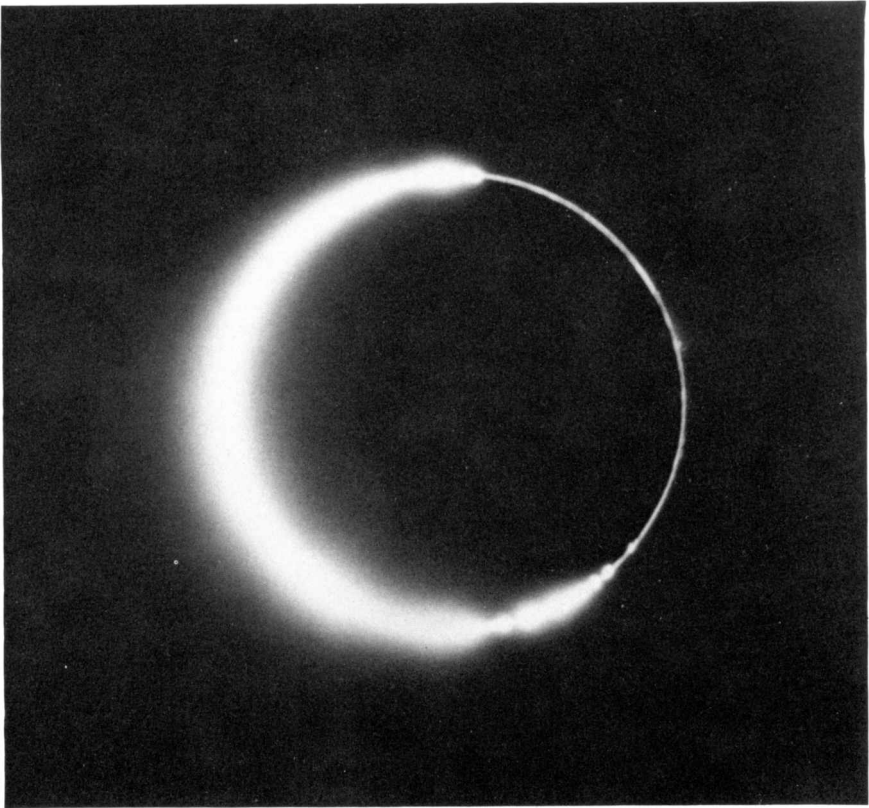


NATIONAL NEWSLETTER

August, 1984

Supplement to the JOURNAL OF THE ROYAL ASTRONOMICAL SOCIETY
OF CANADA

Vol. 78, No. 4



Despite the insalubrious weather of the previous two days, observers in the southern U.S. were treated to the rare sight of an annular solar eclipse on 30 May. A report on the successful Toronto Centre expedition begins on page L50 of this issue. Photo by B.R. Chou on Fujichrome 100, 1/1000 second at 12:33:35 EDT with a clock-driven Celestron 5 telescope.

NATIONAL NEWSLETTER

August, 1984

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A Dazzling Diamond Necklace

**by Michael Watson
Toronto Centre**

For 30 straight hours the rain had fallen. From the moment of departure at 22:00 on Monday, May 28 right through until the early morning hours of eclipse day, Wednesday, May 30, the 44 members of the 1984 Toronto Centre Annular Eclipse Expedition had seen nothing but cold, wet, and completely overcast skies. Not once during our 13½ hour bus trip to Petersburg did we see even a glimmer of sunlight.

Realizing that weather prospects in eastern North America are never that good, I had taken the precaution of obtaining 36 large-scale topographic maps of a 410 km long portion of the path of annularity running from Charlotte, North Carolina through to Petersburg, Virginia. It made sense to have back-up sites should bad weather make a quick dash from our primary site necessary. Last Christmas I had visited one of the back-up sites in Greensboro, North Carolina, about 270 km west south-west along the path from Petersburg. Because it had never seriously occurred to me that we would have the time or the inclination to travel further than Greensboro on eclipse morning no matter what the weather, I had not actually visited any of the half dozen other possible sites which the maps showed lay to the west of Greensboro.

As we prowled restlessly around our motel rooms late on Tuesday evening, listening to the incessant rain and the gloomy weather reports it became obvious that the high pressure zone (and its accompanying clear skies) would move into our area only when the eclipse was over. A very early departure and a long drive into the Carolinas on Wednesday morning seemed the only hope.

During breakfast at 5:30 a.m. on eclipse morning, our decision to drive at least as far as Greensboro was announced. In spite of the rain, there seemed to be an amazing amount of optimism among the observers as we left Petersburg at 6:45 a.m. By 10:00 a.m. we were on the outskirts of Greensboro. The

sky had cleared to only 8/10th cloud cover, and occasionally the sun could be seen peaking through. One of our members, Air Canada pilot Charles Burbank, made a telephone call to a pilot weather information service and was told that the weather prospects did seem slightly better further west.

We were now running into time constraints. Interstate 85, along which we were travelling, ran about 20 km south the centre line of the eclipse, and parallel to it. Given that we needed about one hour on the site before mid-eclipse to set up equipment, and another 20 minutes at least to get off I 85 and up to the path, it seemed that we could travel down the road only until about 11:00 am. or so before turning off to the observation site. As the bus sped down the highway, we huddled with the maps and determined that our best chance was the tiny town of Cleveland, North Carolina. The playing field of the junior high school was the best potential site. We announced our decision to the bus drivers and to the observers as we approached the turn-off.

As we entered Cleveland observers on one side of the bus were peering intently and pointing excitedly to the partial eclipse which was already underway. We roared up to West Rowan Junior High School under a deep and delicious blue sky. My father and I leapt from the bus, ran into the school, found the principal and received permission to use the playing field as our site.

Telescopes, tripods, movie cameras and binoculars soon lay strewn about the field, and before long organization began to take shape from the tangled mess of equipment and people. The school children found the entire scene immensely entertaining and certainly more interesting than their classes.

