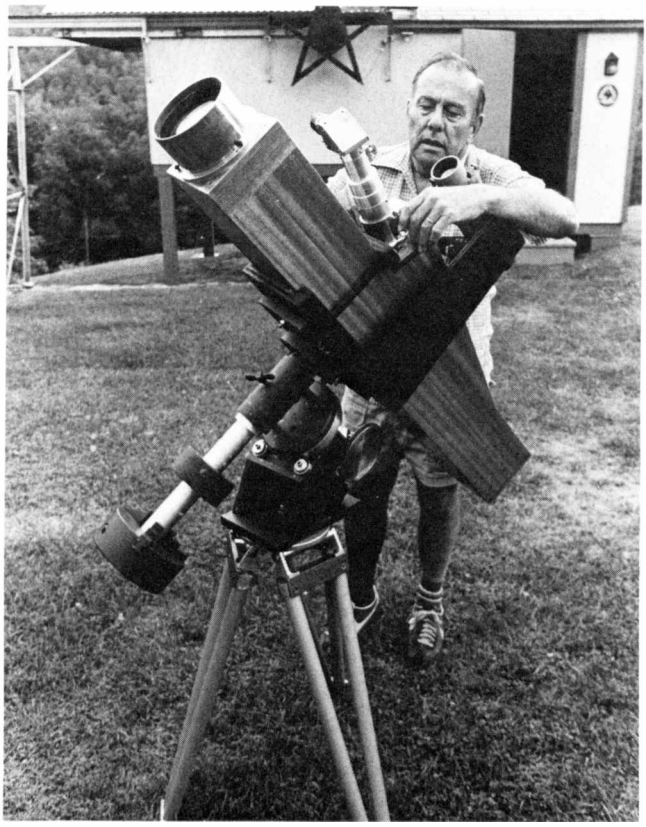
NATIONAL NEWSLETTER

August, 1985

Supplement to the JOURNAL OF THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

Vol. 79, No. 4



Unattached member Richard N. Gerry displays the 12.7-cm f/15 folded refractor of his Gemini Observatory in Buckland, Massachusetts. The objective, made in the 1940s by E.C. Witherspoon of Sumter, S.C., is mounted in a solid mahogany tube. The telescope, built entirely in Mr. Gerry's home workshop, earned him the 1983 Stellafane first prizes for design and craftsmanship.

Photo by R.N. Gerry

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Deadline for December issue is October 15.

Editorial

by Ian G. McGregor

Congratulations to the Edmonton Centre on the excellent General Assembly put together over the July 1 Canada Day weekend. Between 80 and 90 Society members were in attendance for the four-day event and while this was less than expected, one only has to consider the airfare costs to appreciate why more from eastern Canada, where most Society members live, were not in attendance.

The full, but not rushed paper sessions, the Friday night social evening with slides and songs, the enjoyable Saturday banquet, the Sunday visit to Fort Edmonton, and the impressive scale of the gigantic West Edmonton Mall all left many favourable memories. The Edmonton Space Sciences Centre, then celebrating its first birthday, put on a good programme for the delegates. But perhaps most of all the General Assembly is the participants. Fourteen of the Society's twenty Centres were represented and it was often the informal gatherings of members at "late night" events which provided that added ingredient that makes these annual events so important to the strength of our Society.

A special thanks must go to the organising committee whose many hours of planning and hard work were readily apparent to the delegates by how smoothly everything went. Certainly to this participant, the G.A. was a great success and ranks as one of the best of the dozen or so I have attended. More detailed reports will appear in the October *Journal* and *Newsletter*.

As announced in the June *National Newsletter*, Dr. Ralph Chou stepped down as *Newsletter* editor at the G.A. after eight years of dedicated service as Editor and staff member. At the National Council meeting following the Annual Meeting your Managing Editor was elected to be the new Editor. My association with the *Newsletter* dates back to 1977 (has it really been that long?) but I do wish to take this opportunity to invite your thoughts about the *Newsletter*. In particular what you would like to see in its pages (sorry, bimonthly centrefolds of "celestial beauties" are beyond our budget!). I am pleased to take on the Editor's position and I look forward to working with you to make the *Newsletter* an interesting and informative publication of our Society and the Canadian astronomical community.

Observing Tips for Comet Halley

by Dave Chapman
Halifax Centre

Many people hoping to view Comet Halley in 1985/86 have never seen a comet of any description before, except perhaps in photographs. This article will describe when the comet will be visible, roughly where it should appear in the sky and what we might expect to see. As the comet approaches Earth and the Sun throughout this year, there will be many articles in newspapers and magazines and many broadcasts on radio and television that will provide more detailed information than we can supply here in a short article. Nevertheless, the basic information below should be useful for planning purposes, especially for the novice.

Two misconceptions regarding comets: Comets do not streak across the sky like rockets, as do meteors (i.e. shooting stars). From night to night, comets move steadily across the sky on a smooth, predictable curve relative to the stars, travelling at most several degrees per day. If you miss the comet one night due to cloudy weather, it will be there the next night! Also, a comet does not necessarily move in the direction suggested by its tail, that is, the tail is not propellant pushing the comet on its trajectory. The tail is made up of gases and small solid particles boiled out of the comet's nucleus by the Sun and pushed away from the head by the solar wind of charged particles and by radiation pressure from the Sun. Consequently, the tail generally points away from the Sun, regardless of the actual direction of motion of the comet. The word 'comet' derives from the Latin word 'coma, ' meaning 'hair'; imagine the comet's 'hair' being blown in the direction away from the Sun by the solar wind.

Comet Halley travels on an elliptical orbit which brings it past Earth on its inbound journey to the Sun on 27 Nov. '85; the comet passes around the opposite side of the Sun on 9 Feb. '86; on its outbound journey, it passes Earth again on 11 Apr. '86. Although predictions of the comet's brightness vary, it should be observable in binoculars and small telescopes from late November to late March, except for a period in February when it will be lost in the sun's glare. In a dark sky, we should be able to see the comet with the unaided eye in late December and in January, and parts of March and April.

The visibility of Comet Halley will depend upon the observer's location on Earth. From the latitude of southern Canada, which is about 45 degrees North, the comet will be easiest to observe on its inbound journey in December and January. It will appear high in the southern sky during mid-December evenings. As the weeks pass, it will move westward and down as it closes with the Sun. In late January, the comet sets soon after the Sun and will be seen only in twilight low in the western sky. After it passes around the sun in February, it will appear in March very low in the southeastern sky during morning twilight. As the weeks pass, it will move southwards at dawn, remaining low in the sky, and will eventually disappear below the horizon in early April. This is unfortunate for us, since it will be at its brightest on 11 Apr. '86 but will only be seen at more southern latitudes. (For example, at its best, the comet will be 25 degrees above the horizon in Jamaica and almost overhead in New Zealand.) It actually will reappear in our southwestern evening sky later in April, but it will have dimmed considerably.

