NATIONAL NEWSLETTER

August, 1979

Supplement to the JOURNAL OF THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

Vol. 73, No. 4

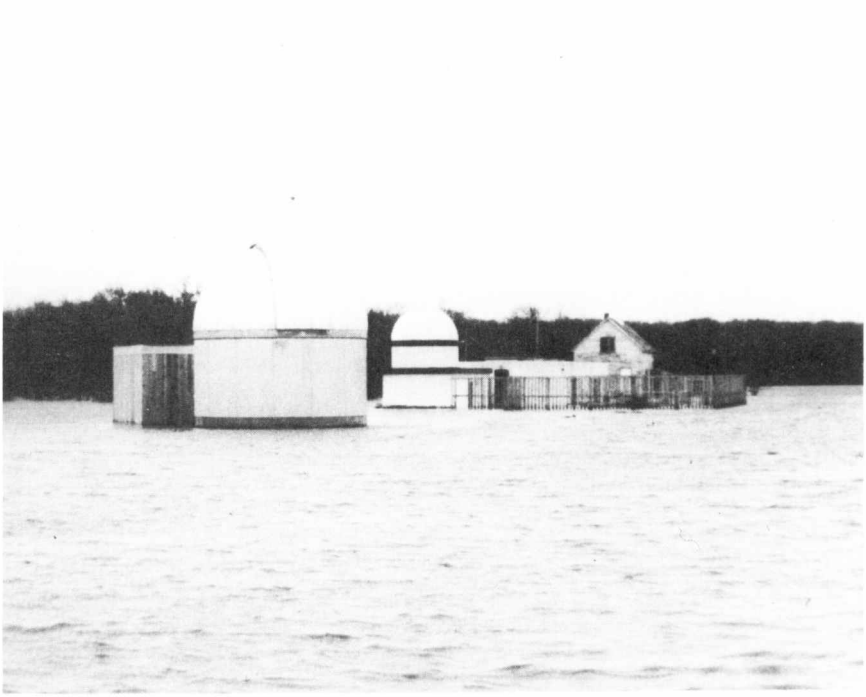


Photo by Del Stevens, Winnipeg Centre

AQUARIUS OR PISCES – IN MAY?

The observatory in the foreground is the recently erected facility of the University of Manitoba to house the 16-inch telescope obtained from the Dominion Astrophysical Observatory. Behind it is the observatory of the Winnipeg Centre, with the wind-screen for the many telescope piers for Community Astronomy development.

NATIONAL NEWSLETTER

August, 1979

Editor: B. Franklyn Shinn
Associate Editors: Ralph Chou, Ian McGregor
Assistant Editors: Harlan Creighton, J. D. Fernie, P. Marmet
Art Director: Bill Ireland Photographic Editor: Richard McDonald
Press Liason: Al Weir

Regional News Editors
East of Winnipeg: Barry Matthews, 2237 Iris Street, Ottawa, Ontario, K2C 1B9
Centres francais: Damien Lemay, 477, Ouest 15ième rue, Rimouski, P.Q., G5L 5G1

Centre and local items, including Centre newsletters should be sent to the Regional News Editor. With the above exception, please submit all material and communications to:

Mr. B. Franklyn Shinn,
Box 32 Site 55, RR #1,
Lantzville, B.C.
V0R 2H0

Deadline is six weeks prior to month of issue

A Setback but not a Disaster

by Del Stevens and Phyllis Belfield
Winnipeg Centre

The Red River Valley experienced its worst flooding in thirty years this spring due in part to an unusually heavy snowfall in the United States. This event, combined with continued rain and a fast thaw, prevented the normal run-off on the tributaries of the Red River. As a result, all the towns and farms in the Valley and along the Red River had to be evacuated. The Winnipeg Centre Observatory is located 14 km south of Winnipeg at the University of Manitoba Research Station at Glenlea, Manitoba. It is situated about 300 meters from the river. An accurate prediction by the Flood Forecasting Committee enabled members to take action to try to save it from the flooding waters.

When it became evident that the Glenlea complex was going to be flooded, Roy Belfield, President of the Centre, arranged through Del Stevens to have an earthen dike built around the site, but unfortunately this was found beyond our powers.

With the water continuing to rise, a group of the Centre members tried to protect our observatory by a second line of defence. Our President, assisted by Del Stevens, Guy Westcott and friend, Manfred Hirschfield, Ned Mazerall, Don Hladiuk, Hans Thater. Ed Goletski, Ken Hatch, Bill and Brenda Krosney, Greg Bailey, John Haines, Martin Clutton-Brock, Richard Bochonko and his friend Dave, and Marjorie Turton worked very hard sandbagging for long hours in cold, miserable weather, often into the small hours of the morning. Tom and Muriel Cairns were a welcome sight appearing with hot coffee and doughnuts for everyone.

Again we were thwarted in our efforts to keep the water out; this time it was the prohibitive

cost of sandbags that brought us to a halt. Since the observatory is outside city limits we are not eligible for any free sandbags. We had purchased a large number of them, and the folk at the Research Station gave us a lot of extra ones, but it became evident that we would need about 8,000 more bags, plus the sand. At a cost of $1.00 per bag the Centre could not afford it, no matter how much we wanted to protect the building.

It was therefore with great reluctance that Roy made the decision to let the rising waters engulf our observatory. Everything of value; telescopes, library, projectors etc. were removed to safety. Chairs, tables, carpet etc., were put upstairs in the dome room.

As of May 1 the observatory was under four feet of water; the only way into the site was by boat. The whole area looked like a gigantic inland sea, the geese and ducks being the only living things seemingly enjoying themselves.

In early June the water had receded sufficiently that an appraisal of the damage could be made. While the water had reached a level of over one meter in the observatory, there was no structural damage and it is hoped there will be little damage to the inside walls and insulation.

To Straighten the Records

The National Secretary, Norman Green, has forwarded correspondence from Jim Low, Toronto Centre, regarding a discrepancy in the sequencing of the General Assemblies in our recent publications. Mr. Green writes in part:

> The London Assembly was most enjoyable. I noted that this meeting was called the "Eighteenth General Assembly, and reference was made to the 1962 meeting in Edmonton as the first General Assembly.
>
> The history of the R.A.S.C. is of interest to me, and although what I wish to point out is a small matter, I would like to maintain historical accuracy. I have been a member of the R.A.S.C. since 1956, and thought that I attended the "first" General Assembly in Montreal in 1960. Upon checking back issues of the *Journal*, I would say that the General Assembly "evolved" over several years and, perhaps, no definite year could be called the year of the first General Assembly. However, the term is first used in 1960.
>
> Here is a summary of what I found in back issues of the *Journal* regarding annual meetings and "General Assemblies":
>
> *1958 March 28. Hamilton*
>
> This was an annual meeting, and the first time it was held outside Toronto. It was noted that the Montreal Centre urged the extension of the Annual Meeting to a second day for a paper session. This was endorsed for 1959 (*Jour. RASC*, Vol. 52, June)
>
> *1959 March 13–14. Toronto*
>
> Annual Meeting, paper session, and "At-Home" gathering. (*Jour. RASC*, Vol. 53, June)
>
> *1960 March 11, Annual Meeting, Toronto*
> *April8–9 Montreal*
>
> Because of the former constitutional requirement that the annual meeting be held in Ontario, there were, for several years, an "official" annual meeting, then another meeting starting in 1960.

The Montreal meeting was called the "*General Assembly* and Session for Papers." Also, in the report published in the Journal it was stated: "... the *General Assembly* was held in the McConnell Engineering Building, McGill University, ..." (*Jour. RASC*, Vol. 54, June)

Beside the paper session, many Centres sent displays, and this was the beginning of the display part of our Assemblies. I attended this meeting, and recall it being the "first" General Assembly, at that time. In many ways it was similar to present-day assemblies, and I would personally call this the first General Assembly.

In the March 1961 *Supplement to the Journal*, this was called the "General Meeting".