After setting up my telescope I calculated the predicted time of exact mid-eclipse to be within a few seconds of 12:33:51 EDT. We set stop watches accordingly. Most of us had resolved to remove the solar filters about 40 seconds before that point, watch and photograph the eclipse unprotected for about 80 seconds, and then replace the filters.

As the moment approached, the wind died, the temperature dropped dramatically and the lighting took on its customary quick-silver cast. Subsequent viewing of a videotape which Randy Attwood and Betty Robinson had set up, showed a marked and impressive darkening, beginning about 30 seconds before mid-eclipse. With Venus gleaming to the naked eye just 4° to the west of the crescent sun, we removed the filters as the seconds counted down. Those of us who observed the eclipse through the ground glass focussing screens of 35 mm cameras attached to large telescopes saw an astonishing view: while a brilliant and dazzling crescent of uncovered sun peered around the east limb of the moon, an enormous 150° arc of shocking pink chromosphere ringed the west limb. A large, detached pink prominence floated off the west limb, and fine brushes and wisps of the silver inner corona danced before our eyes.

As the moon moved rapidly across the solar disk, brilliant points of photosphere suddenly burst through the chromosphere on the west limb – the diamond necklace was upon us! Within a few seconds the moon covered the bright solar surface on the east limb, and a large arc of chromosphere with several small pink prominences appeared, framed by the silver corona with its definite structure. Amazingly (experts had said that no one would see any corona), we kept the sun's atmosphere in view for a full minute after mid-eclipse, until the staggering brilliance of the uncovered photosphere made continued observations too difficult and dangerous.

The emotional impact of what we had just witnessed was enormous. It was an unprecedented view – never before had anyone seen inner corona with such a long arc of chromosphere at the same time. The jubilation was immense. The scene in the school yard dissolved into self-congratulatory pandemonium. After a leisurely picnic lunch, we packed up the equipment, climbed aboard the bus and busied ourselves with comparing observations and demolishing a case of champagne.

Our discussions made a number of points clear: by far the best view was had by the few observers who looked at the eclipse right through the ground glass of their cameras attached to large aperture unfiltered telescopes. The ground glass appeared to diminish the brilliance of the unobscured arc of photosphere while leaving the dimmer chromosphere and inner corona unimpaired. No one who observed naked eye or with binoculars was able to see corona because of the dazzling brilliance of the uneclipsed sun. Photographic exposures much shorter than usual for a total eclipse were necessary. Many observers understandably overexposed their images. Nonetheless, members such as Rand Lomas, Steven Spinney, Scott Ramsay, Ralph Chou and I did get good photographs, which will long be treasured as moments of a unique and unforgettable experience.

Reprinted from *'Scope*

The May Eclipse – A Toronto Perspective

by Ian McGregor
McLaughlin Planetarium

While a few dozen members successfully viewed the May 30 solar eclipse from North Carolina, most Ontario observers missed the eclipse due to heavy cloud cover. The clouds either completely discouraged them from trying to observe the event, or, in their location, no breaks in the clouds appeared. However, for at least several hundred people present at the McLaughlin Planetarium on eclipse day, we had the chance to briefly spot the crescent sun high in the sky.

Two weeks prior to the eclipse was a time of madness for Planetarium staff. Ministry of Education representatives, principals, teachers, parents, children, physicians and the news media all realized that an eclipse was to take place over Canada at the end of May. The Planetarium staff was deluged with phone calls. The taped information line was in constant use, often with only 10–15 seconds of break between calls. Staff members handled a total of 35 media interviews in four days, as well as numerous general enquiries.

Thousands of years ago, before people could predict eclipses, the relatively sudden blackening out of part or all of the sun's face caused mass hysteria. It appeared the sun was being eaten and possibly would not return. Today a somewhat similar hysteria occurs. We know when eclipses are going to take place but unfortunately for many people, it is a cause for alarm. Having days or weeks advance notice just means there is more time to close the curtains, hide under the bed, or rearrange schedules to avoid being outside during the eclipse.

For the press, the event is news, something reported just before it takes place or immediately afterwards, and which gets placed just after the classified section of the newspaper, or on the 11 o'clock news the night before. On the Friday prior to the eclipse, a joint R.A.S.C.-Planetarium press briefing was held at the Planetarium and 17 media representatives were present. Randy Attwood and I handled the briefing. It was a great success and was prominently featured in newspapers and television over the next two days. On a more sober note, the reason we got so many reporters was that there was no other news in the newsrooms that morning. We were the only news!

It was indeed a treat to speak to one Toronto school principal who regarded the eclipse as an opportunity to do some real science with his students. He was planning to do a special program so that his students would not only fully realize what was happening but also safely observe it. On the other hand, another principal couldn't understand all the fuss because the solar eclipse was taking place at night anyway!

The day of the eclipse was grey, cold, and cloudy for most of Ontario. In Toronto there was even a possibility of rain. Despite a dismal forecast, John Kenny, Tom Wujec, Brian Beattie, Peter Jones and I set up two telescopes in front of the Planetarium. One was an eight-inch Schmidt-Cassegrain with a solar filter and the other was a standard 2.4-inch refractor for projecting the sun's image. At 11 a.m., there we stood, two lonely telescopes, three staff members, a vast empty plaza, and cloudy skies. Two nearby popcorn vendors were the centre of activity with about 20 students rushing and shouting about them. Then a film crew arrived from the CBC National network and asked if we could see the sun through the telescopes. We couldn't even find the sun!

We soon began to wonder why we were outside staring at thick, dark clouds. Occasionally members of the public would join us for a few minutes of conversation and then move on. "Oh well, partial eclipses aren't that exciting anyway," I was saying to myself and hoping the Centre's expedition in south-eastern United States was getting as much sun as we were getting cloud.

Then much to our surprise at about 12:40 p.m. thinner patches of cloud appeared and a few minutes later, a much dimmed crescent sun was visible high overhead. Hundreds of school children had just left the Planetarium and with the usual noon-hour business crowd in the area, hundreds of people screamed, shouted, and gasped at the spectacular sight in the sky as only about 25% of the sun's face was not covered by the moon. A CBC television reporter standing beside me almost fell over when she saw the eclipsed sun.