The view of a comet is improved through binoculars or a large-aperture, low-magnification telescope having a wide field of view. High magnification does not improve the appearance of diffuse objects such as a comet's head and tail, but their apparent brightness can be increased by using the aids mentioned. At its best, the Comet Halley's head will appear half as large as the Full Moon, while the tail may span 10 degrees (the breadth of a clenched fist held at arm's length).

A comet's visibility will depend upon the darkness of the background sky. In twilight, in the Moon's glare, or in urban light-polluted skies, a comet will be more difficult to observe. We can't do much about the first two, but the third problem can be overcome by finding a rural dark-sky observing location.

Assuming we have found a dark observing site on a date with no Moon and we know where to look for Comet Halley amongst the stars, what should we look for? As mentioned, a comet's head is diffuse, brighter near the centre than at the edges, and looks somewhat like a cotton ball amongst the point-like stars. In binoculars and small telescopes, it might be easy to confuse a comet with a globular star cluster or a gaseous nebula. For this reason, it would be a good idea to have a reasonably good star atlas which indicates the position of these known objects. If the fuzzy-looking thing is a comet, it will move with respect to the background stars over a period of several hours, whereas the clusters and nebula

are fixed in position. Once you have located the comet for the first time, it should be easy to track its position from night to night. Early on, when Comet Halley is too far from the Sun to have formed a tail, only the head will be visible. As the comet approaches the Sun, it will begin to form a tail, which will grow longer with time. The tail should be more spectacular after perihelion, since a lot of material will have been blown off the comet's head by the Sun during the period of closest approach.

A useful pastime with which to occupy yourself this summer is to begin to learn the location of the principal constellations and brighter stars. When the time comes, it will be easier to locate Comet Halley amongst the stars if you already know your way around the sky. Also, you can become familiar with the appearance of the brighter star clusters and nebulae in your binoculars or telescope. Most bookshops carry elementary astronomy books which contain simple star charts suitable for the beginner.

We hope these few tips will assist those of you hoping to view Comet Halley next next winter and spring. If you find that you are interested in learning more, why not contact the local centre of the R.A.S.C. or another astronomy club?

Edmund Halley

by Eric Orr
Hamilton Centre

Edmund Halley was born in Shoreditch, London, on October 29, 1656. His parents were well-to-do so he was educated in the best of schools in his youth. He went to Oxford and studied hard. He was a model student and had no trouble in getting degrees in science and astronomy. His papers on observing were then used as studies by his teachers. He was sent to St. Helena, an island in the South Atlantic, where he catalogued and mapped the stars of the southern hemisphere. When he returned to England in 1675, King Charles II made him a Fellow of the Royal Society.

From 1679 to 1681 he lectured at universities across Europe and met many famous astronomers; Cassini was one of his friends who interested him in planetary work. His interest in facts not theories was well known. In 1684 he went to Cambridge where he studied with Newton and persuaded him to publish his theory on gravitation. As Secretary of the then nearly bankrupt Royal Society, Halley was given responsibility for publication of the *Principia* – and the privilege of paying the costs out of his own pocket! In 1693 and until 1698 he charted the English Channel and he began seriously to study comets and cosmology. He researched past comets and the comets of the years 1531 and 1607, coming to the conclusion that it was the same comet seen 76 years later again in 1683. He predicted that it would be back again in 1758. Thereafter it was called Halley's Comet.

John Flamsteed, the first Astronomer Royal, died in 1719, and his place was taken by Halley in 1720. Flamsteed's family removed all his belongings from the Royal Observatory, his instruments and papers included. So, Halley had to petition the Royal Society for funds to procure new ones. He was given five hundred pounds, a big sum in those days.

He later found the unfinished star catalogue of the Northern Hemisphere that Flamsteed had started, and completed it. It was copied by the astronomers of that time as a guide to stars and constellations. He could not see well enough to do much observing in his later years but was Astronomer Royal until he died in 1742.

There is an annual lecture at Oxford in memory of this great Astronomer, and successful popular member of the Royal Society.

Reprinted from *Orbit*

SPIE Conferences on Astronomy

The Society of Photo-Optical Instrumentation Engineers (SPIE) is organising two conferences and a technical instrument exhibit on astronomy, to be held at the Doubletree Inn, Tucson AZ on 2 to 7 March 1986. Co-operating organizations include the American Astronomical Society, The Astronomical Society of the Pacific, Dominion Astrophysical Observatory and Royal Greenwich Observatory, among others.

Instrumentation in Astronomy VI will deal with present and planned instrumentation for both ground- and space-based astronomy. Wavelengths to be discussed will range from x-ray through vacuum ultraviolet to visible and the far infrared. Optical design, instrumentation controls and image processing (especially digital techniques and instrumentation) will be emphasized.

Advanced Technology Optical Telescopes III will deal with ground- and space-based telescopes. Topics to be covered include optics fabrication, testing and coatings, telescope optical and structural design, site testing, atmospheric studies, pointing and tracking, special adaptations for high resolution or spectral coverage, and telescope enclosures and domes.

Information on these conferences can be obtained by writing to SPIE, P.O. Box 10, Bellingham, Washington 98227-0010, U.S.A.

Henry Draper Memorial Centennial Symposium

A symposium to mark the centennial of the beginning of the Henry Draper Memorial, widely regarded as the cornerstone of modern astrophysics, will be held on 23 October 1985 at the University of Western Ontario. Papers will be presented by Dorrit Hoffleit (Yale University) on the histoncal aspects of the Draper Memorial project, and Nancy Houk (University of Michigan) on the project to re-classify the stars in the Draper Catalogue on the more up-to-date "M-K System." These papers will be chaired and commented on by Helen Hogg (University of Toronto) and Robert Garrison (University of Toronto), respectively. For further information, contact Dr. Howard Plotkin, Department of History of Medicine and Science, University of Western Ontario, London, Canada N6A 5C1.

Les V. Powis

Members of the Hamilton Centre were shocked by the sudden death of Les Powis on 19 April 1985. As a leading member of the Hamilton Centre, Mr. Powis was active in its public education programme and in the planning, construction and maintenance of the Centre observatory. One of his last contributions to the latter was to repair a window just days before his death. He served the Hamilton Centre as a Councillor, Treasurer, and as President (1961–62, 1971). In 1984 he received the Society's Service Award Medal at the Hamilton – Niagara General Assembly. We extend the condolences of the R.A.S.C. to the Powis family and the Hamilton Centre on the loss of this dedicated long-time member of the Society.

Vénus en janvier 1985

by Marc A. Gélinas
Centre Français de Montréal S.R.A.C.

A un certain moment dejanvier 1985, Vénus présentait une phase d'illumination d'exactement 50%. D'après l'analyse de 103 observations effectuées entre octobre 1984 et mars 1985 par 14 amateurs, ce moment c'est produit 2.17 ± 0.25 jours avant la date prévue par la mécanique céleste.

