closest observations outside the path were made in Calgary. Steve Moths and Geoff Kennedy obtained a photoelectric record at the Priddis Observatory, while Neil Laffra and Don Hiadiuk observed at the Calgary Centre's Observatory at Strathcona-Tweedsmuir. Bob Loblaw also obtained a negative observation in north Calgary.

For me, it was a great feeling to have finally observed an asteroid occultation, although it was frustrating not to have more observations from the Edmonton area. Perhaps we'll have better luck next year.

Reprinted from *The Starseeker*

Eclipse!

by Walter MacDonald
Toronto Centre

Fellow Toronto Centre member Steve Chomniak joined me for the total eclipse of the moon on the morning of December 30th, 1982 at my parent's farm, 15 miles north-east of Belleville. With him, he brought a freshly gas-hypered stock of Kodachrome 25 and Ektachrome 200 film. But only hours before the eclipse was to start only one thing was missing – a clear sky!

One hour to go before the eclipse started, I looked out the window. The sky was absolutely cloudless! Going outside, we discovered a very cold, strong north-westerly wind. However, this did not deter us in any way, and we crossed the field to our observing site. A very low horizon stretched 360° around us. The moon shone brightly in a light blue sky that was dotted only by first and second magnitude stars. We set up our equipment and cameras and started the cameras recording three hour time exposures. First the Earth's penumbral shadow and then the umbra advanced across the face of the moon. To keep warm we had to sit in the car on four occasions but our cameras continued to click away. On the radio set up behind us, we occasionally heard something about the eclipse. The anticipation grew. Adrenalin surged through our veins. We felt no fatigue – not even the cold.

In the final minutes before totality, the general light level noticeably dropped. Around us, the landscape darkened and a vast multitude of stars burst forth from the sky. Flashlights were now a necessity as the moon, our sole source of light until this time, was slowly extinguished.

Then – totality. In a very few moments we terminated the furious short exposure camera shots for the relative calm of a fifteen minute exposure. It was then we beheld a magnificent visual spectacle unrecordable by any camera or other sensing device. The pale orb of the moon appeared to float in three dimensional relief in the midst of the Milky Way in Gemini. A surge of colour spread across the full lower half of the moon like a million tiny volcanoes erupting blood-red lava.

On the point of frost-bite, we ran back to the house as fast as our half-frozen bodies would take us. An old "Findlay" wood stove provided warmth for our feet and we decided to extend our 15 minute exposure to 20 minutes.

After some hot chocolate and coffee, we raced back to our cameras to close the shutters. The moon still floated in three dimensions and the radio was buzzing with descriptions of totality. Saturn and Jupiter had risen in the south-east and I took their pictures in the encroaching daybreak.

As totality drew to a close, the cameras that had been doing three-hour trail exposures were shut down and the others, once again, were recording short time exposures. The moon slowly left the umbra, and in the growing daylight the cameras kept clicking as the moon set over a farmhouse in the north-west.

As we watched elsewhere in the sky, the last stars disappeared. Then as a grand finale to a spectacle of grandest proportions, the sun rose in the south-east, following the disappearance of the moon and the stars.

Our hands were now so completely frozen that we could not take down our equipment until after breakfast. Fatigue started to set in, but with it came the knowledge that all of our planning and preparation had paid off. And with this knowledge came satisfaction and patience enough to be content with the long wait for August 16, 1989 – our next total lunar eclipse.

(Last December's total lunar eclipse was viewed by many members across Canada. From start to finish the eclipse lasted over five hours, providing time for various types of photography, observations, and weather changes. – Ed.)