From then until the end of the eclipse, the sun was visible every few minutes as thin cloud patches became more frequent and occasionally, even blue sky appeared. There was an eager lineup to look

through the eight-inch telescope which was on a motor drive. The undriven refractor rarely spotted the sun. I would very roughly guess the eclipse was visible for about 25 minutes of the last hour or so of the eclipse, although no more than a minute or so at one time. It was an experience for me to watch the closing partial phases of the eclipse. My last two eclipses were the total eclipses of 1979 in Manitoba and Kenya in 1980 and for those, after mid-eclipse, I was sipping champagne. Partial eclipses are interesting but give me a total any day. Unfortunately the next total solar eclipse near to us will be in 1991 when the path of totality will cross Hawaii and Mexico. See you in Hawaii!

Reprinted from *'Scope*

R.A.S.C. Centres Observe Astronomy Day

by B.R. Chou
Editor

In 1983, the Society's National Council appointed Leo Enright of Kingston Centre to the position of Astronomy Day Co-ordinator. As part of his effort to encourage Centres to mark International Astronomy Day, Leo prepared an information package, which was distributed to all Centre presidents and secretaries. By press time (late June) reports from five Centres were received, showing that Leo's work had paid off.

Calgary Centre and the Calgary Centennial Planetarium combined efforts to celebrate Astronomy Day on 7 April, to avoid daylight saving time at the end of April. About 1300 visitors to the Planetarium saw star chamber demonstrations, mini-presentations, science fair exhibits, computers, laser disks, telescopes and a wide variety of displays. The University of Calgary kindly loaned a laser disc player and colour monitor for the day's programme, which concluded successfully with a star night featuring the Moon, M42, a bright satellite and an auroral display in clear skies.

Four Ontario Centres reported successful programmes on 5 May. The Kitchener-Waterloo Centre set up a display in Waterloo's Conestoga Mall. Peter Daniel presented a slide show on the solar system and space flight. Visitors perused displays of astrophotography and astronomical publications, as well as a 3-inch refractor. In the evening, visitors to the Centre's observatory open house viewed the Moon, Saturn and Mars with the 12½-inch reflector.

Toronto Centre ran three programmes during the day. An indoor display consisting of posters and four telescopes was set up in the York Quay Centre at Harbourfront. This was part of a programme on leisure time activities presented at the STRESS '84 conference organized by the Canadian Mental Health Association. Meanwhile, telescopes, posters, literature and the Centre's eclipse banner attracted many visitors to the display at Nathan Phillips Square in front of Toronto's "new" City Hall. During the afternoon the display drew the attention of the local media as municipal politicians and celebrities attending Toronto's sesquicentennial celebrations at the Square came over to take a look. In the evening, five telescopes were set up on the grounds of the David Dunlap Observatory to supplement the Saturday evening public tours. It was certainly a busy day for the Toronto Centre!

Ottawa Centre marked International Astronomy Day with a display of telescopes, literature and astrophotography at the St. Laurent Shopping Centre. Sky charts, old issues of *Astronomer* and the *Observer's Handbook*, and information sheets were distributed, while copies of the current *Handbook* and the Ottawa Centre's *Observer's Manual* were offered for sale. The display drew much attention and the four members present were kept busy all day. Meanwhile, the National Museum of Science and Technology hosted an Astronomy Day programme jointly with the Ottawa Centre and the Herzberg Institute of Astrophysics of the National Research Council of Canada. Presentations during the afternoon covered astrophotography, radio astronomy, astronomy as a hobby, and concluded with a panel discussion. Two talks were given in the evening by members of the Canadian Astronaut Programme. An observation session with the Museum's telescopes as well as those of several Ottawa Centre members brought this very popular programme to a successful conclusion.

The Kingston Centre enjoyed its most ambitious and successful display ever at the Cataraqui Town Centre. The mall display, which ran from 9 a.m. to 6 p.m., included posters, astrophotographs, mirror



Randy Attwood, President of Toronto Centre, talks astronomy with Art Eggleton, Mayor of Toronto, at the Nathan Phillips Square Astronomy Day display. Photo courtesy of J.R. Attwood.

grinding, a book display, astronomical binoculars, and several telescopes, one of which was the Centre's 10-inch reflector. Visitors were invited to participate in a constellation-recognition game and an astronomical trivia game which was very popular. The R.A.S.C. information bulletin on Halley's Comet drew much attention. David Stokes and Leo Enright organised solar observing sessions at mid-day. In the evening, a Public Star Night drew several hundred visitors who observed lunar craters, Mars, Saturn, double stars and several meteors. The efforts of Kingston Centre members were well rewarded, as at least six visitors to the Astronomy Day programmes joined the Centre.

The success of these programmes is a strong indication of the public's sense of wonder at things astronomical. We look forward to even greater success next year in celebration of International Astronomy Day.

Awards of the R.A.S.C. for 1984–85

Awards may from time to time be conferred upon members in recognition of meritorious service or achievement. Recommendation for such awards should in most cases be made through the Council of the local Centre. Members at large may submit recommendations, if they so wish, to the National Office for consideration of the National Council. Centre Councils will, of course, submit recommendations as they see fit, to National Council for final approval.

CHANT MEDAL

The Chant Medal of the Society was established in 1940 in appreciation of the great work of the late Professor C.A. Chant in furthering the interests of astronomy in Canada. This medal is awarded, not oftener than once a year, to an amateur astronomer resident in Canada on the basis of the value of the work which he has carried out in astronomy and closely allied fields of original investigation. Nominations (including citations) should reach the National Office by *December 31*.

SERVICE AWARD MEDAL

The Service Award was established in 1959 and, on recommendation of a special committee of the National Council, this small bronze plaque is presented to members who have performed outstanding service to a Centre or to the National Society. Nominations and citations should reach the National Office by *December 31*.