Des régions de Sydney, N.E., Montréal, Québec, Winnipeg, Manitoba et même de l'état de Washington au U.S.A. des amateurs ont observé la phase de Vénus à divers moments. Le résultat de l'anomalie provient d'une analyse statistique, par la méthode des moindres carrés, de ces observations. Si on pointe sur un graphique toutes nos observations et que l'on fait passer ensuite une courbe en plein milieu de celles-ci on trouve alors la moyenne. C'est ce que fait la méthode des moindres carrés. Un programme de micro-ordinateur fait celà en un rien de temps et permet même de résoudre l'équation de la courbe pour trouver, par exemple, le moment de la dichotomie.

Chaque amateur qui observa Vénus fit en général une série de dessins ou de photographies. Il calcula

ensuite la valeur moyenne de la phase ainsi reproduite. Chaque observation avait en moyenne une précision de 2% . En connaissant ce degré de précision il était possible de calculer celui du résultat. Plus le nombre d'observation était élevé, plus l'écart type du résultat était petit. Ainsi avec 103 observations on obtenait un écart type de 0.25 jour.

On a raffiné ce premier résultat en calculant l'anomalie pour les observations faites en lumière intégrée (blanche) seulement. Résultat, une anomalie de 2.30 ± 0.32 jours. En lumière bleue on trouve 6.42 ± 0.41 et en rouge 3.58 ± 0.55 jours.

L'anomalie en rouge est nettement plus faible qu'en bleu. Cela s'explique parce que les rayons bleus de la lumière solaire seront dispersés par les fines particules des hautes brumes de l'atmosphère alors que les rayons rouges pénétreront plus loin sans encombre. En raison de la faible incidence des rayons solaires près du terminateur, les rayons bleus seront complètement diffusés plus loin du terminateur que les rouges. En conséquence un observateur verra s'ajouter au côté nuit naturel une zone d'ombre supplémentaire plus grande en lumière bleue qu'en rouge.

Hypothèse

En 1977 la British Astronomical Association (B.A.A.) calculait que l'anomalie en bleue moms celle en rouge (B-R) était de moins de 5 jours (d). En 1978 la sonde Pioneer Venus arrive près de la planète et décelle une forte concentration de composés de souffre dans l'atmosphère, en particulier du SO_2. Cette même année la B.A.A. trouve un B-R = 8d. De 1978 à 1983 Pioneer Venus mesure une diminution radicale (90%) du taux de SO_2. Les scientifiques de la N.A.S.A. attribuent celà à une eruption volcanique monstre, qui aurait projetté d'énorme quantité de SO_2 dans l'atmosphère juste avant l'arrivé de Pioneer. Depuis le taux retomberait à un niveau normal. De 1978 à 1982 la B.A.A. trouve que le B-R a diminué jusqu'à devenir inférieur à 3 jours.

En janvier 1985 notre valeur de B-R est de 2.84 ± 0.51 d, ce qui s'incrit parfaitement dans la tendance remarquée par la B.A.A.

En conclusion on peut avancer qu'en janvier 1985 Vénus présentait une atmosphère ayant un taux de SO_2 moyen et si l'hypothèse de l'eruption volcanique en 1978 est juste, Vénus à aujourd'hui pratiquement retrouvée son équilibre.

Les données receuillies au Canada iront rejoindre celles de nos confrères européens pour une analyse plus exhaustive. Cependant, nous pouvons déjà être fier de notre contribution.

Remerciements

Des remerciements particuliers s'adressent à messieurs Raymond Auclair à Sydney, Todd W. Lohvinenko à Winnipeg et Daniel Louderback à South Bend, Washington State qui ont permis un couverture continentale de l'évènement.

Abstract

In January 1985 the dichotomy of Venus happened 2.17 ± 0.25 days earlier than forecasted. This is the result of 103 observations made from coast to coast by 14 amateurs between October 1984 and March 1985. This, and other results in blue and red wavelength, tend to confirm a relation between the size of the anomaly and the content of SO_2 in the atmosphere of Venus as suspected from N.A.S.A. and British Astronomical Association's data.

Planets in the Daytime

by Carl Savage
Calgary Centre

Daylight observation of the planets is a difficult and challenging pursuit, and is very rewarding when you find the planet you are looking for. In the daytime five of the nine planets, not counting the Earth, are visible: they are Mercury, Venus, Mars, Jupiter and Saturn. Also visible in the daytime are many of the brighter stars and the moon, when it is very young or very old. You can observe the planets Venus, Mars and Jupiter during the day with the unaided eye, if you know where the planet is and you have very good eyesight.

By far the best way to view the planets during the day is with a telescope whose aperture is over 3 inches. Although smaller telescopes have been used, most of them lack the next requirement, setting circles. Also, the telescope must be on an equatorial mount with a motor drive. You may find a dewcap useful to help block out stray light. Also useful is an orange filter, which can be very effective in reducing background light and increasing contrast. Of course, you need the coordinates of the planets. The *Observer's Handbook* has the coordinates, but only for the beginning, middle and end of the month. If you own a home computer, there is a program in Celestial Basic called Program II RADEC which will calculate the position of any planet any day of the year.

Now that you have all the equipment you will need, it is time to set up. The best occasion as in nighttime viewing, is on a clear day with little or no dust in the air. Of course, you won't be able to find a dark site, but you should find a site with a clear view of the south.

Polar alignment of the telescope should be done the night before. To do this, you align the telescope the way you always do and then mark the location of the legs of the tripod. Just remember when you take the telescope down for the night to leave the wedge, if your telescope has one, on the tripod and try not to move it in any way. But what happens if it is cloudy the night before? Are you out of luck? I am afraid that this is the case, because you need the polar alignment very close in order for the setting circles of your telescope to be accurate.

With the telescope mount oriented, you can get started. First, you must set your setting circles. You can do this by pointing the telescope at the sun, finding the coordinates of the sun and then setting the setting circles. But remember to leave all the lens caps on the telescope, when the telescope is pointed at the sun, even the ones for the viewfinder, to protect the optics of the telescope from too much heat. To make certain the telescope is pointing at the sun, just use the shadow the scope casts on the ground. With the setting circles now set, it is just a matter of dialing in the coordinates of the planet you wish to view. Then, looking through the viewfinder, you should spot the planet and centre it in the scope. After that it is just a matter of focussing the telescope; you should put the dewcap on at this time to help cut down on the stray light. Just remember, if you ever go back to the sun to reset the setting circles, to put all the lens caps back on.