Aurora at Hamilton Centre Observatory Site

by Michael Devillaer
Hamilton Centre

On the evening of January 9, 1983, I had just finished entering in the Observatory log book the outcome of an evening of frustration under poor seeing conditions when, as I left the building, my wife Heather remarked that there were some “very strange streaky clouds in the sky.” Since I had been concerned all evening about an incoming cloud front, I paid no attention. However on her urging I looked skyward and saw that her description was indeed accurate. All at once the streaks began to shimmer and dance across the sky and we both realized that we were being treated to an auroral display. Somehow I remembered to note the time – 2245 EST. Not only were the sharp white patterns moving but they were now expanding across the sky and becoming increasingly intricate. While much of the sky was lit with a bright white glow, the most active area stretched from the middle of Gemini in the east, southward past Orion, and extended well into the southwest. I would estimate that the aurora spread from about 45° above the horizon to approximately 80° . By 2250 EST the display had subsided to an occasional faint pulsating arc high in the southern skies.

Excited by our experience, Heather and I dashed into the observatory and made our respective entries in the observing log. Upon completing our notes, we once again left the building, locked up, and started toward the car. Suddenly, the dim glow that was still hovering above, began to expand and intensify. We decided to wait a moment longer – a fortunate decision, as an instant later (2255 EST), the sky seemed to be violently ripped by dozens of shimmering spikes of bright white light, streaking in all directions. The whole sky was ablaze with this activity. Near the zenith, constantly shimmering ray and glow patterns formed and reformed into countless beautiful and intricate designs. Next, my attention shifted to a spot approximately 20° from the zenith in the north-north-west where a 360° rayed arc was positioned. The opening in the middle of the arc was approximately 1° in diameter and the entire arc, including the outer fringes averaged about 10° in extent. This was a particularly wonderful sight, and yet, the best was to come!

In the south-west, the rayed arc patterns began to turn a dim green colour (Heather thought a dim blue-green) – our first sighting of any colour! Heather directed my attention to a faint pink glow above the trees slightly west of due north. We watched it drift slowly to the west changing colour from light pink to dark pink before it vanished in the southwest. It was breathtaking.

After making another entry in the log we headed home. At 2310 EST the auroral activity seemed to be picking up again, so we pulled over to the side of the road, hoping for another spectacular display. While not as spectacular as the previous display, this particular showing was characterized by white quickly-changing glow patterns near the zenith. Eventually the aurora subsided to some more modest ray patterns roughly 45° from the horizon. We again set out on our trip home, watching for another outburst. Only very faint patches, as had accompanied the more brilliant patterns earlier, could be seen in the east. By 2330 EST, from our front yard in the heart of Dundas, only faint slowly-changing spots could be seen in the north east just beyond a patch of real clouds that were now moving in. But the images of the more spectacular displays that evening remained in our minds and no doubt will for some time.

An Amazing Messier Marathon

by Leo Enright
Kingston Centre

Over a year ago, our observer in Tuáson, David Levy, joined the “Nine-Planet Club” by an amazing one-night observing feat; now he has done it again. This time it is an amazing Messier Marathon.

David has informed me that on March 15–16 he was able to observe no less than 109 of the 110 Messier objects currently listed in the *Observer's Handbook* edition of the Messier Catalogue. Only the globular cluster M30 in Capricornus, escaped his observation, and his telescope was pointing at it in the morning twilight which had become too bright for the cluster to be distinguished.

In my opinion David's feat puts him above all other Messier marathoners, and even ranks among the

great accomplishments by observers of both the present and past centuries. Several observers have seen over 100 Messier objects in a single night, but these feats do not rank with David's for two reasons.

First, most of them were done as part of a Messier Group Marathon, an event in which *several* observers found the objects, and all present who wished to record a sighting then viewed the objects which had been located by *someone else*. David alone located all the objects and carefully recorded his observations of each one. Second, David used the *Observer's Handbook* listing which gives 110 different objects. The Messier Catalogue found in a number of other sources (as well as in *The Observer's Handbook* until 1979) lists only 103 objects, of which two (numbers 91 and 102) are duplicates; this list has only 101 objects.

I am unaware of anyone ever claiming to have seen all of the Messier objects, even when looking on the date in March when viewing is most favourable, and even when using the listing which only has 101 different objects. Congratulations to David on this rare and magnificent accomplishment in astronomical observing: 109 Messier objects in one night!