1961 March 17–18. Toronto

There was a paper session, annual meeting, trip to Hamilton for a visit to the planetarium, a dinner, and a tour of the D.D.O. (*Jour. RASC*, Vol. 55, June)

In the December 1961 Journal, is an invitation to submit papers for the "... *next* General Assembly ... in Edmonton".

1962 March 2. Annual Meeting. Toronto

May 18–21. Edmonton

This was the "... first General Assembly held in *Western* Canada ..." (*Jour. RASC*, Vol. 56, June)

In conclusion, it would appear that the General Assembly evolved over several years, and that the first "full-fledged" General Assembly was the meeting in Montreal in 1960. The term General Assembly was first used at that meeting.

IN MEMORIUM

January 8, 1979, at 4:20 in the afternoon, Pat Corey, my beloved wife and understanding fellow astronomer passed away at Lion's Gate Hospital. She succumbed to a lengthy battle with cancer, and during the last week or so, after being told it was terminal, quietly prepared herself to make the ultimate journey to a destination that both of us are sure awaits us. Her sense of humour and courage lifted all our spirits and made her parting, if anything, a joyous occasion.

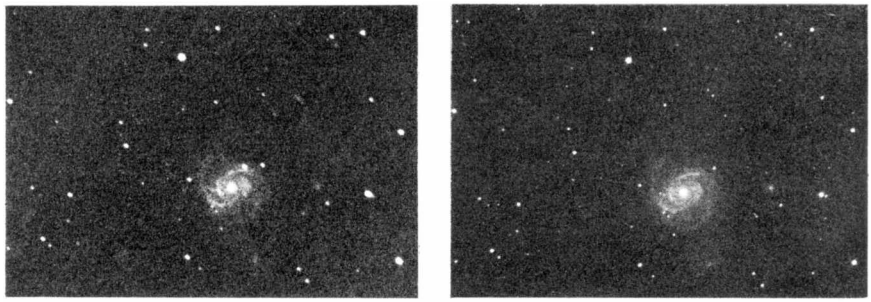
Pat wished to be remembered to you all, and was sorry not to be here for the great eclipse, but reminded me that she would probably have a far better seat than any of us in the long run! She was also excited about being able to look at the wonders of the heavens with eyes unaffected by city glare, cloud cover or the ravages that time plays on these precious instruments of ours. For years she has wanted to visit Andromeda. I believe she will do it, if she's not there already.

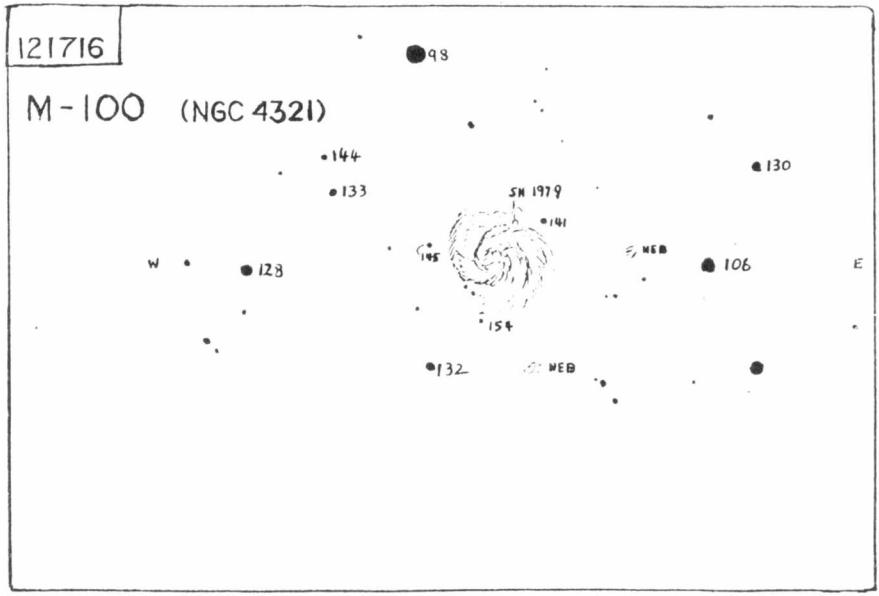
The R.A.S.C. was special to Pat for many reasons. It gave her great pleasure to see young and eager members enrolling in a field that was full of awe and wonder at every juncture. She was proud of her knowledge of the constellations and stars. Also, we met through the R.A.S.C. and understood each other's love for the sky, space, cosmology and the logic of the universe. It is a common bond shared by too few couples. I shall miss her.

Many of you will never have the pleasure of her presence or friendship but she only had one great wish for you before she left. Be a clear voice of enthusiasm and excitement for one of the greatest endeavours in the world! Be proud to be an astronomer and don't be afraid to kindle that flame in others – as many as you can light? For when you teach them to look up, you teach them to look from whence they came and where they are inevitably going to return.

Mal Corey
Vancouver Centre

Two Photos and Comparison Chart of Supernova in M100





On the left, 16 May 1978; on the right, 19th May 1979. Both photos by Jack Newton, Victoria Centre. 12.5 inch Newtonian telescope, f/4.6, 103 aF film. On the left, 20 minutes; on the right, 25 minutes. Chart from A.A.V.S.O. Alert Notice number 30, June 1979, courtesy of American Association of Variable Star Observers. Magnitudes are given without the decimal. South is up.

Supernova in M100 (NGC 4321) in Coma Visually Discovered by Gus Johnson, Maryland.

From *AAVSO Alert Notice No. 29*: AAVSO member Gus Johnson, [R.D. 2, Box 67, Swanton, Maryland] visually discovered a supernova in M100 (NGC 4321) in Coma. He first observed the bright object southeast of the nucleus on the evening of April 18, 1979. He confirmed it on April 19, comparing what he saw with photographs of M100. George Kelley and George Lindbloom verified the presence of a bright object $11^m.6$–$11^m.8$ about 2 to 2.5 minute of arc southeast of the nucleus, that evening. Dr. Brian Marsden, the editor of *I.A.U. Circulars* was notified. He contacted several observatories. On April 20, Kitt Peak in Arizona and Asiago Observatory in Italy confirmed the supernova spectroscopically. They reported that it has a featureless spectrum and appeared near maximum or possibly before maximum.

Alert Notice No. 30 updated the above to June 1. – "Our" supernova has been under close investigation by several observatories and the International Ultra-violet Explorer (IUE) satellite. On April 22 and 24, the IUE spectral observations showed "relatively smooth continuum spectrum" with ionized carbon, silicon, and nitrogen lines. These lines displayed P Cygni-like profiles (i.e., lines with blue shifted absorption components, indicating mass loss). The measured expansion velocity was only about 3000km/sec (*IAU Circ. 3353*). L. Rosino of Asiago Astrophysical Observatory in Italy reports that the slow decline of $0^m.5$ from April 20 to May 3 ($0^m.03$ per day) and the photometric colors observed suggest a Type II supernova discovered around maximum. However, typical Type II spectrum features have not yet been observed. (Type II supernovae have spectra with strong hydrogen emission lines). This may be due to the slow expansion velocity. The maximum brightness is also abnormally high for Type II, when typically it is 14m – 15^m at maximum in other Virgo galaxies.

Gus Johnson is the first AAVSO member to discover a supernova in another galaxy! AAVSO records show that in the 20th century he is the second visual discoverer of a supernova in another galaxy.