KEN CHILTON PRIZE

The Chilton Prize was established in 1977 by the National Council of the Society, in remembrance of K.E. Chilton, an active member of the Hamilton Centre. The Prize is awarded annually to an amateur astronomer resident in Canada, in recognition of a significant piece of astronomical work carried out or published during the year. Nominations and citations should reach the National Office by *December 31*.

SIMON NEWCOMB AWARD

The Simon Newcomb Award was established on recommendation of the Halifax Centre, in 1978. Full details are given in the *National Newsletter* for December 1980, Vol. 74, No. 6, subject to the following additional criteria adopted by National Council in May, 1982.

The maximum length of entries has been increased to 2500 words. This limit will be strictly enforced. Nominations should be sent to:

Awards Committee, R.A.S.C.
136 Dupont Street,
Toronto, Ontario
M5R 1V2

Due\$ Due

Yes, once again, it's renewal time: the 1985 membership fees are payable as of October 1, 1984. National fees are \$20.00 for the regular membership, and \$12.50 for youth members under the age of 18 years, payable to your Centre. Unattached members should remit their fees directly to the National Office. Certain Centres have added surcharges to the basic national fee structure. Members should consult with their Centre treasurers to check their fee. Members wishing to transfer to Life Membership in the Society should apply to the National Office, remitting the fee of \$300.00 directly to the National Office. Members who have not renewed by 15 January, 1985 will be dropped from the publications mailing list, so please send your dues now. The Society's publications are distributed on the basis of the calendar year of the membership. Don't miss your 1985 issue of the *Observer's Handbook*, or any issues of the *Journal* or *National Newsletter*.

Bart Bok Memorial Fund

A fund to carry on the work of the late Bart J. Bok in sharing the excitement of modern astronomy has been established by the Astronomical Society of the Pacific.

Seed grants totalling \$23,000 have already been received from the Perkin Fund, and from several of the astronomer's students and colleagues. The A.S.P. hopes to raise an endowment of at least \$100,000 to support a variety of public education programmes. These would include a Bart J. Bok Memorial Lecture Series, in which well-known scientists would give non-technical talks to large public audiences; as well as astronomy workshops for elementary and secondary school teachers; the development of educational materials on astronomy for use by libraries, schools and youth groups; and support for the Bart and Priscilla Bok Awards for high school astronomy projects.

Gifts to the fund are being solicited from both the amateur and professional astronomical communities. Acknowledgements will be sent to both the donor and the Bok family. Contributions to "ASP, Bart Bok Fund" should be sent to the Astronomical Society of the Pacific, 1290 24th Avenue, San Francisco, CA 94122, U.S.A.

Astronomical Observations in the *Anglo-Saxon Chronicle*

by Owen Brazell
Calgary Centre

The Anglo-Saxon Chronicle is a series of annals written in the monasteries of Winchester, Canterbury, Peterborough, Abingdon and Worcester. The annals detail the history of England and Europe from about A.D. 1 to A.D. 1154. Since this period encompasses 1066 and the appearance of Halley's Comet, it was thought to be of interest to search through the Chronicles to see what other astronomical events were recorded. Since my own knowledge of Anglo-Saxon is negligible, the descriptions are subject to the translator's interpretation as well as my own.

Two of the more interesting aspects of the Chronicle is that it was written in English at a time when Latin was the language of the clergy, and it uses the numbering system introduced by the Venerable Bede of numbering the years from the birth of Christ. The search for astronomical references may not be complete, but should give some idea of the kinds of events that were noticed. Table 1 gives a summary of the astronomical events seen.

Table 1

Type of Event	Number Recorded
Solar eclipses	7
Lunar eclipses	9
Comets	11
Aurorae	8
Meteor showers	1

In this brief article I will discuss in turn each type of event, giving some examples of how they were recorded.

Solar eclipses were recorded in 538, 540, 664, 809, 879, 1135 and 1140. In general, there are fewer observations in the years 850 to 1000, as the chroniclers were more concerned with the ravages of the

Vikings than with what went on in the sky unless it was regarded as a portent. The eclipse in 1135 was reported as follows: "At Lammass [1 August] of this year King Henry went overseas and on the following day while he lay asleep on board, the light of day was eclipsed over all the lands, and the sun looked like a moon three nights old and there were stars around it at mid-day. Then men were greatly astonished and terrified and said that some important event should follow upon this; and so it did, for the King died in Normandy the day after St. Andrews day."

In 1140, an eclipse was recorded similarly: "Afterwards in Lent, the sun and the light of day were eclipsed about noon when men were eating, and candles had to be lit for them to eat by. This happened on the 20 March and men marvelled greatly." The other solar eclipses were recorded with just a date and time.

Possible lunar eclipses were recorded in 734, 796, 800, 802, 904, 1078, 1110, 1117 and 1121. Mostly again these are just notes, but the eclipse in 1110 was recorded thus: "On the fifth day of May, the moon appeared in the evening shining brightly and afterwards little by little its light waned so that as soon as it was night it was so completely extinguished that neither light nor circle could be seen of it; and it remained so until almost daybreak, when it appeared at the full and shining brightly."

Comets were always a source of wonder, so it is of no surprise, that many of these events were recorded. Comets were recorded in 676, 792 (twice), 892, 905, 975, 995, 1066, 1097, 1105, 1110 and 1114. The comet of 1066 (Halley's) was recorded thus: "At that time throughout all England a portent such as men had never seen before was seen in the heavens. Some declared that the star was a comet, which some call the 'long haired star': it first appeared on the eve of the festival of Letania maior, that is, on the 24 April, and it shone every night for a week."

The comet of 892 also had an interesting entry: "And the same year after Rogationtide or earlier appeared the star which in Latin is called 'cometa'. Likewise, men say in English that a comet is a long-haired star, because long beams of light shine therefrom, sometimes on one side, sometimes on every side."

There is only one entry reporting a meteor shower, which must have been quite spectacular. In 1095, the scribe noted it with these words: "Then after Easter on the eve of St. Ambrose, which is on 4 April, almost everywhere in this country and almost the whole night, stars in very large numbers were seen to fall from heaven, not by ones or twos, but in such quick succession that they could not be counted." Assuming the date given for the meteor shower is correct, it is possible that it was a display of the Lyrids.