Reprinted from *Regulus*

Astronomy Toronto: An Update

by Randy Attwood
Toronto Centre

Toronto Centre's cable television programme *Astronomy Toronto* has completed its fourteenth show. When we dove into production in November 1980 (see *NNL* 75:L46, 1981), we had no idea how much time and energy would have to go into each programme.

When our show proposal was accepted by Rogers Cable, the first thing to be done was to round up and train a production crew. Many are Toronto Centre members. All the people who work in the studio and the control room are volunteers who may or may not have any experience when it comes to putting on a television show. People have to operate the cameras, audio, lighting, switching, titles, video recorders, visuals (slides), and carry out the directing in both rooms.

We were taught all this during courses set up by Rogers one night a week for a month. Also, the set had to be built and shows had to be written. Our first set was a painted mural which we made from scratch. For guests I depended mainly on Ian McGregor and Paul Deans of the McLaughlin Planetarium staff, two knowledgeable people who convey their topics well using many slides and diagrams. I have had other R.A.S.C. members as guests, including Dr. Helen Hogg, Doug Welch and Doug Gies.

I will never forget the first day – we taped three half-hour shows. When the first series was completed, we began to think of new ideas and a live hour-long phone-in was suggested. This went very well as it gave the audience an opportunity to interact with the guests and ask any questions they had on the topic. Of course, there have been the odd crank calls which fortunately were screened before they made it onto the air, but most of the questions were surprisingly good.

The topics for discussion are usually very timely, dealing with a current event in the sky. The July 1982 total lunar eclipse was discussed with Ian McGregor during one show. The evening of the eclipse itself, the show was rebroadcast to remind watchers of the event. We described the two Toronto Centre total solar eclipse expeditions in one show, and hopefully a report on the expedition to Indonesia this June will be reported in the autumn.

It is difficult to put a figure on how many hours I spend on each show. The February 1983 programme, "The Moon – 10 Years After Apollo," took over 25 hours of editing, and just as many in the planning stages before that. But the production of a quality astronomy programme is satisfying. It is surprising to see the lack of any such programming on the networks. Certainly the demand for these programmes is there.

I am indebted to the crew who have been coming out from the beginning and are always patient with whatever I want to try out. Their support tends to make the seemingly impossible and frustrating gel into something of which we are all proud to be a part.

Currently *Astronomy Toronto* is seen the last Wednesday of the month at 8:00 p.m. on Rogers Cable Network Toronto, channel 10.