Gus Johnson himself writes to the R.A.S.C. *Newsletter*:

> "I feel that I am a privileged observer to have been the discoverer of the recent supernova in M 100. The AAVSO is delighted to have its first supernova discovery in its membership, but in that I live out-of-country the R.A.S.C. may not be aware that I am also one of its members, so you should share the honors.
>
> Galaxies and double stars are a special interest of mine. It is an uplifting experience to make a tour through the Virgo-Coma galaxy cloud and it was on my first complete "tour" of this spring, using the guide in the February 1955 *Sky and Telescope* that I spotted a star in the "nebulosity" of M100 on the evening of April 18, 1979. I was sharing these sights with a newcomer to astronomy, my new church pastor, David Long, and he also saw the star. I didn't make any written notes of it, but hoped to remember it and check it with a photo from *Hubble's Atlas of Galaxies* later, for bright stars in or near galaxies bear checking. Later I found no such star on the photograph, but [by] then the galaxy field was behind trees from the viewing area of my 8-inch f/5.7 Cave Newtonian. It was a blessing to have the next evening clear so I could make a confirmation. ... I then phoned the AAVSO director, Janet Mattei, and soon the word was abroad requesting confirmation and a spectrogram. This discovery proves that, as the famous and long-time AAVSO member and comet discoverer, Leslie Peltier maintains, visual observing is not an obsolete method.
>
> The Milky Way Galaxy is over-due for its own supernova. Let unaided-eye observers take courage and keep watch so that the next visually caught supernova also finds its "ownership" in the R.A.S.C. and AAVSO."

Gus indicates that although he is a citizen of the United States, his grandfather, Herbert Ellison, was from Port Stanley, Ontario. Gus signs himself; 'Gus Ellison Johnson'.
The R.A.S.C. is proud to add its congratulations to those of the AAVSO for this discovery.

Nouvelles des Centres Québécois

de Damien Lemay

Centre d'Astronomie de Montréal

Lors de l'assemblée Générale annuelle a London, Monsieur Rolland Noel de Tilly s'est vu décoré de la "SERVICE AWARD MEDAL". Monsieur de Tilly, que l'on pourrait surnommer le "Secrétaire perpétuel de la SAM", s'est dévoué, corps et âme, au service de cette société pendant de nombreuses années. Depuis la date à laquelle il a officiellement pris sa retraite, il est pratiquement devenu un employé à plein temps au service de l'astronomie. Nos sincères félicitations à Monsieur de Tilly.

A la méme occasion, Monsieur André Paul, membre de la SAM, s'est mérité deux prix pour sa participation à la competition de travaux astronomiques. Ces prix lui étaient octroyés dans la catégorie spéciale sur l'éclipse du 26 février dernier.

Mizar and Alcor A Two-Ring Circus

From R. L. Linkletter, President.
Olympic Astronomical Society.

I wish to amplify and perhaps correct one tiny item [in the April 1979 *National Newsletter*] in the interest of stopping a perpetuating story about Alcor and Mizar. In the article by Herb McGrath on Double Stars about the middle of page L26 he states that Mizar and Alcor are not physically related, and that Mizar is a double star. I submit the following:

1. A wire service science note of perhaps five years ago announces the discovery that Alcor and Mizar are a binary pair, with a period in the order of 250,000 years per revolution.

2. Mizar is not just a pair of stars as seen visually, but a pair of pairs. In *Pictorial Astronomy*[1] is a spectrum of one of those two pairs, showing the stars at equal velocity in one, and in opposite velocity in the other view, with a period of 20.5 days.

3. Alcor is also a pair, same reference, page 203.

4. These discoveries were dated: 1857 Mizar is a pair; 1889 the brighter star of Mizar is a pair and Alcor is a pair; 1908 fainter star of Mizar is a pair, making six stars at the centre of the handle of the Big Dipper.

Mr. McGrath's excellent article is oriented to what the amateur can observe directly, of course, but aside from the statement about Alcor and Mizar not being related there is the thrill of the two-ring circus going on right there day and night in the most recognizable of all constellations. I hope you will forward this note to his attention and help spread this "rest of the story" that the Griffiths Observatory directors have stated so well.

[1]*Pictorial Astronomy*, Alter and Cleminshaw, 2nd edition 1952, Crowell Publishing Co. There is now a fourth edition.

L52

The Time Machine

by Roy L. Bishop

Nearly a century ago H. G. Wells wrote that classic of science fiction "The Time Machine", an account of the adventures of a man who devised a machine of brass and crystal which could transport him forward or backward through the fourth dimension: time. A decade later and with profound insight Albert Einstein noted that the structure of space and time actually does possess the flexibility necessary to allow one half of Wells' fantasy: it is indeed possible to travel into the future. As in Wells' novel, one's own clocks continue to eat time at an unchanging rate; nevertheless the clocks of others will spin wildly into the future for him who takes a high speed return trip. The technology required to transport a man a significant way through time goes far beyond that of Wells' "glittering metallic framework". Even NASA's expertise is too primitive to produce the Wellsian machine that Einstein's equations permit, although atomic clocks have measured the effect at the feeble speeds of jet planes.

The other direction for Wells' time machine – backward, into the past – has two facets. The direct travel of an observer into the past as in Wells' novel is inconsistent with the second law of thermodynamics, not to mention basic logic of cause and effect. The arrow of time can be altered in length, but apparently it cannot be reversed in direction. The Persian astronomer poet Omar Khayyam has described the unidirectional arrow of time in these words:

> The Moving Finger writes; and, having writ,
> Moves on: nor all your Piety nor Wit
> Shall lure it back to cancel half a Line,
> Nor all your Tears wash out a Word of it.

The other facet of entry into the past has been before us for three centuries, ever since Römer used the Galilean moons to establish that the speed of light is finite: we always see other objects as they were at some time in the past. Ironically, the equations of relativity which point the way into the future also tell us that within our own reference frames we must invariably view the past since no signal can exceed the speed of light. The much slower ion pulses along the cell membranes of the human brain insulate us from the short steps into the past associated with daily affairs. Even conversations relayed from synchronous satellites seem instantaneous. However, at the distance of our Moon and beyond, the times required are longer than those for our thought processes. We view our Sun as it was eight minutes ago, and the hot stars of Orion as they were at the fall of the Roman Empire. The myriad stars in the vault of a summer night are sprinkled across the entire time span of civilization.

The astronomical telescope is the nearest we have yet come to realizing Wells' time machine of brass and crystal. A telescope multiplies the detail, the number, and the distance of events in the past which can be viewed by man. An amateur's 20 centimetre mirror will reveal the Virgo cluster in the eocene epoch, the quasar 3C-273 in the pre-cambrian era. The glass giants of Palomar and Zelenchukskaya reach back before the birth of the Solar System. The ultimate time machine was that of Penzias and Wilson with which we first viewed the glow of the creation of the Universe itself.

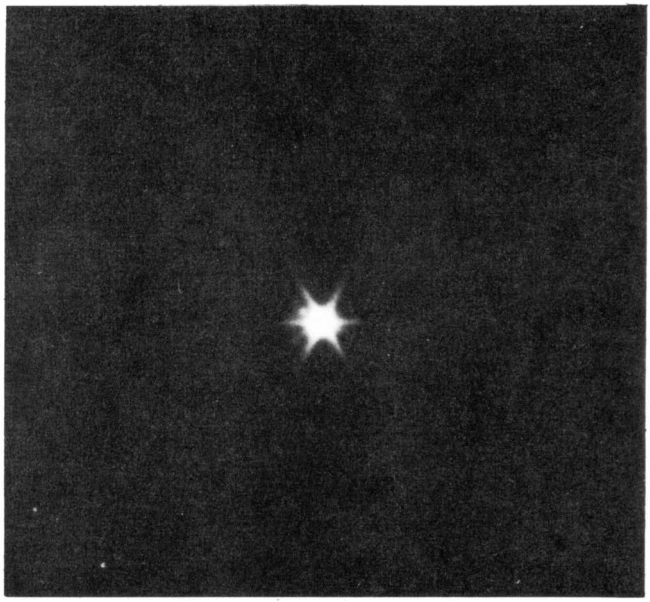
An image forming optical system such as an eye or a telescope is a time machine in a subtle way as well: all the paths taken by light rays in tumbling through its optics to a point in the image are paths of equal time. This ensures that the guiding waves arrive constructively at the foci. A converging lens is thicker toward its center in order to retard rays on the more direct paths. The mirror of a newtonian has the shape to provide the same time to a focus as rays would require to reach a plane normal to their initial direction: the locus of such a figure is a paraboloid. The elegantly simple but painstaking Foucault test is in essence a means of determining that a mirror provides equal times for incident light to a precision of about 10^{-16} of a second, the time for light to travel a small fraction of its wavelength.