Now you may be asking yourself, "What will I see?". Good question. I have seen Mercury, Venus, Jupiter and Saturn as well as some of the brighter stars in the daytime using a 16" telescope. The planet Mercury is too close to the sun most of the time to be visible. If any planet is close to the sun do not try to find it – there may be enough light to cause some eye damage. When Mercury is not too close to the sun, you see a bright ball of reflected light in a sea of blue, and if you are lucky you may see it in one of its phases. Venus, like Mercury, is very bright and also shows phases. Once you have found Venus with the telescope, try to find it with the unaided eye. If it is far away from the sun and you have good eyesight, you should be able to spot it. Mars, like Venus and Mercury, is bright, but as we all know this planet shows no phases and thus appears the same to us all the time. The same applies to Jupiter, but Jupiter appears by far the biggest and if you find it just before the sun sets you should be able to see the four Galilean moons. Saturn can be very spectacular if you can find it! The best time to view this planet is around sunset or when the sun is low in the sky, such as in winter. By doing this you cut down some of the light and the rings should become visible. All the planets beyond Saturn are too faint to see with most amateur telescopes, so it is not worth trying for them.

This type of project is very difficult, even at the best of times. But at the same time it is very satisfying when after all the time spent setting up and getting your setting circles set just right you find the planet you have been looking for.

National Library Open

Last autumn the Society's National Library in Toronto was opened on Saturday afternoons as an experiment to see if the use of the Library facilities by members could be increased. Initially the response was poor. Members of the National Library Committee volunteered their Saturday afternoon hours to be available to assist members but only half a dozen people turned up for the first four openings. It seemed the extensive facilities of the Library were going to waste and various alternate uses for the space were being considered.

Fortunately during the winter and spring, attendance at the Saturday openings noticeably increased and it was decided to continue the Saturday openings this autumn.

The Library contains a large number of books, both current and historical in nature as well as many popular astronomy magazines, Centre newsletters, and specialised publications. There is table space for work on research projects, chairs for casual reading, and a photocopier.

The Library will be open on the following Saturdays: September 21, October 19, and November 23. Hours are from 1 to 5 p.m. The Library is located at 136 Dupont Street in Toronto. The Library can be contacted at (416) 924-7973 during regular business hours.

A Successful Astronomy Day

For many observatories, planetariums, and astronomy clubs across North America and in countries around the world, April 27 was recognised as International Astronomy Day, a special event celebrated annually, to bring the excitement and wonder of astronomy to the general public. And across Canada weather conditions seem to have been generally favourable from the many successful reports received of Centre activities.

KINGSTON: The Kingston Centre set up a mall display at the Cataraqui Town Centre from 8 a.m. to 10 p.m. On show were photographs, posters, books, an astronomical trivia game, a constellation recognition game, and several telescopes. An automatic slide show and a computer demonstration of the orbit of Halley's Comet (prepared by David Stokes) were popular attractions. The fine weather allowed visitors to the mall to observe sunspots through telescopes carefully managed by David Stokes and Leo Enright but clouds in the evening limited nighttime observation.

HAMILTON: Visitors to the Centre's Display at the Limeridge Mall were able to examine Bill Fautley's home-made 6-inch reflector, which features an equatorial mounting made from a car differential, Eric Orr's Celestron-8 telescope, and the antique 5-inch Bell refractor. Exhibits were set up and three audiovisual programmes were run during the day. At least seven new members resulted from the day's efforts.

OTTAWA: A display at Merivale Mall Shopping Centre consisted of telescopes, astrophotographs by Rolf Meier and Fred Lossing, and information on the Centre's activities. The five members running the exhibits were kept busy all day, and several new members was the result.

SASKATOON: The Centre observed Astronomy Day on April 20 at the Market Mall. Members provided telescopes and slide shows and a demonstration of computer use in astronomy were crowd pleasers. A variety of handouts were distributed.

EDMONTON: Astronomy Days were centred around the Edmonton Space Sciences Centre. Although the weather did not cooperate, visitors enjoyed sky familiarisation shows in the mobile planetarium of the Provincial Museum, Alan Dyer's mini-lectures on astronomical phenomena, and a display of videodiscs, displays, and telescopes.

TORONTO: Under sunny skies members put on displays at Toronto City Hall and the Ontario Science Centre. Response among the public was good with the indoor displays and talks at the Ontario Science Centre attracting good audiences and long lineups of people to observe the Sun and Moon. Unfortunately, clouds moved in for the evening and a major effort at the David Dunlap Observatory was a more limited success. Principal organisers were Brian Beattie and Randy Attwood.

VANCOUVER: April 27 was a great success for the active members of the Centre. Despite rain and clouds early in the day the sun appeared in the mid-afternoon and in total about 1000 people saw the afternoon and evening displays and demonstrations. The program was focused at the Gordon Southam Observatory. In addition to telescopes of all sizes and types, the centre's own audiovisual show *Stargazer* was shown. "Astronomy Day" balloons decorated the observatory and the Planetarium presented two special "sky tonight" shows.

MONTREAL: The Dow Planetarium was the site of the efforts of several astronomy clubs to recognise April 27. Telescope demonstrations and displays of the centre's astrophotography efforts highlighted the day's activities.

CALGARY: Many members put a good effort into making April 27 a successful day. Don Hladiuk coordinated the Centre's efforts which featured exhibits and displays of the Centre's activities.

NIAGARA: The Niagara Square Shopping Mall hosted the Centre display. Slides were shown and telescopes set up indoors during the day. That evening, despite persistent clouds in the southern sky, several members set up their telescopes for the public to view a variety of sky objects.

Across the R.A.S.C.

VICTORIA: Members of the Centre have been practising the proper use of photometers by observing the series of occultations and eclipses of the Galilean moons of Jupiter this past summer. David Kopriva, the Centre's Director of Telescopes, was in charge of organising the pairs of observers needed to carry out the observations. One of the major instruments used was the University of Victoria's 0.37 m Tinsley reflector telescope.

WINDSOR: The Centre's 40th Anniversary Banquet was held May 25 and suitably recognised by a talk by Cyril Hallam, a founding member and Centre Treasurer for many years. His talk described how a talk by Dr. H.R. Kingston in the 1940's imbued the early members with enthusiasm to form an R.A.S.C. Centre. The guest speaker for the evening was Dr. Orren Mohler of the McMath–Hubbard Observatory who discussed historical studies of the Sun. Among the 40 participants were John Thompson of the Sarnia Centre, Eric Clinton of the London Centre, Jack Brisbin of the Detroit Astronomical Society, and Mike Flegel of the Chatham–Kent Astronomy Club.

KINGSTON/OTTAWA: Leo Enright of the Kingston Centre and Rolf Meier of the Ottawa Centre completed a successful speaker exchange between the two Centres during May. Leo spoke about the Kingston Centre's activities and Rolf about the astrophysics of galaxies and supernovas. Kingston had a good turnout of 14 members for Rolf's talk.