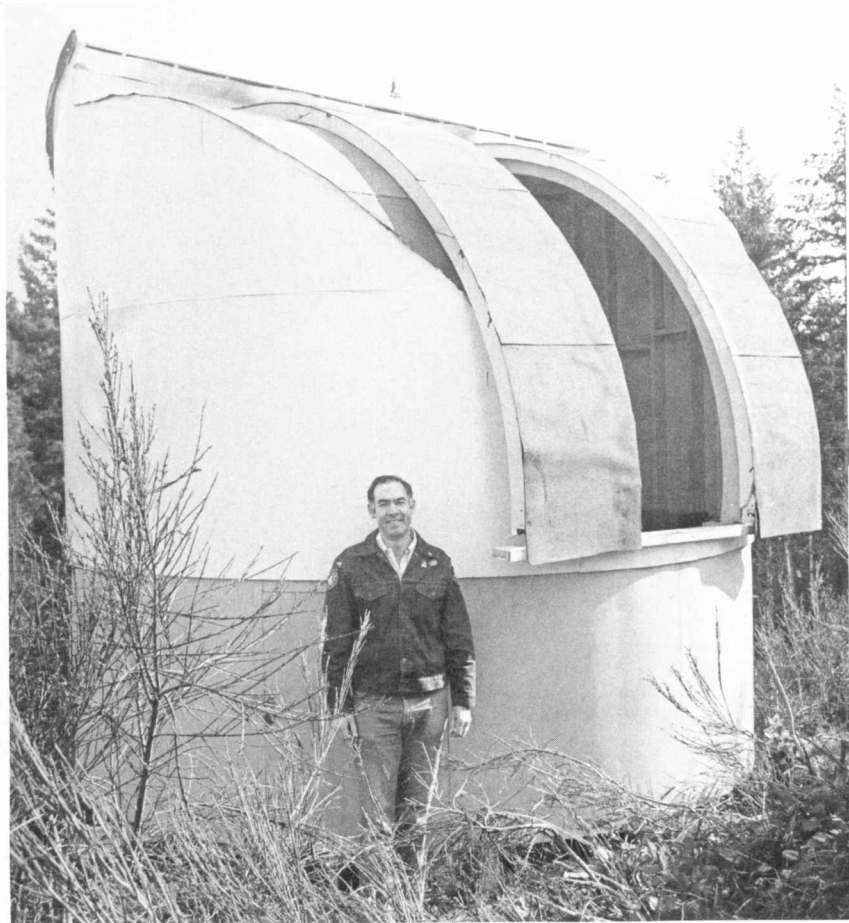
Reprinted from *'Scope*

Another Newton Observatory!

by Jack Newton
Victoria Centre

My latest telescope, a 50-cm $f/5$ Newtonian reflector, is now complete and in its new home. Leo VanderByl of Victoria Centre ground and polished the 25-kg mirror. To reduce the weight of the assembly, much of the telescope tube is open, being formed of steel struts. Sections of solid tubing (for light shields) hold the mirror cell and the secondary-eyepiece mounting assembly. The top of the tube can be rotated to bring the eyepiece mount to any position which is convenient for the observer. The telescope requires 150 kg of counterweights, and is driven in right ascension by a 42-cm Mathis motor drive. The overall weight is 500kg.

Leo also designed the 3.7-metre observatory to house this instrument. The dome configuration (see Figure 1) is very different from the hemispherical domes I have constructed in the past. A standard dome is supported by many curved struts which must be laminated and fitted with great care. The sheets of covering material for such a dome must be cut and bent into shape as sections of a spherical surface.



L44

The curved edges of adjoining sections must match closely, or leaks will develop along the many seams of the finished structure.

Leo's design eliminated most of these problems. All of the curved surfaces are cylindrical, and thus much easier to cut and bend into shape. Half of the roof is flat, with a gentle slope to run off water. The curved portion of the roof and the slit doors are covered with standard roofing materials. Vents in the cave at the peak of the roof allow hot air in the closed dome to escape during the day; this helps to maintain the telescope in thermal equilibrium.

The dome is mounted on a circular track bolted to the top of the observatory wall. Sections of 40mm steel channel were bent with a hydraulic jack to form the track, which guides the sixteen steel wheels which support the dome assembly.

The first-light photograph (of M45) was taken in the new installation in February 1983.

The Moon by Eye and Film

**by Jillian Buriak and John Hicks
Toronto Centre**

The following photo and sketch illustrate a favourable libration of the moon which allowed a fair view of Mare Humboldtianum, a lunar sea appearing as a dark indentation along the limb of the moon at about the two o'clock position.



Often a sketch can purposely illustrate a phenomenon better than a photograph because the artist can selectively emphasise features which are not prominent on film. In this respect, art can surpass photography. The photo is by John Hicks using a 20cm Schmidt-Cassegrain telescope and a 2X teleconverter. The sketch is by Jillian Buriak using an 11 cm Newtonian and pen and ink.



Reflections on Coring a 16-inch Mirror

by Mike Wesolowski
Saskatoon Centre

The Saskatchewan Centre is currently involved in the design and construction of a 16" Newtonian Cassegrain telescope to be installed in the Centre's Rystrom Observatory. The design calls for a hole in the centre of the 16" mirror so that a smaller tertiary mirror can be mounted to send the light out of the side of the tube. This article represents an attempt to record some of what I learned while I cored the mirror, so that the next time (!) the centre gets involved in a project like this, the person responsible won't make the same mistakes I did. (It should be pointed out that we did not actually grind away the glass in the centre of the mirror. Rather, a glass plug was cut using a cookie-cutter-like tool. The plug was not completely cut out—it will be removed after the optics are completely finished.)