Man has looked back to the creation. He has learned to extend his vision with isochronal frameworks of metal and glass. If he survives his own follies, one day he will doubtless have the technology to make half of Wells' time machine a reality. I for one, however, would not buy a one-way ticket into the future.

Maktomkus Observatory

The Double Star Sirius

by George R. Ball
Victoria Centre



Sirius B photographed with a Schmidt-Cassegrain telescope made by George Ball, Victoria Centre. Sirius B is the tiny image at about 11 o'clock)

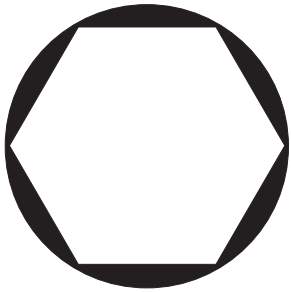
Most everyone is familiar with the bright star Sirius (mag. –1.5) and the fact that it is a double star. It dominates the night sky from late fall until early spring. The companion known as Sirius B is mag 8.7 and is not easily seen. It moves in an elliptical orbit around Sirius A in fifty years, and can be as close to the main star as 3″ of arc, or as far away as 11″. At present they are separated by about 10″.

Two objects in the sky that are separated by 10″ are quite easily resolved, even in a small telescope, but Sirius A is nearly 12,000 times brighter than its companion and this is where the difficulty occurs.

I have tried for years to observe Sirius B with negative results until this year. Last year I completed a 6-inch f/11 Schmidt-Cassegrain telescope I had been working on for some time. I was quite pleased with the operation of it but didn't try it on Sirius until January of this year. After bringing the star to the centre of the field I was amazed to see the two stars well separated. There was one-and-one-half times the diameter of the main star of dark sky separating the two! Quite a few members of our Centre came to observe it over the next few weeks, and all agreed they could see the companion quite easily.

After the excitement had died down slightly I decided to try to photograph the pair. This proved to be more difficult than observing them visually. If the film is exposed long enough to register the image of the faint star the image of the bright star has grown larger than the separation of the two.

The suggested way to photograph Sirius A & B is to distort the diffraction pattern of the star with a hexagon-shaped diaphragm placed over the top end of the telescope tube. This doesn't dim the light of the main star, but draws it out into six spikes, thereby shrinking the size of the



Diffraction Diaphragm shown by George Ball at meeting of Victoria Centre.

central part of the image. If the diaphragm is oriented correctly the companion star should appear between two spikes. Of course the companion will be affected in the same way but being so much dimmer it is not apparent.
After experimenting with several types of film I found that a very fine grained Panatomic X ASA 40 film exposed for five minutes at the prime focus produced fairly satisfactory results.
All the optical work for this telescope was done by myself and the aluminizing with my own equipment. I made the fibreglass tube and all the metal fittings. I made moulds and cast the corrector lens with black casting resin. The main mirror is movable for focusing and is supported on a casting that fits the end of the fibreglass tube and supports the eyepiece fitting as well. This was also made with casting resin.

If anyone in the Victoria area is interested I would be very pleased to see them.

George R. Ball
54 Maddock Ave W
Victoria, B.C. V9A 1E7
Phone (604) 384-1770

The 1979 R.A.S.C. General Assembly

by Peter Jedicke
London Centre

Any national association worth its salt must provide its members with opportunities to exchange thoughts. In the Royal Astronomical Society of Canada, the most effective of many means directed toward this end is the annual General Assembly. Delegates from across the country and around the world are invited to one of the Society's 17 cities to meet face to face, and each year this event is one of the most exciting astronomical conventions anywhere on this planet.

Fully two-thirds of the Centres have hosted or co-hosted a General Assembly – some more than once. But prior to 1979 this magnificent responsibility had never fallen on the London Centre. As early as 1975, Londoners realized that their time had come, and National Council formally accepted the invitation of the London Centre on June 30, 1977. So, right on schedule, the first "Forest City" G.A. was launched on May 18, 1979, designed to reflect the unofficial motto of the Centre, "Zaniness & Tradition."

Most of the 192 official delegates arrived on Friday, a very busy day. Gerald Schieven ferried many of the newscomers to the campus of the University of Western Ontario, where they were greeted at the entrance of Delaware Hall by London Centre President Robert Cornforth. Delegates soon discovered, as they settled into their rooms, why Delaware Hall

has a reputation as the "Hilton" of campus residences. After they met Eric Clinton at the registration desk and were presented with their nametags and program guides, delegates participated in a variety of activities. Entrants in the R.A.S.C. Competition were introduced to Walter Campney, who assisted them in setting up the Display Room, while those with official duties on National Council attended the meeting of that congress. Still others were treated to astronomical films shown by the University's Department of Astronomy and audio-visuals chief Paul Clinton. A few attended the taping of the London Centre's television program, "Telescope," in the mobile studio set up at the Hume Cronyn Memorial Observatory.

After an informal wine and cheese party, at which host Mike Flegel encouraged delegates to take advantage of this rare opportunity to mingle with their fellows, the M147 Session was held. This was the regular monthly meeting of the London Centre, and it broke attendance records! The capacity audience witnessed an awesome display of the wonders of astronomy, as captured on film and audio recordings by amateurs from across the country. Many of the presentations, of course, dealt with the total solar eclipse of February 26, 1979, which over 20 million Canadians had the bad fortune not to see in person. As the evening continued, the University's Department of Astronomy played host at an open house in the Cronyn Observatory, giving R.A.S.C. members a chance to visit the 25 cm. refractor which saw first light in 1940.

On Saturday morning, the delegates rose to brilliant sunshine and a delightful meal in the dining room of Delaware Hall. The Paper Sessions got underway promptly after breakfast, and delegates were treated to a fascinating lecture on the mammoth "Canada-France-Hawaii Telescope," delivered by the London Centre's Honorary President, and Chairman of the University's Department of Astronomy, Dr. William Wehlau. Dr. Wehlau, who is Chairman of the Scientific Advisory Committee responsible for the CFHT, described how this instrument will benefit the study of astronomy in Canada, and gave an up-to-the-minute progress report on the status of the project. With Urania's blessing, the CFHT should be officially opened later in 1979. It is a matter of historical interest that Dr. Wehlau also delivered a paper at the 1964 General Assembly, titled "A Large Telescope for Canadian Astronomers" – fifteen years later the dreams he expressed have been realized.

The Paper Sessions proceeded apace, with an enviable variety of topics discussed. A group photo was taken, and then delegates were turned loose on the exhibition of the 1979 CanadaWide Science Fair, which was held coincidentally with the G.A. Later in the afternoon, busses transported the delegates to the Elginfield Observatory, where the Department of Astronomy once again played host. Accompanied by an impressive array of electronic and optical equipment for optimum effectiveness, the 1.2 m Ritchey-Chretien telescope was a memorable sight. Delegates toured the whole observatory and its facilities, with the University's faculty and graduate students on hand to answer questions. From there, the busses converged on D.B. Weldon Park in Arva, Ontario, where a steak barbecue dinner was served.

The Toronto Centre members asserted their superiority over their Ottawa counterparts in a game of softball. This game was followed by an unsuccessful effort, orchestrated by National 2nd Vice-President Frank Loehde, to build a six-layer human pyramid. After repeated attempts, only partial success could be claimed, although no one in the bottom level required hospitalization, and that might be considered success of a sort!

Unfortunately, an ominous bank of clouds rolled over just as the sun set, blanketting any plans for observing with the numerous telescopes which had been brought along. The busses returned to Delaware Hall much earlier than anticipated, and many members watched the hockey game on TV. Shortly after midnight, over 80 people gathered in a cramped residence lounge for the first annual (we hope!) song contest. Judged by Norm Sperling and Marie Fidler, this delightful event included gusty entries performed by members from the Kingston, London, Ottawa, Montreal and Winnipeg Centres. When the decision was announced, Owen Ash presented the "trophy" to Ron Sawyer of the London Centre, who was the soloist in the winning number, "The Australian Astronomer's Drinking Song." (The lyrics have appeared in the July issue of ASTRONOMY LONDON.) All in all, it was a beautiful evening and the song contest was one of the zany highlights of the Assembly.