MONTREAL: Au cours de l'été nous auront eu le plaisir de revoir M. Lucien Callier. Monsieur Callier avait subi une attaque cardiaque durant l'hiver mais il s'en est bien remis. Il y a aussi M. Jean-Paul Larrue qui à presente des diapositives de l'eclipse de soleil de novembre 1984. M. Larrue avait eu la mauvaise surprise de voir tous ses films voiles par les rayons X d'un aéroport. Heureusement il a pu emprunter des photos à des compagnons de voyage. M. Pierre Bastien, notre Président, sera absent une partie de l'été. Il sera en France, question de presenter sa petite derniere, née en octobre 1984, a sa belle-famille. M. Marc Gelinas à presente quant à lui, les premiers resultants de la determination de la dichotomie de Vénus de janvier dernier. Quatorze observateurs repartis de l'Atlantique au Pacifique ont participe au projet. Une communication au *Journal* est en préparation.

HALIFAX: A spring talk by National President, Dr. Roy Bishop, on Halley's Comet was an overwhelming success. An observing session following the talk was very well-attended and a perfectly clear night was only "hampered" by a most impressive aurora display lasting until midnight. The Special Issue of *Nova Notes* devoted to Comet Halley published in the spring is available for $1.00. Those interested in obtaining a copy should write to the Kingston Centre R.A.S.C. c/o 1747 Summer Street, Halifax, Nova Scotia B3H 3A6. The annual Banquet was held appropriately in a Chinese restaurant as the Centre's new Honorary President, Dr. Murray Cunningham, has travelled to the People's Republic of China and corresponds frequently with Chinese astronomers.

TORONTO: A much needed computer has been purchased to ease the heavy load of keeping up-to-date membership records on the Centre's over 800 members. Society lapel pins were on sale at several spring meetings and over thirty sold. The Centre has confirmed Fred Espenak of the Goddard Space

Centre as its guest speaker at the Centre's Annual Banquet on October 26. Many Centre members are heading south for Comet Halley next spring. Randy Attwood and Ian McGregor are leading expeditions to the Galapagos Islands and Australia respectively and at this moment at least half a dozen other members are heading for more southerly latitudes.

NIAGARA FALLS: Recent speakers at Centre meetings included Robert Jedicke who had recently won the Gold Medal in Physics on graduation from the University of Western Ontario and Joady Ulrich, President of the Windsor Centre, who was completing the second half of a speaker exchange between the two Centres. Discussion at a spring meeting centered on a proposal to purchase a 1.04 m mirror blank for $2500.

HAMILTON: The death of well-known Centre and Society member Les Powis (see Obituary elsewhere in this issue) was recognised at the Centre's May meeting. Mike Jefferson, Bob Speck, and Rob Allen attended the spring meeting of the Niagara Frontier Council of Amateur Astronomical Associations (N.F.C.A.A.A.) in Buffalo. A mall display is planned at the Burlington Mall on October 18 and 19.

CALGARY: The Centre has arranged for Mr. Ron Volk to teach a three-day course in model rocketry in August. Other summer events included a camping trip in July and a summer barbecue in August. Plans are well underway for a Calgary Centre expedition to Australia in April 1986 for Comet Halley. Centre President Robert Loblaw will be acting as host.

Across the R.A.S.C. is a regular feature of the *Newsletter*. We need your contributions and reports of Centre activities if the feature is to be of interest and relevance to our readers. Deadline for December issue is October 1.

The Moose Factory Telescope

by Philip and Debbie Mozel
Toronto Centre

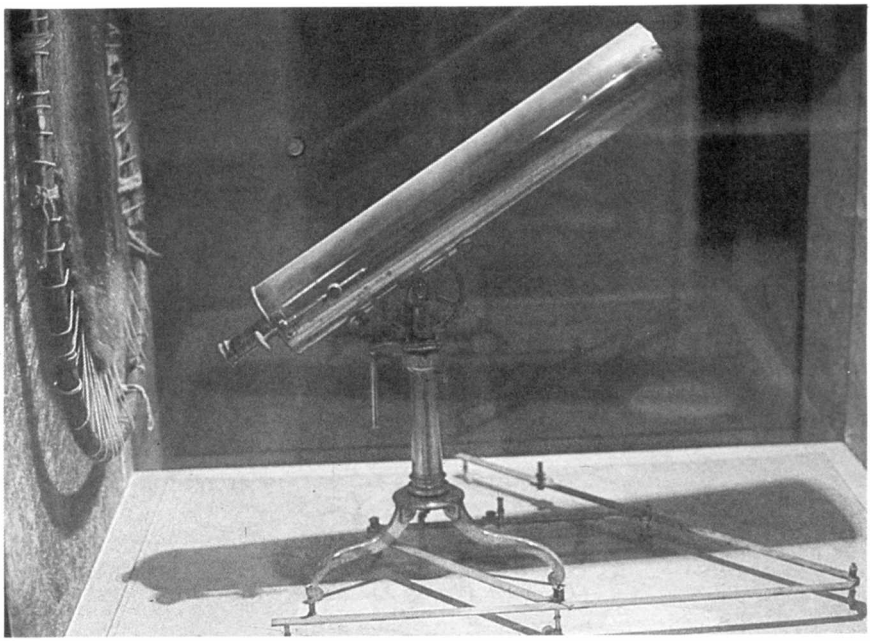
Astronomy is always with us regardless of where we may travel: we need only look upward. The same is often the case when one's interest is directed downward. This proved to be true in September 1981 during our visit to Moose Factory, Ont. on the shore of James Bay. Located at this northern locale is a refurbished Hudson's Bay Company trading post. An old stone building at the site has been converted into a museum with exhibits detailing matters of generally local interest. Yet gleaming in the centre of the museum was a beautiful brass telescope which immediately captured our attention and initiated a search which is, even now, only partly complete.

An examination of this obviously old instrument revealed engraving at the rear, near the eyepiece holder. By pressing a nose to the glass of the display case, "London", could be read. There was more but the orientation of the scope in the case did not allow further reading. This was a great source of trouble for, while these words were probably the makers name, no one locally could open the case to find out. Several years were spent trying to accomplish this seemingly simple task. In the meantime the instrument, needing some kind of name, became affectionately known as the "Moose-scope".

The major obstacle to overcome was the fact that no one seemed to want to claim responsibility for the museum. We gathered that the Ministry of Northern Affairs was looking after the place but they were of little help. Promises made to open the case in summer were conveniently forgotten until winter when access to the building was impossible. Repeated appeals for help were fruitless.

It then transpired that the Ontario Heritage Foundation was to take over the museum and inquiries to this organization brought offers of help. After another long wait over the winter of 1983–84, came an interesting day. A phone call from a second contact at the Ministry yielded a name on the scope! Progress at last! But ... awaiting us in our mail box that very same day was a letter from the Foundation. Someone there had inspected the instrument too and supplied a different name! Unbelievable! After two and a half years, to end up with two names! Oh well. A little further digging eliminated one and gave the full inscription as "T & T Blunt London".