First, a bit of history: we knew that the mirror was going to end up with a hole in the centre, but we had no idea where this could be done or at what cost. The first place tried was the machine shop at the Physics Department of the University of Saskatchewan. Unfortunately, the equipment there could not handle pieces of glass 16" in diameter. Further inquiries around the city were inconclusive. About this time, there was a lot of head-scratching; we didn't know what we were going to do.

About this time, I started work as a summer student at the Accelerator Lab on campus, which has a fairly well-equipped machine shop. It took me some time to realize that some of the equipment there looked like they could be adapted to cutting holes in large glass discs, but I did. Inquiries verified this, and permission was obtained from the director of the lab to set up our mirror in the machine shop for the purpose of coring the mirror.

The equipment was set up one evening by Doug Miller, Rick Huziak, Ted Walston, one of the machinists in the shop and your author. The mirror was face-down on a piece of plywood, then affixed securely to the platform of a vertical milling machine. Ted was able to centre the mirror quickly and

grinding started immediately. After several minutes there was a small but noticeable groove cut in the back of the mirror. Seeing how shallow the groove was really made us aware that the job was going to take a long time.

No one in our group had ever done this before, so it was very much a learn-as-you-go type of process, and several problems were encountered. One of the first of these was that as the hole deepened, introducing fresh abrasive became more of a problem. This was easily solved by cutting several wide, deep slots in the tool. Towards the end, though, when the hole was almost as deep as the tool was long, I had to raise and lower the tool to introduce fresh abrasive.

During the early stages, it was discovered that the tool was apparently wearing away as fast as the glass was. If this had been allowed to continue, it seemed likely that we would have ended up with a tool too short to do the job. Although making a new tool would have been feasible, if necessary, we tried to change the technique used. Small slots were cut in the end of the tool to (hopefully) trap abrasive rolling between glass and tool, wearing each of the materials away. It is not known whether or not this worked; the tool was still wearing away at an alarming rate, and ended up being half as long as when we started, just barely long enough to make the hole as deep as we wanted.

One of the problems we encountered fairly early was also quite embarrassing – we had neglected to level the mirror when we started. For some reason, we assumed that the plywood upon which the mirror was resting was flat. It wasn't! This problem was quickly eliminated when we realized this!

Next problem: How does one clean used abrasive from a circular slot 4 mm and several centimeters deep? It seems to be virtually impossible, unless you want to wash the mirror in a sink after each grinding session. Of course, this also requires recentering and releveling the mirror on the milling machine when you've finished. I've tried letting the stuff dry out, then using a vacuum cleaner, pieces of cardboard, and a small spatula. However, these became less effective as the hole deepened. By the time the job was finished in early December, no really satisfactory way had been devised. This will have to be a problem solved by later generations.

One of the lesser problems encountered was that of finding time to work on the mirror. As I am the only person on the mirror grinding committee with access to the machine shop, I pretty well had to do most of the work. As a student, time was not always in abundance. Consequently, it required about 3 months to do all the work on the mirror, of which about 30 hours were actually spent working on the mirror.

At the time of this writing, Doug and Rick have resumed the fine grinding on the mirror, and hope to have it ready for polishing by February (hopefully, putting this in writing will commit them to this date). As for myself, I intend to stay away from the mirror for awhile. I've probably used up all my luck while handling it and I'm sure that if I go near it, something terrible will happen.

I would like to express my gratitude to Dr. H. Caplan, director of the Accelerator Lab, for allowing the Centre to do some work on our mirror at the lab, and to Ted Walston and John Greefkes, the two machinists there, for their comments, helpful suggestions, and patience while we tied up some of their equipment.