The Paper Sessions continued on Sunday morning in the Lecture Theatre of Middlesex College, and the Society's Annual Meeting was held in the same room after lunch. The Annual Banquet was held in the evening, in the Great Hall. This luxuriously panelled chamber is decorated with crests and portraits of past Presidents of the University. The massive oak tables were set with silver candelabra and white candles. Following the dinner of Roast Duck à L'Orange, the delegates were formally welcomed to London by Mr. Cornforth, and to the University by the Chancellor Mr. J. Allyn Taylor. On behalf of all the diners, our National President Dr. John Percy thanked the London Centre for their efforts in organizing this dinner and, in fact, the entire Assembly.

The presentations following the dinner were very lengthy, but were eminently interesting. The comfortable chairs and the cool, breezy air-conditioning kept everyone alert in a situation which might otherwise have been soporific. For a unique combination of excitement and entertainment, only the Academy Awards ceremony can match an R.A.S.C. Annual Dinner!

Service Awards of the Society were presented to Rolland Noël de Tilly of the Centre D'Astronomie de Montreal and to Alf Scott of Toronto. The second Ken Chilton Memorial Prize was awarded to Warren Morrison of Peterborough, discoverer of Nova Cygni. And, for only the second time since 1959, the C. A. Chant Medal was given; the winner was Rolf Meier of Ottawa, whose comet searching program met with success early last spring. Furthermore, there was the first Simon Newcomb Award, which was won by William J. Calnen, a member of the Halifax Centre who, unfortunately, was unable to be present. As if all this weren't enough, awards of the 1979 R.A.S.C. Competition were also announced and presented. Then Roy Bishop stood to give a very special invitation regarding the 1980 Assembly.

It was already eleven p.m. when the Ruth J. Northcott Memorial Lecturer stepped to the podium. He was Dr. Gerard K. O'Neill of Princeton University, and his talk, well-illustrated with slides and film, discussed the concepts of living and working in space on a grand scale. Time may prove this to have been an historic lecture.

By Monday, many delegates already had to leave. Certainly no one wanted to miss being home on Tuesday, May 22, to vote in the Federal election; however, those who were able to remain for the holiday were offered a bus trip north of London to the shores of Lake Huron to see the Bruce Nuclear Power Development. After a chilly picnic lunch at Inverhuron Provincial Park under leaden skies, two busloads entered the B.N.P.D. site and were treated to films and a display in the Information Centre. Judging by the nature of the questions which were asked, the astronomers present certainly learned a great deal about the generation of electricity by nuclear power. The visit also included a walking tour deep into the interior of Bruce Generating Station "B", which is still in an early stage of construction.

If the General Assembly can ever be said to have had a specific ending, it came later that night when the delegates watched – via TV – the Montreal Canadiens win the Stanley Cup. It was a fitting finale, for just as the hockey team had completed a great four-year effort and been rewarded with victory, so, too was the London Centre rewarded for its teamwork in organizing this Assembly by the smiles and jubilation of the delegates as they left the Forest City. Certainly the Assembly Committee (Jill Carroll, Tom Glinos, Dale Armstrong, Mark Sinkins, Dianne Kapitaniuk, Leslynn Flegel, Steve Sharpe, Tom Steckner, Rick McCammon, Carl White and others) enjoyed hosting this event as much as the 192 official delegates enjoyed attending. Parting was a sad necessity, but there were promises all around that we would meet again over the Canada Day weekend in 1980, at the "Bluenose" Assembly in Halifax.

Editor's Note: Judging from all reports reaching this office the London committee are to be heartily congratulated on conducting a very fine, well organized program, and all delegates were very impressed with the weekend. We extend on their behalf heartfelt thanks from all members of the R.A.S.C., whether they were present in person or only present in spirit, as we all were.

B.F.S.

1979 Competition Roundup

by Walter K. Campney

Without a doubt the 1979 competition was a success. There were 42 entries that managed to make it to the competition, which is a definite improvement over previous years. As expected, this year was flooded with solar eclipse photographs. This of course provided the judges with quite a dilemma.

The Centre Display category also provided a problem, as half the displays were of the slide show type, and all of them were excellent. As was their prerogative, the judges decided to split the category into two areas.

In spite of the enthusiastic turnout we still had one empty category, which I know someone out there could have filled. (Section V (b), Solar Eclipse or Solar Activity, Visual, was not represented. Ed.)

The following is a list of the winners:

I*a* Centre Display (Audio Visual)
1st—Toronto Centre
2nd (Tied)—Kingston Centre
Edmonton Centre.

I*b* Centre Display (Other)
1st—London Centre
2nd—Toronto Centre
3rd—Halifax Centre

II Observational Equipment or Techniques
1st—Frank Roy Ottawa Centre

III Amateur Radio Astronomy
1st—Frank Roy, Ottawa Centre

IV Open
1st—Clive Gibbons, Halifax Centre
2nd (Tied)—Alan Dyer, Edmonton Centre
David Beale, Edmonton Centre

V*a* Solar Eclipse or Solar Activity, Photographic.
1st (All tied)—George Ball, Victoria Centre
André Paul, C. de A. Montréal
Ambrose Moore, Hamilton Centre

VI*a* Deep Sky Photographic
1st—André Paul (C. de A. de M.)
2nd—Mark Sinkins, London Centre
3rd—Alan Dyer, Edmonton Centre

VI*b* Deep Sky Visual
1st—Steven Sharpe, London Centre

VII*a* Solar System Photographic
1st (Tied)—Dave Belcher & Darrell Cross, Edmonton Centre

VII*b* Solar System Visual
1st—Robert Dick & Doug Welch, Ottawa Centre

The prizes are too numerous to mention individually, but the R.A.S.C. would like to thank the following for their indispensable contributions:

Astro Cards	Pachart Publishing
Astromedia Corporation	Roger W. Tuthill
Celestron International	Rudy E. Kokich
Edmund Scientific Company	Sky Publishing Company
Efstonscience Inc.	Tasco Optics
Eric J. Clinton	University of Toronto Press
Gall Publications	W. B. Saunders Company
Janus Publications	Woodstock Products

The assignment of prizes was solely at the discretion of the judges. We would like to encourage everyone to enter subsequent competitions; even if you don't win it is a worthwhile experience.

Manitoba College Leads Eclipse Expedition

By Harlan Creighton, Assistant Editor

During the winter of 1978, a group of instructors at Keewatin Community College, The Pas, Manitoba, secured approval from the College to offer through its evening school programme during February 1979 an opportunity for students, staff and local citizens to view the total eclipse of the sun on 26 February, 1979. Soon after approval was given, planning began for a small expedition to Arborg, Manitoba on the central line. Accommodation was reserved at two local motels, the Busy Beaver and the Stardust(!).

There were three phases to this project.

1. *Evening course*. The writer gave a series of three classes prior to the event. The classes covered such topics as how eclipses occur, their scientific importance, and what to look for. Special emphasis was put on how to observe a solar eclipse *safely*. A total of 29 persons registered for the evening sessions, making this the second most popular evening course offered this winter. Registrants came from college staff and students as well as the general public.

2. *Expedition*. Most of those who registered for the evening course, plus a few others, travelled to Arborg to see the eclipse. A package deal was offered consisting of transportation by chartered bus and accommodation.

3. *Experiments/Activities*. A highlight of the project was a number of scientific activities that were arranged by various college staff. Mrs. Marg Nikolychuk supervised a team of students who sought to time first, second, third and fourth contacts. Myles Donahue's team photographed both partial and total phases of the eclipse, while Andy Mahalek's group were recording changes in temperature, pressure and humidity. Another group worked with Jack Harmer to video-tape the event, while Richard Winiarz's crew attempted photometric observations. Finally, Esther Nikkel led a team to a nearby farm to observe the reactions of the animals to the event.