One of the most terrifying sights to the superstitious men of the Dark Ages was the appearance of the Northern Lights. Possible displays were recorded in 776, 789, 793, 926, 979, 1117, 1122 and 1131. The appearance of the aurora in 793 was connected with several disasters in an often quoted passage from the *Chronicle*: "In this year terrible portents appeared in Northumbria, and miserably afflicted the inhabitants: these were exceptional flashes of lightning, and fiery dragons were seen flying in the air and soon followed a great famine, and after that in the same year the harrying of the heathen miserably destroyed God's church in Lindisfarne by rapine and slaughter."

In 979 a red aurora was seen: "This same year a cloud as red as blood was seen, frequently with the appearance of fire, and it usually appeared about midnight: it took the form of rays of light of various colours and at the first streak of dawn it vanished." This description parallels closely some of the auroral displays I noted in St. Andrews, Scotland.

The most extreme case of panic over an aurora was in 1130: "In this year after Christmas on Sunday evening just after bedtime, all the northern sky appeared like a blazing fire, so that all who saw it were more terrified than ever before; this happened on 11 January. In this same year over the whole of England murrain [plague] among the cattle and pigs was worse than any within living memory; so that in a village where ten or twelve ploughs were in use, not a single one was left working: and a man who had owned two or three hundred pigs found himself with none. After that the hens died and then meat and cheese and butter were in short supply. May God improve matters when it is his will!"

And you think you have it tough! This article mentions some of the more obvious events seen. There are more scholarly treatments of the subject, and if the reader is interested, they can always read the *Chronicle* for themselves.

Reprinted from *The Starseeker*

Herschel House in Trouble

by Ian McGregor
Associate Editor

The famous house in Bath, England where Sir William Herschel discovered the planet Uranus in 1781 and which was converted into a Museum just over three years ago is in danger of closing.

The house at 19 New King Street was the home of William Herschel from September 1777 to December 1779, and again from early March 1781 to July 1782. During his second period of occupancy, on March 13, 1781, Herschel discovered Uranus from the back garden using a seven-foot telescope. Of several places where Herschel and his family lived in England, this house is the only one still standing.

The William Herschel Society was formed to acquire the house and create a Herschel Museum. Elizabeth and Leslie Hilliard purchased the rather run-down building in 1978 and work began on repairing it. Through generous donations, the house was restored and on the 200th anniversary of the discovery of Uranus, the Herschel Museum was opened to the public. Several rooms have been restored to what their appearance might have been like in the 1780's including an astronomical museum, a music room (music being very dear to Sir William's heart), a living room, and a telescope workshop.

Unfortunately, revenue from admissions and donations has not kept up with the expenses of operating the Museum. In the Herschel Society's Newsletter No. 14 for June 1984, it is stated that "unless, therefore, substantial sources of income for the Museum are found before the end of October this year, it is regretted that the Museum part of the Society's activities will have to be discontinued". It is reported by the Society that about £1,000 are needed to maintain and run the Museum annually but income has not met this figure. Since opening, the Museum has enjoyed rent-free use of the three museum floors but unfortunately the Hilliards, now in their eighties, can no longer continue their generous support, and as of October 1984, the rent-free arrangement will cease.

Several of our Society's members have visited the Herschel Museum including the *National Newsletter's* two senior editors and the National Librarian, Phil Mozel. Reports can be found in the *Newsletter* for February 1981 (Vol. 75 No. 1) and April 1982 (Vol. 76 No. 2) and an article in *Sky & Telescope* (Vol. 61 No. 3 March 1981). Members interested in joining the Herschel Society, or making a donation should write to:

William Herschel Society,
19 New King Street,
Bath, Somerset, England

Star-Struck Students Win R.A.S.C. Awards

by Susan V. Bosak
Youth Science Foundation

With a project titled "Meteoroids, Meteors, and Meteorites", Peter Brown of Fort McMurray, Alberta and Doug McLachlan of Edmonton, Alberta won the R.A.S.C. award of \$50 cash and 1 year membership at the Canada-Wide Science Fair held May 13-20 in Halifax, Nova Scotia. When asked to describe their "materials", the 13-year-old students listed a lawn chair, blanket, paper, pencil, and stopwatch. Their "apparatus" was even more straightforward: the human eye! Other winners of R.A.S.C. 1 year memberships were 18-year-old Martin Aubé of Sherbrooke, Quebec and 16-year-old Sylvain Paquet of Thetford Mines, Quebec for their project titled "Etude Visuelle des Etoiles Variables." Keith Hitchon of Calgary also won an R.A.S.C. membership for his project titled "Eclipsing Variable Stars." As well, the 16-year-old Hitchon received a Silver Medal in Intermediate Physical Sciences from the Youth Science Foundation, the science fair's organizer.

Across the R.A.S.C.

by Peter Jedicke and Ian McGregor

HALIFAX: About 33 people attended the annual Halifax Centre banquet on May 18 at the Clipper II Restaurant in the Dartmouth Ferry Terminal. The Centre's newsletter *Nova Notes* continues to print a good selection of articles in each issue.

CALGARY: There are plans to get a new cover design for newsletter *The Starseeker*. Calgary student member, Keith Hitchon, has won the R.A.S.C. Calgary Centre award for the third year in a row for the Best Astronomy Project at the Calgary Youth Science Fair. The Centre's Annual Picnic was scheduled for August 4. A new 12½-inch Newtonian reflector has been purchased for use at the Centre's Wilson Coulee Observatory. There are now ten piers at the Observatory where members can mount their telescopes. Several Centre members observed the May solar eclipse from Atlanta, Georgia. The Centre is doing a ten-week series on astronomy on CBC radio for the summer.