In the meantime, the Foundation had put us in touch with J.J. Wood, a past Hudson's Bay Company



The Moose Factory Telescope photographed in its case. The instrument may date from the early 19th century but the history of it is unknown.

manager in Moose Factory. In 1956 he had removed the telescope from storage in an old forge and polished the brass. Mr. Wood endeavoured to trace its history at that time but could only ascertain that it had probably been in Moose Factory since at least 1900.

The Blunts of the inscription were probably Thomas, father and son. The elder Blunt was apprenticed to Edward Nairne, the instrument maker, in 1760. They later became partners but Blunt went his own way in the early 1790's, eventually being joined by his son. Thomas Senior died in 1823. Around this time the firm was taken over by Thomas Harris who continued to use the Blunt name until 1827.

Can the date of manufacture of the Moose Factory telescope be pinned down more precisely? Upon inspecting a photograph of the instrument, G. L'E. Turner (Museum of the History of Science, University of Oxford), stated that he expected "... the T & T Blunt signature to be from the 1820 period ...".

Some questions have now been answered. Others remain. Who used this instrument? Did an early explorer of Canada's north bring it from England to make astronomical observations? What, where and when did he observe? A logical place to search for answers might be the Hudson's Bay Company Archives. Luckily, this material was transferred, in 1974, from England to Canada. It can be examined at the Manitoba Provincial Archives in Winnipeg or the Public Archives of Canada in Ottawa. Since the researcher's presence will be required to sift through the wealth of information available, a member in one of those cities may wish to take up the challenge.

Many people helped piece this puzzle together. Besides those mentioned already we also thank Judith Beattie, Hudson's Bay Company Archives; Dr. Roy Bishop, Acadia University; Randall C. Brooks, St. Mary's University; R.W. Brooks, Ontario Northland Transportation Commission; Peter Broughton, R.A.S.C.; John Carter, Heritage Branch, Ministry of Citizenship and Culture; Dr. Jon Darius, Curator of Astronomy, Science Museum, London, England; Dr. Ed Kennedy, University of

Saskatchewan; Jocelyn McKillop, Public Relations, Hudson's Bay Co.; Bob Moore, Hudson's Bay Co. Staff House Project; Mr. Rhine and Pauline Hall, Heritage Trust, and Larry Ryan, Ontario Heritage Foundation.

November's Marine Eclipse

by Andrew Lowe
Calgary Centre

After successfully observing the June 1983 eclipse in Indonesia, I knew that my last chance of seeing another eclipse for the next five years was the November 1984 event in the South Pacific. But it would hardly be a favourable eclipse; the maximum duration of totality was less than two minutes and the most favourable areas of the eclipse path were over the open ocean.

I left Calgary on November 16 and arrived in Sydney two days later. The first few days were spent adjusting to the new time zone and to the change in season (of course, November is late spring in the southern hemisphere). I took a city tour and visited a koala farm. But I was impatient to board the cruise ship *Fairstar* that would rendezvous with the eclipse shadow. Finally, it was November 20 and I proceeded aboard ship, which was docked next to the famous Sydney Opera House. The stay on deck, however, was a very short one. There was a call for the amateur astronomers to meet; we had a few minutes to meet each other before the reason for the meeting became known. The directors of the cruise line walked in and, with the greatest of concern, told us that due to boiler problems the ship would be unable to reach the eclipse site in time. In retrospect, it seems a little amusing, but at the time ours were faces of sheer incomprehension. We had travelled thousands of miles to get this far (and in fact had overflown the eclipse path) and now the eclipse seemed father away than ever.

Most of the astronomers seemed resigned to staying and enjoying a cruise without totality. Others cancelled and went home. In the end, three of us were determined to beat the odds and get to the path of totality in time. In addition to myself, there was John Beattie, an American, and Robert McNaught, who lived in Australia. Through the assistance of the *Fairstar* crew, we learned of an air connection to New Caledonia, via Fiji, that would put us in touch with eclipsers collecting in Noumea (the capital of New Caledonia). John had been speaking with some of these people in Tahiti and knew of their plans to charter a boat from Noumea to the eclipse site some 100 kilometres to the southwest. With this in mind, we left the ship a few hours before it sailed from Sydney.

We flew as scheduled to Fiji, stayed one night in Nadi near the airport, and flew to New Caledonia the next day. My French, after seven years of hibernation, got a severe workout in this French island as we obtained a car and checked with the weather office at the airport. Prospects for the eclipse, then less than 24 hours away, seemed excellent. We drove to Noumea to meet the captain of the boat. We purchased our tickets and discussed the recent troubles on the island between the native people and the European settlers. Then we travelled to the hotel and met the other amateur astronomers. It was quite exhilarating to know that so far we had escaped a doomed ship to get this close to the path of totality. We joined the rest of the group for dinner and then drove to the docks to board the eclipse vessel *Cap des Pins*. The ship left harbour about 10:00 p.m. and soon it was time for some sleep, which few people accomplished very well.

By 5:00 a.m. eclipse day, it was light enough to roam the boat and meet the various groups aboard. In addition to the people we had talked with in Noumea, there was also a large contingent of Japanese amateurs. The fore and aft decks exploded in a display of telescopes, telephoto lenses, cameras and a horde of other optical and electronic equipment. I set up my Meade 4″ f/10 Schmidt-Cassegrain and loaded Kodachrome 64 for the partial phases. For totality I would be using VR 1000 film; the rocking of the ship made long exposures impossible. The sea was choppy enough to cause whitecaps, but the wind was only moderate and the skies were clear as expected.

With the aid of a shortwave radio, we were able to predict the start of the partial phase to within seconds. Sure enough, the previously unblemished disk of the sun had a tiny notch to one side that quickly grew in size. When a cloud passed over the sun 30 minutes before totality, the drop in light was very noticeable. Ten minutes later, the decreasing light was noticeable even with the sun in a clear sky. The engines were shut down to prevent excessive vibration and the ship gently rocked upon the water. The feeling in the last two minutes before totality belies rational explanation, even though this would be my second view of the corona. The sky brightness was dropping by the second – one could see that it

was getting darker – and all aboard were transfixed by the sun about to be snuffed out. There were a few brief seconds when a ring could be seen forming around the moon – the diamond ring – then the sun was gone. The sky was dark blue and the horizon glowed a dusky yellow. Everyone on deck was screaming at the corona enveloping the black disk of the moon. It was completely unlike the Indonesian spectacle. Now it was dimmer, but with long equatorial streamers and delicate brushes at the solar poles. Meanwhile, I was trying to chase the wandering image in the camera viewfinder. In the 93 seconds of totality I managed to get five shots of varying exposures. Prominences were visible all around the moon. Then the sun burst through at the other side of the moon. In the instant that I could behold this sight, the yellow brilliance of the sun contrasted with the pearl white of the corona and the reddish-pink prominences. But it was time to return to the solar shields.