In spite of gloomy weather predictions right up to the morning of the event, we obtained a marvellous view of the entire spectacle. Only a thin veil of cirrus cloud was present. We were

joined by another member of the *Newsletter* staff. Dr. Paul Marmet, who just happened to be in the area along with two other Quebec Centre members. Also present were observers from the United States, Denmark, England, and Russia, as well as Manitoba.

All participants agreed that the expedition was not only enjoyable, but educational as well. Those who participated in the experiments learned a great deal from the exercise of planning, carrying out and analyzing the results. I might add, that careful planning and scrounging by the experiment co-ordinators kept the cost to the college to a minimum. Practice sessions prior to the event helped ensure the success of each experiment. Some excellent photographs were obtained, even by those photographers who had never operated a single lens reflex camera before joining the expedition. The College received a great deal of very favourable publicity in the local press, both before and after the eclipse.

It is hoped that this report will encourage others in the future to take advantage of the interest aroused by various natural events to teach students and the public about the world of nature.

In closing, I would like to acknowledge with sincere gratitude the assistance of those colleagues named above for their excellent work in connection with the project, as well as the efforts of Ms. Lois Britton, Director of Keewatin Community College; Mr. Grant Buchanan, Chairman of Community Education; and Mr. Terry Dartnell, Co-ordinator of Evening School Programmes. Special thanks are due to the Astronomy Department of the University of Manitoba, the Manitoba Planetarium, Roy Belfield of the Winnipeg Centre of the Society; Mr. Frank Shinn, editor of the *Newsletter*; and Mr. and Mrs. Alvin Faaren of the Busy Beaver Inn in Arborg, Manitoba.

National Council Approves Grants for Exchange of Speakers Between Centres.

The Minutes of National Council for 18 May, 1979 contain (Item 2.8, ref. item 12, 25/2/79) the report that the proposal submitted by Alan Dyer in the referenced item had been favorably received by the Finance Committee in that up to $1000. of the income earned per year from the "Paterson Fund" be made available to help defray the cost of travel for *exchange* of speakers between Centres where this was beyond the budgetary capability of the local Centres. The original proposal limited the granting of such to Centres more than 300 km apart. As of going to press we have not been informed whether this restriction to excess of 300 km was retained or modified. Centres expecting to invoke this facility should immediately contact National Office.

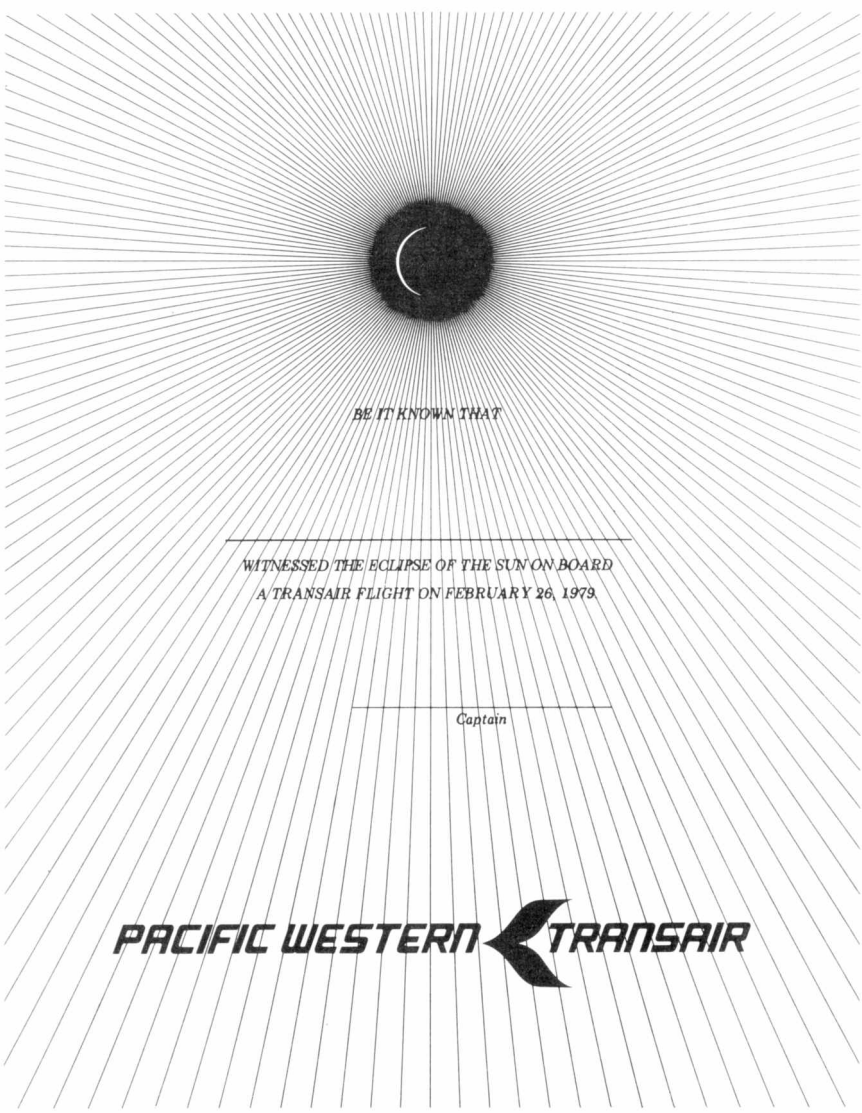
Centre secretaries should note that requests should reach National Office by *September 1st* each year, for the ensuing year.

Transair Passengers see Eclipse

Pacific Western – Transair, one of Canada's snappiest regional airlines, gave some of its passengers an unforgettable view of the recent total solar eclipse. Passengers on board flights in the air along the path of totality were supplied with proper viewing devices and instructions for their safe use. Aircraft were maneuvered to allow all passengers a view of totality. Afterwards, passengers were given a special certificate, signed by the pilot, to commemorate

their rendezvous on PWA-Transair with the moon's shadow. A copy of the certificate is reproduced below, courtesy of Mr. Gordon Camp, PWA-Transair manager at The Pas.

News reports prior to the eclipse stated that Air Canada and CP Air were planning to discourage passengers from viewing the eclipse from their aircraft, but at least one report (from a Saskatoon member) indicates that an Air Canada pilot maneuvered his plane to allow passengers a chance to see the totally eclipsed sun.



Abstracts of Papers Presented at London General Assembly

The Canada-France-Hawaii Telescope; an Opportunity for Canadian Astronomers.

**Dr. W. H. Wehlau, Chairman, Scientific Advisory Committee CFHT.,
Astronomy Department, University of Western Ontario,
London, Ontario, Canada. (invited Guest Lecturer)**

During 1979 the 3.6 meter telescope will be installed in the dome and the first observations will be made. The co-operation of Canada, France, and the University of Hawaii in achieving this has been successful and interesting before and after the agreements were signed in 1974.

The site on Mauna Kea, Hawaii, was chosen because of the excellent seeing, dark sky, clear nights and good transparency there. The telescope design provides for observations at coudé, Cassegrain, and prime foci. The telescope itself, ancillary equipment such as spectrographs and photometers and observing possibilities will he discussed.

The Ottawa Centre's Radio Telescope

**Ken Tapping, Vice President Ottawa Centre R.A.S.C.,
Chairman, Radio Telescope Group**

On October 21, 1978, the Ottawa Centre's radio telescope commenced operation at the Centre's Indian River Observatory. It uses two 45ft antennae separated by over 600 feet and is one of the largest amateur built radio telescopes in the world. It was constructed by a small group of centre members and has been in use for regular observing programmes since it opened. Radio emissions from the sun, radio galaxies, the Quasar 3C84 were successfully detected. The paper describes the construction and testing of the instrument.