OTTAWA: Variable star coordinator Sandy Theusen has introduced a programme of variable star observation. Six stars have been chosen including Delta Cephei, Beta Lyrae, RZ Cassiopeia, R Scuti, X Herculis, and Chi Cygni. The variability of all of these stars can be observed using binoculars. As incentive for participation, a Variable Star Award based on quality of observations has been instituted.

VICTORIA: Members have set up telescopes for the public at the Dominion Astrophysical Observatory on Saturday evenings during the summer. The Centre's Annual Meeting and Dinner will be held on October 17.

NIAGARA: The Centre presented an award at the Niagara Region Science Fair for the Best Astronomy Project. Congratulations to Timothy Hendriks who has won a membership in the Niagara Centre. Members participated in Education Week at Stamford Collegiate Institute with a planetarium show and a star party. Dennis Beach has completed his new 17½-inch telescope and Bob Winder should have his 26-inch instrument completed in the late summer.

EDMONTON: Alan Dyer has stepped down as editor of *Stardust*. At the time of writing it was unknown whether a new editor would be appointed or the Centre would participate in a joint publication with the new Edmonton Space Sciences Centre which opened July 1.

TORONTO: The Centre organized a successful expedition to North Carolina to see May's solar eclipse. Forty-four people participated in the Centre's sixth eclipse in twelve years. Plans are underway to get more active involvement in the Centre's Schomberg Observatory with major star parties in July and September. An Awards Banquet with speaker and door prizes is planned for Saturday, November 10 at the Toronto Harbourcastle Hilton Hotel. The annual Open House at the David Dunlap Observatory is scheduled for September 21.

WINDSOR: Congratulations to Cyril Hallam and Henry Lee, two long-time members, who received the Society's Service Award at the Hamilton General Assembly. Brian Perry and Dan Karemen are building a 41-inch reflector telescope with completion scheduled for mid-1985. The Centre received good press coverage of its May Astronomy Day activities and picked up some new members. A group of members were planning to attend the annual Stellafane conference in Vermont in July.

Please send Centre newsletters and late items describing the activities of R.A.S.C. Centres and members to Peter Jedicke, 810-1297 Huron Street, London, Ontario, Canada N5Y 4L9. Deadline for receiving material is six weeks prior to the beginning of the month of issue. Material for the December column must be received by no later than October 15. Late news can be forwarded by phoning (519) 455-5907.

N.F.C.A.A.A. Meeting Report

**by Randy Attwood
Toronto Centre**

On April 28 there was a meeting of the Niagara Frontier Conference of Amateur Astronomical Associations (N.F.C.A.A.A.) in Woodstock, Ontario. This organization (formed in 1968) is a collection of amateur astronomy clubs from the Niagara area, including the United States. They meet twice a year to discuss their observing activities, star parties, newsletters, etc.

When notified of the April 28 meeting, a contingent of Toronto Centre members—Michael Watson, Betty Robinson, Phil Mozel, Otto Langmark and I — drove to Woodstock to participate in the conference. Both Phil and Otto presented papers.

Some of the organizations represented at this meeting were from Buffalo, Almira, Syracuse, Binghampton, Rochester, Detroit, Chatham, London, Hamilton, Niagara Falls, Sarnia, and North York.

The next meeting of the N.F.C.A.A.A. is scheduled for Saturday, November 3, 1984 in Niagara Falls. I would recommend this meeting to any members curious about other amateur astronomical clubs. There are many active astronomy clubs in the southern Ontario and upper New York State area, and exchanging ideas and experiences can only be positive for all involved.

Reprinted from *'Scope*

Dial “M” for MMT

**by Doug Welch
Department of Astronomy, University of Toronto**

Last autumn I journeyed down to Tucson, Arizona for two observing runs: one on the 1.6-metre telescope at Mt. Lemmon and one on the 4.5-metre Multiple Mirror Telescope (MMT) at Mt. Hopkins. As the first run was rained out, I shall restrict my discussion to the MMT. Chris McAlary and I were the investigators on both runs.

It was an unconventional trip to an unconventional telescope. The journey began innocently enough — an hour’s drive from Tucson to Amado where the headquarters for the MMT is located. Then to get to the Observatory we had to cross a river, but the “Flood of ’83” had changed all that. The bridge across the river had been ripped to pieces by raging torrents earlier in October. Fortunately, a five-hour detour was no longer necessary and instead we were handed a map showing the most recent route to Mt. Hopkins. Where our path was to cross the river lay the cryptic warning “Drive slowly — don’t flood the engine”. Sure enough our four-wheel drive vehicle crossed the less than one metre deep Santa Cruz river without the benefit of a bridge.

The hour-long drive from the river to the mountain was no less interesting. The road to the summit was very poor. By comparison, the summit road on Mauna Kea (CFHT Telescope in Hawaii) looks like a four-lane highway. The last kilometre of the access road is paved. This is fortunate, as the section leading to the telescope has a 25% grade!

The summit on Mt. Hopkins is quite picturesque and has a view unrivaled by any observatory I have visited. The lodge and common building are both new and very comfortable, and the observatory itself is most interesting. The “dome” in this case is the building. The first thing one notices upon arriving at the summit is a sign stating “Warning — Building Rotates”. Indeed, inside the observing room one often has the impression that one is at sea, as the building tries to keep pace with the telescope. The scope itself consists of six 1.8-metre systems. The structure holding these together resembles an enormous “jungle gym” in that the observer must climb around inside to prepare equipment for observing. The mounting is altazimuth and as the building rotates with the telescope, the telescope chamber is very compact.

Our first night on the mountain was scheduled for engineering. This was necessary because the

infrared equipment had recently been drop-kicked and alignment problems were possible. As it turned out, the equipment was fine and after three hours of checking things out and aligning the telescopes, the MMT was turned over to us. Chris was scheduled for one night observing Seyfert galaxies prior to our three nights for Cepheid variable stars in the galaxy M33. However we observed Cepheids on both nights prior to the official run in exchange for a few hours on Seyferts when M33 was too low in the sky. As a result of this arrangement, we observed Cepheids on four nights out of five – the last being cloudy.