Reprinted from *Saskatoon Skies*

(Doug Miller subsequently reported in the February 1983 *Saskatoon Skies* that the mirror was ready for polishing by February as planned. The Centre is also going ahead with the construction and purchase of other materials and equipment for the instrument. – *Ed.*)

Comet Halley Reference List Published

The recovery of Comet Halley in the autumn of 1982 has rekindled public interest in one of the best-known objects in the solar system. A selected list of references on the comet has been published in the November 26, 1982 issue of the *Library of Congress Information Bulletin*. Each entry in the seven pages of listings is fully referenced and abstracted. The Bulletin is sent to many public and school libraries. A more comprehensive bibliography on Comet Halley is also in preparation. (Our thanks to John Townsend of Sarnia Centre for this information. – *Ed.*)

A Quadrantid Fireball

by David Rechtshaffen
Toronto Centre

On the evening of January 3, 1983, about 9:45 p.m., I set up my camera for a series of simple constellation shots to capture some of the more conspicuous asterisms of the winter sky (the only ones visible from my light-infested location in North York). As I prepared a portrait of one of the more widely sought objects, M45, which was situated near the zenith, a brilliant streak of light raced across my field of view. Travelling rapidly from west to east was a bright fireball – my first!

It was approximately fourth magnitude and orange in colour, leaving a very conspicuous trail, which lasted for about three seconds. Although it appeared to be low, I did not detect any sound from it.

I immediately consulted my *Observer's Handbook*, hoping to correlate the fireball with the evening's listed events, and sure enough, that night corresponded with the night of the Quadrantid meteor shower. (Quadrans Muralis is the ancient name for, the area of the sky from which the shower appears to originate – where the present day constellations of Bootes, Hercules and Draco meet.)

Reprinted from 'Scope

A Bright Quadruple Star

by Leo Enright
Kingston Centre

We know that there are many double and triple stars that can be easily resolved in our small and medium telescopes. Did you know that there is a bright naked-eye star in a prominent summer constellation that can be resolved into a "quadruple star"? A famous observer has called it "the most beautiful quadruple group in the heavens." Binoculars can split the star into two, and then, as in the case of the "double-double" in Lyra, each one can be further split into two more in a telescope.

This star is Nu Scorpii, located near Beta Scorpii at the upper edge of the Scorpion. Its four components are true members of one group: all four show a common proper motion. The two pairs, which are 41.4" apart, are very unusual in being close both in brightness and separation. The one pair at magnitudes 4.6 and 5.6 are only 1.2" apart, and the second pair at magnitudes 7.0 and 7.7 are 2.3" apart. Nu Scorpii, a true quadruple, is certainly worthy of our observation and study this summer. Telescopes of 6-inch aperture or more should, under good conditions, resolve all the members of the group.

Reprinted from *Regulus*

A L'AIDE!

Les éditeurs du "Journal" et du "Newsletter" tentent de vous faire parvenir ces publications dans un délai raisonnable et vous pouvez nous y aider en complétant ce court questionnaire.

Fait en collaboration avec le service des Postes, ce sondage devrait nous permettre de déterminer les régions où certains problèmes retardent la livraison de nos publications.

Comme nous connaissons la date à laquelle nous avons mis votre copie à la poste, vous n'avez qu'à nous indiquer la date à laquelle vous l'avez reçue.

Faites parvenir ce questionnaire (ou une copie) à Monsieur Harlan Creighton, a/s Société Royale d'Astronomie du Canada, 124 rue Merton, Toronto, Ontario, M4S 2Z2.

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Merci!

***The Joy of Gazing* Now Available**

**by J.W.S. Marshall
Montreal Centre**

The Joy of Gazing by David H. Levy, longtime member of the R.A.S.C. Montreal and Kingston Centres, has been published by the Montreal Centre.

This little book is a personal guide for the new observer. It is intended to whet his appetite by giving him a quick look at some of the many fields of amateur observational activity. Solar system and Messier objects, stars, eclipses, comet and nova searches, and the aurora borealis are included. While variable stars and solar system objects are covered in some detail, star clusters, nebulae and extragalactic objects are barely mentioned. Nevertheless, the reader is left with a clear impression of the author's joy of gazing and of his continuing enthusiasm as his observational experience develops over a period of some twenty years. A list of books for further reading is included.

The Joy of Gazing can be ordered from the R.A.S.C. Montreal Centre, P.O. Box 1752, Station B, Montreal, Quebec H3B 3L3. The price is \$3.65, postage paid.

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