Radio Observations of the February 1979 Solar Eclipse

**Ken Tapping vice President Ottawa Centre R.A.S.C.,
Chairman, Radio Telescope Group.**

Although Ottawa was clouded out on the day of the eclipse, the Ottawa Centre's radio observations went ahead without any difficulty. The project consists of two parts: firstly using the Centre's radio telescope at Indian River Observatory and one other amateur radio telescope, the variations were measured in solar radio waves during the eclipse; secondly studies were made of ionospheric changes during the eclipse. This was a joint venture with the Ottawa Amateur Radio Club. By monitoring the strength of several distant radio stations and by using a homemade ionospheric sounder, (a sort of radar system) the variations in the ionization levels in the upper atmosphere were monitored. This paper describes the observations and the conclusions drawn from them.

Nova Cygni 1978

Warren Morrison, Peterborough, Ontario

On the evening of September 9, 1978, the author came across a star in the constellation Cygnus which proved to be a nova discovered about two days before maximum. This paper describes the circumstances surrounding this discovery and traces the subsequent history of the nova. The art of nova hunting is then discussed with particular emphasis on the nova search programme of the American Association of Variable Star Observers.

Astronomy, Navigation and Nova Scotia in the Eighteenth Century.

Randall C. Brooks, Halifax Centre

Astronomy and navigation are intimately bound together in the eighteenth century history of Nova Scotia. The French and later the English went to great lengths to obtain good cartographic data for the region. The men directing these nautical surveys were capable, industrious and enterprising and were responsible for the establishment of three astronomical observatories. Two of these have been previously unrecognized in the astronomical history of Canada and one predates J.F.W. Des Barres' Castle Frederick Observatory of 1765 at upper Falmouth, N.S.

Project Zubenelgenubi 1978

Gerald Schieven, 1st Vice President, London Centre

In 1977 and again in 1978 an application was made by the London Centre R.A.S.C. to Young Canada Works for funds (approved for the summer of 1978) to run Project Zubenelgenubi 1978, a public awareness of astronomy programme. Seven people including: a project manager, two university students, and four high school students were hired for periods running between May 8 and September 8. Ten public and separate schools in London and Woodstock were visited with slide presentation, then displays, including boards, posters, telescopes etc. were brought to eight malls and two libraries, spending one week at each location, and also a weekend at Story Book Gardens in London. In the evenings telescopes were set up in parks throughout London for public observing. Over 3000 students and hundreds of other people were thus introduced to astronomy. The paper gives a report in greater depth.

The Construction of a Lensless Schmidt Camera
or
A Project without an Objective

Michael P. Edwards, Bedford, Nova Scotia.

In 1931 Bernhardt Voldemar Schmidt published a paper which described how a high resolution, deep space camera of small focal length and wide field could be constructed. It was calculated to provide images without coma. In spite of the revolutionary qualities of his camera, he was unable to find a buyer for his instrument. This paper discusses construction of a small lensless Schmidt camera, and shows the results obtained with it.

Very Small Computers Applied to Astronomy

J. Don Jones, Castlegar, British Columbia.

Description of the application of an SR-52 programmable calculator for:

1. Writing a short programme.
2. Repeating Shapley's location of the centre of the galaxy from location of globular clusters.
3. Determination of distance and size of stars from colour index, absolute and apparent magnitudes.
4. Investigations of stellar structure.

The paper shows how these calculations could be done using microcomputers as well, and how the depth and scope of the investigations could be extended.

Flamsteed's Mysterious Star, 3 Cas

Peter Broughton, Toronto Centre

The supernova which gave rise to the strong radio source Cas A is thought to have occurred in the last half of the seventeenth century, though apparently the supernova went unnoticed. Flamsteed's catalogue does include a fifth magnitude star, otherwise unknown, at a present position less than 0.3 degrees from the radio source. The star's position is based on angular distances to two stars which Flamsteed measured on August 16, 1680. One of these distances is consistent with 3 Cas being the star we now call AR Cas, but the other distance cannot be reconciled with any other known star. if this is a mistake, then it is the only one amongst all of Flamsteed's sextant observations, if it were an observation of Cas A, the error would be 6.5 minutes of arc; much larger than Flamsteed's mean observational error.

Exploring Planet Earth

Norman Sperling, Assistant Editor, *Sky & Telescope*
Cambridge Massachusetts U.S.A.

Over the past year Norman Sperling has acquired a number of spectacular Landsat pictures. Some of these were published in *Sky & Telescope* in November 1978 and February 1979, but most have never been shown or published anywhere. His talk paid particular attention to Canadian scenes, including some circular features which ought to be geologically investigated to see if they are astroblemes.

An Astronomy Programme for Young Children

David H. Levy, Amherstview, Ontario.

An unusual programme for teaching astronomy to young children was conducted at a large day camp near Montreal during the past three summers. Children from ages four to eleven were given their first major introduction to astronomy and related science in a relaxed, out-of-school milieu that included astronomical discussions, demonstrations, and observing sessions. One summer ended with an experiment that tested the youngsters' ability to observe a meteor shower.

RASCH Observations of Delta Cephei

Walter Zukauskas, Halifax Centre

During the autumn of 1979, Randall Brooks, Ron Burke, Rick Burton, Michael Edwards, Peter Edwards, Mike Gilhooly and Walter Zukauskas of the Halifax Centre R.A.S.C. (RASCH) observed Delta Cephei visually with the naked eye, binoculars, and small telescopes. The objectives of this programme were three:

1. To encourage the study of both variable stars, and of variable star observing techniques.
2. To assemble the observations into a light curve for the star observed.
3. To determine an epoch of maximum brightness and to compare this with the predicted maximum in a representative ephemeris.

The paper reviewed the programme and presented the results.

National Council News

by Harlan Creighton
National Recorder

The Society's National Council met during the recent General Assembly in London, Ontario, May 18–21. Following are a number of items that were dealt with by your Council.

Grant from Special Projects Fund

National Council awarded the Edmonton Centre a grant of $350 for use towards the construction costs of an astronomy display consisting of 18 panels suitable for use in shopping centres. The grant came from the interest on the $35,000 Special Projects Fund, established by National Council to provide grants and loans to Centres for worthwhile projects. Applications for grants or loans from the Fund must reach the National Office by May 1. Full details may be found in the Society's *Administrative Handbook* which has been distributed to all Centres.

Future General Assemblies

The 1980 General Assembly will be held jointly with the Canadian Astronomical Society from June 28 to July 1, 1980 and will be hosted by the Halifax Centre.

National Council also accepted the invitation of the Victoria Centre to host the 1981 General Assembly over the Victoria Day weekend.

1979 Canada Wide Science Fair Winner

Congratulations to 13-year old Brian Whittaker of Victoria, B.C. for winning the R.A.S.C. prize at the 1979 Canada Wide Science Fair held in London, Ontario May 14–19. The grade 7 student's project dealt with the sun.

1979 *OBSERVER'S HANDBOOK* SALE

National Council decided recently that any copies of the 1979 *HANDBOOK* remaining unsold at the National Office after October 1 may be purchased by members for $1.50 each while the supply lasts.

Editor of *Supplement* Appointed

National Secretary Norman Green was appointed Editor of the annual *Supplement to the Journal*. This publication contains the annual reports of the national officers and centres and is published in April each year.

Simon Newcomb Award

Congratulations to Mr. William J. Calnen of the Halifax Centre for his winning entry "Astronomy at King's College, Windsor, Nova Scotia". The Newcomb Award is intended to recognize literary ability among non-professional members of the Society and is given annually for articles relating to astronomy, astrophysics or space science. Details pertaining to the 1980 contest will appear in the October issue of the *Newsletter*.

Committees of National Council

National Council has a number of committees that were appointed at the General Assembly. These committees provide one means for members of the Society to become more active in its affairs. Following is a list of the Committees for this year, together with the address of the Chairman of each. Members are invited to contact the Chairman of any of these committees if they have any comments or suggestions, or if they wish to help with the committee's work.

1. **Executive Committee**. *Chairman*: Dr. John Percy, c/o R.A.S.C. National Office, 124 Merton Street, Toronto, Ontario M4S 2Z2 *Members*: Dr. I. Halliday, Mr. F. Loehde, Dr. L. Higgs, Rev. N. Green, Mrs. M. Fidler, Mr. H. Lee, and Mr. M. Watson.