As it turns out, M33 passes within one degree of the zenith at Mt. Hopkins. Anyone familiar with altazimuth mounts knows that tracking near the zenith is very difficult as the scope must swing through a large azimuth angle very quickly to follow the object. Nevertheless, the MMT performed beautifully.

The run was a tremendous success and we observed 17 Cepheids in M33, 4 in NGC 6822, and 2 in NGC 2403. The local distance scale is no doubt more secure after this run!

Reprinted from the *David Dunlap Doings*

Canadian Astronomy News

by Ian McGregor
Associate Editor

New Infrared Telescope: Calgary Centre reports that on September 13, 1984, a new infrared telescope facility will open at the Rothney Astrophysical Observatory near Priddis, Alberta. Operated by the University of Calgary, the observatory will house a 60-inch (152.4 cm) metal IR mirror scheduled to be first used in 1985. Later a 72-inch (182.9 cm) optical telescope will be added.

Astronaut Going Up: Dr. Marc D. Garneau, a 35-year-old electronics expert and naval commander from Quebec City, will be the first Canadian to travel into space. One of six astronauts chosen last December out of 4,300 applicants, Dr. Garneau will serve as a payload specialist on board the Shuttle Mission 41-G scheduled to be launched this autumn. Robert Thirk, born in New Westminister, British Columbia, and a medical doctor in Montreal will act as backup.

New Planetarium Opens: Canada's newest planetarium, the Edmonton Space Sciences Centre, officially opened on July 1, 1984. The unusually designed building features two large theatres, an observatory, display area, and gift shop. One theatre houses a large Zeiss star projector for use in astronomy and light shows and the second theatre an IMAX projector.

New Science Centre: Last June the spectacular new Science North science centre opened in Sudbury, Ontario. Designed to encourage audience interaction and participation, the exhibit themes focus on the northern experience – natural resource development, survival in the Far North, and human performance. And, of course, there is an astronomy exhibit area. An article on Science North appeared in *Canadian Geographic* magazine, Vol. 104, No. 2, April/May 1984.

Another Science Centre in the Works: The Windsor Centre's June newsletter details some plans for a new science centre to be built in Windsor. A two-storey building would include a planetarium theatre. Cost of constructing the centre would be shared between the federal and provincial governments and private donations. No time schedule for completion is yet available.

Cooke Telescope on the Move: Last March the 6-inch Cooke refractor of the University of Toronto was taken from the north dome of the Administration Building of the David Dunlap Observatory in Richmond Hill and sent to the Museum of Science and Technology in Ottawa. The famous telescope used by generations of university students first came to Toronto in 1882 from England for use in observing the transit of Venus of that year. Unfortunately, the presence of larger and more accessible instruments in the Toronto area resulted in this fine instrument falling into disuse. It is hoped that in its new Ottawa home the Cooke refractor will be displayed to, and perhaps used by, the public. A history of the telescope appeared in the *Journal of the R.A.S.C.* (Vol. 76, No. 2, April 1982).

Canadian Planetariums Meet: Representatives from six of the eight planetariums located in Ontario met for a one-day conference at the McLaughlin Planetarium in Toronto last June. Intended to be an opportunity for members of the planetarium community to discuss common interests and concerns, the conference was a great success and may be continued on an annual basis in the future. The Planetarium Association of Canada's biannual conference will be hosted by the McLaughlin Planetarium in May, 1985.

STARLAB rejected: The federal government has cancelled Canada's participation in an orbiting space telescope project in which Canadian scientists and engineers have put several years of work. Named STARLAB, the joint project of Australia, the United States, and Canada now must look for a third country, or perhaps the European Space Agency, to help sponsor it. For Canadian astronomers, the cancellation is a bitter blow and it means the loss of access to observatories in space. At the same time, the government has allocated money to studying the possibilities for Canadian participation in an orbiting space station to be built by the United States.

Asteroid Named: Congratulations to Dr. Helen Hogg, professor emeritus of astronomy at the University of Toronto. In June, the International Astronomical Union announced that an asteroid discovered in 1980 and numbered 2971 had been named after her. Initially designated 1980RR, the small chunk of rock orbits the sun in the asteroid belt between Mars and Jupiter and is now called asteroid 2971 Sawyer Hogg.

Nineteenth Century Timekeeping for Halifax Shipping

by R.C. Brooks
Halifax Centre

Many visitors to London trek down the Thames to Greenwich in order to straddle the 0° meridian at the Royal Observatory and to see its famous time-ball on the east turret of Flamsteed House. But how many know that until 30 years ago Halifax had its very own time-ball?

Prior to the installation of the first time-ball at Greenwich in 1833, mariners would have to compare their chronometer with a watch, then carry the watch to an observatory where they would find the true time. This procedure was time-consuming and not particularly accurate. A time-ball, however, could be used by mariners to check the time on their ships' chronometers without the need for disturbing the very delicate mechanism. At predetermined times, the ball was raised and dropped indicating a specific instant. At Greenwich, the ball was dropped at precisely 1:00 p.m. allowing ships' masters up and down the Thames to rate their chronometers simultaneously and thus be able to calculate how fast (or how slow) their chronometer was running. The correction to the time could then be made in calculating the ship's longitude. At our latitude an error of just 1 minute translates to an error of 1 mile in position – an error which could of course mean disaster during bad weather.

In the 18th and 19th centuries there were three types of astronomers. The first group, akin to modern astronomers, carried out studies of astrophysical phenomena. This very small group tended to be wealthy upper crust types who studied astronomy for their amusement. The second group carried out studies in the methods and uses of applied astronomy. They, for example, developed techniques for accurate astronomical observations to be used for the determination of longitude which could then be used both by cartographers and mariners. In the 18th century, this group crossed all social levels because of the preoccupation with finding a practical method of finding one's longitude at sea. The third group were what we might term astronomical practitioners and their intent was to make a profit through the use of astronomy. They provided accurate time services to those requiring it, e.g. mariners. They were often equipped with observatories with small transit telescopes and presumably regulated clocks. What their accuracy would have been has not been investigated.