The ship started the long voyage back to port after the end of the partial eclipse. Some people tried to catch up on their sleep, but for most it was a time to compare their impressions of the event and to discuss plans for upcoming eclipses . The unobscured sun provided excellent tanning before it set as we arrived back in Noumea.

The three of us flew out of New Caledonia the next day, arrived in Sydney, and then connected with a flight to Nadi, Fiji. After a long and tiring bus ride overland to Suva, we met the Fairstar which had finally limped into the harbour. The rest of the amateurs on the ship were pleased that our efforts had been successful, but of course they were doubly disappointed to have missed totality. I had my film developed on board and the photos of the corona were passed around at the meeting of the astronomers. The cruise continued with stops at Dravuni Island (where I burnt myself quite well), Port Vila in Vanuatu, and back to New Caledonia. The cruise ended back in Sydney on December 4. In the meantime, I had the opportunity to talk with many amateurs from around the world, including Rodney Austin (discover of comets 1982g and 1984i) and Graham Blow, a noted occultation observer in New Zealand.

After a few days in Sydney, I flew to Alice Springs to join an Australian Adventure Tour. This had been planned as a contingency in case the eclipse had been clouded out, and consisted of a coach and tent expedition from Alice Springs to Sydney. We travelled throughout the desert centre of the continent, to Ayers Rock and the opal mining town of Coober Pedy and south through the wine growing areas near Adelaide. The Magellanic Clouds were spectacular and the Southern Cross was prominent in the ealry morning sky. The final days were spent travelling across the states of Victoria and New South Wales, through the ranges of the Blue Mountains, and onward to Sydney.

By December 18, I was back in Calgary. There was some shock in getting accustomed to the winter temperatures after the 40°C temperatures of central Australia, but in no time at all I was planning my return to the southern hemisphere. I would certainly recommend Australia to anyone contemplating a vacation during the return of Halley's Comet next spring. As for another eclipse, the next really favourable chance for seeing the corona is not until March 18, 1988, when the sun will be obscured for up to 3m. 46s. Hopefully, I'll be somewhere along the eclipse path in Sumatra, Borneo, or the southern Philippines for my third view of totality.

Reprinted from *The Starseeker*

Hello Canada!

by Greg Beach
Sudbury Astronomy Club

Amateur astronomy is alive and thriving in Northern Ontario. The membership of the Sudbury Astronomy Club has climbed to 47 and it is still growing like the happy infant that it is. The telescope population is growing almost logarithmically! We have reflectors ranging in size from 3-inches to 22-inches with a 13-inch and 29-inch now under construction. Not surprisingly, refractors are also very popular. There are six in the 4–6 inch aperture sizes. Yes, even several of these are homemade right down to the glass!

Over the last two years volunteer members from the Sudbury Astronomy Club have been instrumental in the grinding, polishing, and mounting of the 17.5-inch Heliostat at Science North. The Hydrogen-Alpha telescope is now under construction. Telescopes North, a joint venture with Science North and the Sudbury Astronomy Club, has recently started up in the optics shop. This is a telescope-making workshop for all interested citizens of the region.

We pride ourselves on our monthly newsletter *Astronorth*. It contains a wealth of information for the beginning astronomer as well as the more seasoned veteran.

Comet Parties will become the norm for the next ten months as we follow Comet Halley. Tentative dates are September 13 , October 11 , November 16, and November 27. We hope to have seen the great comet by the time you read this!

Regular scheduled meetings of the Sudbury Astronomy Club are held every second Friday of the month (except July and August) at the Doran Planetarium of Laurentian University. If you happen to be in the area please do drop in.

Editor's Note: An introduction to the Sudbury Astronomy Club appeared in the August 1983 *National Newsletter*. Mr. Beach can be contacted at 710 Beatrice Crescent, Sudbury, Ontario P3A 5B5, phone (705) 560-6651. We are looking forward to further reports from this active club.

The Webb Society

Many of you will be familiar with the Webb Society's *Observer's Handbook* series (which of course is to be distinguished from the R.A.S.C.'s "Bible" of the same title) but you may not be so familiar with the Webb Society's purpose and activities. The Society, founded in 1967, is named in honour of the Rev. Thomas W. Webb (1807–1885), an eminent amateur astronomer whose classic *Celestial Objects for Common Telescopes* has been an inspiration to several generations of amateur observers.

The main purpose of the Society is to encourage the amateur observation of double stars and "deep-sky" objects such as star clusters and nebulae, and to provide a forum for observers to communicate and publish the results of their work. Observational activities of the Society are coordinated in various sections each under the control of a director with wide experience in the particular field: Double Stars, R.W. Argyle, F.R.A.S.; Nebulae and Clusters, E,S. Barker, F.R.A.S.; and Galaxies, B.J. McInnerny.

Results of the Society' s work are published in its *Quarterly Journal*. It contains features and articles (many by members who are professional astronomers) of outstanding quality and interest. All members are encouraged to contribute and are given guidance as to how to present the results of their work. At present members are active in some sixteen countries. An Annual General Meeting is held (usually in London) and gives members an opportunity to meet and discuss common interests. The occasion is enlivened by the presentation of papers of outstanding interest and by donation of the notable Webb Society Award given annually for the best new contributions to the *Quarterly Journal*.

One of the initial aims of the Society has been to produce a series of observer's manuals that do justice to the equipment available to amateur astronomers today and to fields not adequately dealt with by other organizations. Five volumes have been published which provide greater scope for the observer to exploit his equipment to the limit and to tackle the challenging difficulties of new fields of observation with confidence of success. Society members receive a special discount when ordering these volumes.

Although this is a British organization, it has a North American arm and membership enquiries can be sent to Ronald J. Morales, 1440 S. Marmora, Tucson, Arizona, 85713. Annual fees are $9.50 US.

Light Pollution and Community Relations

by Dr. C.T. Bolton
David Dunlap Observatory

The skies above the David Dunlap Observatory were relatively dark when the Observatory opened in 1935. The population of Richmond Hill was about 1,200, Toronto had a population of about 700,000, and there were essentially no suburbs. Thus most of the artificial light sources were located some distance from the Observatory, and these had relatively low intensities compared to the ones now in use. Today, Richmond Hill has a population of 40,000, Metropolitan Toronto's population is well over 2,000,000, and the area between Steeles Avenue and the Oak Ridges Moraine, which includes Richmond Hill, has a population of over 200,000. It is likely that the population in the latter area will at least double in the next 15–20 years.

The huge increases in traffic densities and speeds and the greater security problems that have come along with this growth have caused businesses and governments to use increasingly higher levels of outdoor lighting. The increased sky brightness due to this growth first became apparent in the early 1960's, and since then, the sky brightness has increased by about 25% per year, although there are indications that the growth rate has slowed somewhat since 1980. By the early 1970's, the sky had become too bright for broad-band direct photography, and the Hg emission lines from street lights were causing serious problems for spectral classification.