In Halifax, there were a number of astronomical practitioners in the 19th century and it is possible that these men contributed to the development of the time-ball on the Citadel. The first of these was

Richard U. Marsters of Falmouth. Besides being the first Canadian to build chronometers, he was the first to establish an observatory to determine time for chronometer rating in 1828. This date is not just a matter of coincidence for in that year the Royal Navy issued chronometers to all its ships and as explained earlier these had to be compared to the true time. This service was provided by Marsters for a short time but was soon taken up by William Crawford. He made similar observations from 1828, first establishing his telescope on the upper floor of the Royal Acadian School on Argyle St. (now the Five Fishermen Restaurant). By 1831 he had a proper observatory at his home on Lochman St. (between Barrington and Brunswick – it no longer exists). His observatory was moved several times until his retirement in 1865 and the observatory was continued by his successor until 1911. At some point, probably about 1830, the Navy built their own observatory in the Dockyard to rate their own chronometers. This establishment was involved in the first international determination of time by telegraph in 1851. The observatory and knoll on which it stood were leveled in 1881 to make a parade ground.

When Robert Cogswell took up business in 1865, he began supplying a time signal to the Citadel for the firing of the noon gun. Presumably the time-ball was established after 1865 and I have to admit that I have very little information about the Halifax Time-ball. Perhaps someone can recall some details of the establishment and I'd be pleased to hear from you. Basically, all I know for certain was that it was just south of the Citadel's Clock in a small building which was demolished in 1954. A poor quality photo appeared in the papers of the day. Was it established as a result of Cogswell's association with the Citadel or perhaps did the Navy establish it for its own ships? With the amount of shipping in Halifax in the 19th century, there is little doubt that it was useful.

Reprinted from *Nova Notes*

Amateur to Professional

by Ian McGregor
Associate Editor

Over my many years with the Society I have met many professional astronomers and I have always been curious to know how they came to make astronomy their profession. Did they start off as a young child who was fascinated by the stars, perhaps was given a small telescope by their parents or made their own telescope, and then, as they got older, steered their educational training towards a career in astronomy? Or did they get interested in astronomy late in their educational career, and perhaps moved from a subject like physics into its astronomical counterpart of astrophysics? Apart from personal interest in the answer to this question, my work as an astronomy educator means I very frequently encounter young children who have become fascinated by the universe around them and want to know "how to become an astronomer?" I remember when I was about 10 years old writing a letter to Dr. Donald MacRae of the Department of Astronomy of the University of Toronto on just such a subject. He told me that I had to be very good at my mathematics and science courses but I should not neglect literature and grammar because astronomers must communicate with their fellow astronomers and the public, that a second language was important because astronomers travel all over the world and meet other astronomers from other countries, and that all the subjects I studied were important.

Well, the letter from Dr. MacRae was of course written in a much simpler form but its meaning was well understood. A child's interests change as they grow older. And being well-rounded in educational training is very important as those important decisions are made in high school and university which will eventually lead to a person's career after completing their formal years of education. From discussions I have had with many astronomers over the years it appears the number of astronomers who have come from the ranks of amateur astronomy are relatively few. In fact most of the younger generation of astronomers often come from backgrounds in physics, computer science, and the history of science. It is with this in mind that I briefly mention two members of our Society who have moved from the ranks of amateur astronomy to careers in professional astronomy. Both individuals I have had the pleasure of knowing during their early amateur years as active members of the Toronto Centre.

Steven Morris, now Dr. Steven Morris, of the University of Calgary, was a former Toronto member

and a few years ago joined the Calgary Centre. He has been a strong supporter and active member of the Calgary Centre and a frequent contributor to *The Starseeker*. Recently Steven has got a staff position at U.C.L.A. in California and apparently in the future will be doing some of his astronomical research in Antarctica.

Douglas Gies of the University of Toronto was an active member of the very strong C.A. Chant Astronomy Club at Don Mills Collegiate Institute in Toronto in the early 1970's and later became the chairman of the Toronto Centre's Observational Activities Committee. Douglas' bubbling enthusiasm and encouragement of other amateurs was very important in the Centre for many years. I am pleased to report that beginning this autumn, Douglas will be moving to the University of Texas for a two-year programme as a postdoctoral fellow where he will have the opportunity to use 82-inch telescope at the McDonald Observatory.

Astronomers come from many walks of life and educational backgrounds but it is always a treat to hear of amateurs who have made the transition from amateur to professional astronomy. I am sure we all wish Steven Morris and Douglas Gies success as they move from their roots in amateur astronomy in Canada to positions in our neighbour to the south.

A Letter to the Editor

I am writing to request help with preparation of a history of amateur contributions to astronomy. I would like to receive information about amateur astronomers who, in the view of R.A.S.C. members, have made significant contributions to astronomy. My criteria for present purposes are as follows:

- 1 The individual is no longer alive.
- 2 The individual made significant contributions as an amateur, even though at a later date, and perhaps because of that contribution, he or she may have held a professional position.
- 3 The individual had not been trained in a professional sense in astronomy or physics at the undergraduate level or above.

Responses will be of most value if they include biographical information as well as information about astronomical contributions, and copies of articles from various publications that describe the individual or his work, or copies of the published work of the individual.

So far, I have 9 Canadians on my list, including J. Miller Barr, Ken E. Chilton, W.G. Colgrove*, F. Keith Dalton*, Frank J. DeKinder*, Andrew F. Elvins, A.F. Miller, Burton A. Norman, and Cyril G. Wates*. Those marked with * were recipients of the Chant Medal of the R.A.S.C., but I know very little else about them. I have some information on the others, but could use more!

Your help with this project will be sincerely appreciated. Replies may be addressed to me at the address shown below.

Tom Williams
3621 Wakeforest
Houston TX
USA 77098

National Library Open

The Society's National Library will be open to members on the following Saturdays this autumn – September 15 and 22, October 13, 20, and 27, and November 24. Hours of operation will be from 1:00 to 5:00 p.m. The Library's address is 136 Dupont Street, Toronto.