Until the early 1970's, it had been very difficult to try to get any control on lights around the Observatory because there were at least four different governments with jursidiction over lighting in areas within a mile of DDO. However, the first major impacts of light pollution on DDO coincided with the establishment of regional government in the area. This halved the number of governments with primary responsibility for lighting in the immediate area of DDO and made a damage control program possible.

Since then, we have been working closely with the Town of Richmond Hill and the Ontario Ministry of Transportation and Communications to control lighting within a few miles of the Observatory. We have also had excellent cooperation in this regard from the Regional Municipality of York, but unfortunately, we have had no luck in our efforts to obtain cooperation from the nearby towns of Markham and Vaughan, whose lights also have a major impact on the sky over the Observatory.

Since our sky was already too bright for broad-band photography, our principal goal has been to provide the maximum possible protection for stellar spectroscopy in the blue region of the spectrum. Thus we have supported the installation of high pressure sodium lights that are considered unacceptable around installations where broad-band photometry and imaging of faint objects is being carried out. We have also worked to see that lights are shielded so that no light is spilled above the horizontal plane through the light, and we have requested that commercial lights be placed on timers wherever feasible, so that they will be extinguished after business hours.

We have prepared lighting design specifications which the Town incorporates into all site plan agreements in an effort to control light pollution from new developments. However, the Town staff are still learning how to enforce these, and it is often necessary for me to get involved in the lighting design or to intervene to get a problem corrected after construction is completed. The former works pretty well, since I now have a decade of "design experience" to draw on. It is not uncommon for a Developer to request my assistance in the lighting design, and on occasion, the Town has required Observatory approval of the lighting design before the site plan could be forwarded to the Province for approval. This can be time consuming, but I prefer this to intervening after the fact, which can be very messy, even when we have the full support of the Town. We have still not worked out a satisfactory method for coping with problems from new lights in commercial and industrial developments that were built before lighting standards were incorporated into the site plan agreements.

We also spend a lot of time lobbying the Town Council about the planned uses of the large tracts of vacant land that are still found near DDO. Most of the decisions about land use near DDO will be based on economic and planning considerations which do not put any weight on our requirements, but we hope to have enough influence to prevent the installation of high intensity lighting near the Observatory. Our primary goals are to keep lighted outdoor athletic facilities and commercial and industrial developments with outdoor storage as far from the Observatory as possible. The Town has been very sympathetic to our requests in this area.

These efforts can do no more than minimize the damage caused by light pollution. The sky will undoubtedly continue to grow brighter, but there is some hope that the rate will decline. This may have begun in 1980. The present sky brightness is not a serious limitation for the spectroscopic programs now underway or contemplated by our staff. It is a problem for photoelectric photometry of fainter stars, but so far this has not proved to be a serious limitation. This picture is not likely to change much for the next twenty years, and the situation after that will depend on future planning decisions by the province and the development of lighting technology.

Reprinted from *David Dunlap Doings*

1985 General Assembly Hosted by the Edmonton Centre

by Mary Anne Harrington
Toronto Centre

The campus of the University of Alberta proved a very lovely setting over the Canada Day long weekend as the Edmonton Centre hosted the 1985 General Assembly (GA). The GA was well-attended with delegates from 14 of the 20 Centres in attendance as well as some unattached members.

The agenda for Friday started with a National Council meeting followed in the evening by a wine and cheese party, a members' slide show and a song contest.

The paper sessions started at 9:00 am Saturday and speakers presented excellent talks on many interesting topics. These included comet occultations; determination of sunspot latitudes; daytime observations of Venus; free fall; the origin of the constellations; a comet search program; the heavens in colour and *Stargazer* – a superb 10-minute audio-visual film. The afternoon concluded with a lively session on computer utilization.

Saturday evening the Banquet was held at the very picturesque Edmonton Convention Centre. Following a delicious dinner, the distinguished head table guests were introduced by Bob Carson – president of the Edmonton Centre. Delegates were welcomed by representatives of both provincial and municipal levels of government, the University of Alberta, the Space Sciences Foundation, and the Edmonton Space Sciences Centre. Then National President, Dr. Roy L. Bishop, presented the Service Award to J. Campbell Fahrner of the Calgary Centre, and the Simon Newcomb Award to Donald F. Trombino of Danbury, Connecticut. The display competition awards were then presented and the winners were: Dale Armstrong (London) for his extensive survey of amateur astronomy in Ontario; Hein van Asperen (Kingston) for his presentation on the determination of sunspot latitudes; the Calgary Centre for their display describing the various activities of their members; Joan Hube (Edmonton) for her computer program that featured the plotting of astronomical objects; Karl Miller (Vancouver) for his display on computer-controlled telescope slewing and Michael Watson (Toronto) for his collection of deep-sky photographs.

Dr. Douglas Hube, of the University of Alberta, then introduced the guest speaker for the evening – Dr. R.E. Folinsbee, Professor Emeritus from the University of Alberta. Dr. Folinsbee presented a most interesting talk entitled "Meteorites and their Collectors – Close Encounters" which brought to a close a most enjoyable evening.

Sunday morning breakfast was served in the Universe Gallery of the ultra-modern Edmonton Space Sciences Centre followed by the *Stars over China* Planetarium show in the Margaret Zeidler Star Theatre, then the film *Grand Canyon* was shown in the Devonian IMAX Theatre which was a truly breath-taking experience !

Sunday afternoon the Society's Annual Meeting was held and 62 members were present. It was announced to the membership that Marie Fidler had resigned as National Treasurer in the early spring due to health reasons and that the executive council had appointed Dr. Ralph Chou (Toronto) to serve as National Treasurer. It was also announced that Brian Beattie (Toronto) had been selected the new National Librarian by acclamation. As well Dr. Peter Millman had completed his four-year term as Honorary President and Mr. A.E. Covington (Ottawa) had been appointed the new Honorary President. It was announced that Dr. Stephen Hawkins C.B.E., F.R.S., of Cambridge, England had accepted the Society's Invitation to become an Honorary Member of the Society. The proposal made by the Toronto Centre to host the 1987 GA was accepted by the membership. After the annual meeting a second National Council meeting was held.

With the business section completed, Sunday evening was a nice time to relax with a tour of Fort Edmonton which is a reconstruction of a Hudson Bay trading post circa 1846. Then on Monday morning, for our last tour, we headed for the West Edmonton Mall. This is a fantastic complex and some of the highlights included 500 stores, a NHL-sized indoor skating rink and Fantasyland – the world's largest indoor Disney-land type amusement park.

Thus the 1985 General Assembly came to a close. Special thanks to the organizing committee and all the members of the Edmonton Centre who put so much time and effort into making this a truly unforgettable event.

Just a reminder, the 1986 GA will be held in Winnipeg June 28 to June 30 1986. So come on out to Winnipeg in 1986 and help the Winnipeg Centre celebrate its 75th anniversary in style! See you there.