2. **Editing Committee**. *Chairman*: Dr. L. Higgs, Herzberg Institute of Astrophysics, National Research Council of Canada, Ottawa, Ontario K1A 0R6. *Members*: Dr. A. Batten, Dr. J. D. Carett, Dr. D. P. Hube, Dr. R. Racine, Dr. M. Ovenden, Mr. F. Shinn, Mr. H. Creighton, Mr. T. Dickinson, Mr. R. Brooks and Mrs. M. Fidler (as assistant to the editor).
3. **Finance Committee**. *Chairman*: Mrs. M. Fidler, 23 Lyndale Drive, Willowdale, Ontario, M2N 2X9. Members: Mr. C. G. Clark, Mrs. A. Scott; plus advisors M. Altman and J. D. Fernie.
4. **Property Committee**. *Chairman*: Rev. Norman Green, c/o R.A.S.C. National Office. 124 Merton Street, Toronto, Ontario M45 2Z2. *Members*: Mrs. M. Fidler, Mr. C. G. Clark, Mr. R. P. Broughton, Miss K. Mules, Mr. M. Watson. Advisor: Miss R. Freeman.
5. **Library Committee**. *Chairman*: Mr. F. L. Troyer, 53 Woodlawn Ave. E., Toronto, Ontario. M4T 1B9 Members: Mr. H. Creighton, Mrs. C. Cresswell, Mr. N. Laffra, Dr. H. Hogg and Mr. I. McGregor.
6. **Historical Committee**. *Chairman*: Dr. Roy Bishop. Maktomkus Observatory, Avonport, Nova Scotia. B0P 1B0.
7. **Budget Committee**. *Chairman*: Mrs. M. Fidler, 23 Lyndale Dr., Willowdale, Ontario, M2N 2X9. *Members*: Dr. L. Higgs, Rev. N. Green, Advisors: M. Altman, R. Freeman.
8. **Awards Committee**. *Chairman*: Dr. A. H. Batten, Dominion Astrophysical Observatory, 5071 West Saanich, Victoria, B.C. V8X 3X3. *Members*: Dr. H. S. Hogg, Rev. N. Green, Mr. H. Creighton, Mr. B. F. Shinn.
9. ***NATIONAL NEWSLETTER*** Editorial Committee. *Chairman*: Mr. B. F. Shinn, box 32, Site 55, RR#l, Lantzville, B.C., V0R 2H0. *Members*: Mr. R. Chou, Mr. H. Creighton, Mr. W. Ireland, Mr. R. McDonald, Dr. J. D. Fernie, Dr. P. Marmet, Mr. I. MacGregor, Mr. D. Lemay, Mr. B. Matthews.
10. **Membership Committee**. *Chairman*: Mr. Peter Jedicke, Box 842, Station B, London, Ontario, N6A 4Z3. *Members*: Mr. R. Brooks, Mr. H. Creighton, Mr. D. Lemay, Mr. A. Dyer, Mr. S. Sundell, Capt. R. Auclair.

Windows in Space

To ground-based observers, the life-sustaining atmosphere around our planet can be most annoying when trying to observe planets and stars. Only a few kinds of electromagnetic radiation – primarily visible light and some radio waves – reach even the largest telescopes.

During the launch of Skylab in 1973 it was noted that the exhaust vapours from the giant Saturn rockets reacted chemically with the plasma (ionized gas) of the atmosphere and effectively made it disappear for approximately four hours.

Radio engineers at the Stamford Radio-Science Laboratory plan to study this "hole" phenomenon during the launch of space shuttle's Spacelab mission in 1982. The launching of the spacecraft may open a short-lived radio window on the universe, at a frequency which is normally closed by the plasma. Paul A. Bernhardt of Stamford University thinks "this could make possible use of ground-based radio telescopes to study a number of intriguing low frequency radio sources such as the Vela and Gum nebulae."

Sol III

From Edmonton *Stardust*

A group of astronomers have matched up the coordinates of a strong radio source known as PKS 0438-43 with a faint quasar formerly thought to be a galaxy in a cluster of galaxies. Using improved techniques in ascertaining a radio telescope's pointing direction and also employing other nearby radio sources as calibrators the astronomers were able to identify the radio source with its optical counterpart on a plate taken with the Schmidt telescope at the Anglo-Australian Observatory. The optical object was thought to be a galaxy until spectra

obtained at the AAO indicated a large, quasar-type redshift. This gives PKS 0438-43 the distinction of a high radio flux density and high redshift which when translated into actual distance means that the object radiates power at 10^{31} to 10^{40} joules per second (1 joule per second = 1 watt). The total radio luminosity is equivalent to the energy released by seven supernovae a day. Theory is hard put to explain such enormous radio energies combined with such comparatively feeble optical emissions.
(*New Scientist*, *vol. 81*, no. 1 143, p. 573)

Cleaning Aluminized Telescope Mirrors

By Fred Lossing
Ottawa Centre

During the last twenty years I have been aluminizing nearly all of the telescope mirrors produced by the local amateur telescope makers. A nominal charge of $1.00 per inch of diameter has been levied, which I turn over to the Observatory Fund. As of last month I have discontinued this service, partly because it continues to use up a lot of my free time, and partly because my vacuum bell-jar has reached the status of an antique. The danger that it will implode under the stress of the vacuum has increased with its age to the point where I am nervous every time I use it. Being sliced by flying shards of glass is a messy way to go. This means that the local amateurs will have to accustom themselves to paying two or three times as much for having this service performed elsewhere. (Contact Pierre Lemay for one possible solution to this problem.)

For this reason it becomes worthwhile to think about taking proper care of your mirrors, and to learn how to wash them easily and safely when they become dirty.

First, the preventive medicine. Keep your mirror in a reasonably dry place, with a reasonably constant temperature to prevent moisture condensing on the coating. Store your mirror in an unheated garage in winter; do not bring it from the cold into a warm room. Never close up the tube when the mirror is dewed up, but first evaporate the moisture film with a hairdryer, even though this is a tedious chore for a sleepy observer at 4 am.

Second, the remedial medicine. Wash your mirror once a year, or when it needs it. The one and only safe procedure is as follows: place the mirror face up in a plastic dish of larger diameter and cover the mirror to a depth of one-half inch or so with a solution of one or two teaspoonfuls of detergent in water. Tide, Cheer, Dreft, or even liquid detergents such as Ivory Liquid will do. Avoid strong chemical cleansers, bleaches, etc. Probably even shampoo would serve in a pinch. Float a small handful of clean absorbent cotton (about the size of a small peach) on the liquid. It will become waterlogged and sink until it rests lightly on the mirror. Slide the cotton ball gently back and forth, without pressure, until all parts of the mirror have been reached. Contrary to any other advice you may have heard, do not press down on the piece of cotton; allow the water to support most of its weight. Any extra pressure will surely leave sleeks, or even remove spots of coating, leaving a nasty scar. When the surface is reasonably clean, pour off the water, rinse it several times with clear water, and stand the mirror on edge to drain off water spots. (Careful!) If it does not dry spot-free, rinse it down with a few cupfulls of distilled water, (the kind used for electric irons). Distilled water will dry off without making spots.

Never touch the aluminum coating with anything; a camel hair brush will make sleeks, for instance. Some professionally coated mirrors are silica (quartz) overcoated. These can be cleaned with a wetted piece of cotton. Unless you are sure about the overcoating being present, play it safe and keep off the surface.

With proper care and occasional (annual) washing as above, a mirror coating can easily last 10 years or more with little or no deterioration. In fact, the coating becomes harder and more durable with time, as the aluminum surface reacts with oxygen to form a protective layer of aluminum oxide. Washing the mirror occasionally will actually lengthen its useful life, since it dissolves and removes the small specks of air-borne alkaline materials which stick to the surface and eat those nasty little holes everyone complains about.

The Directors' Director

By Dr. J. D. Fernie
Director of David Dunlap Observatory

Directorships, I find, are like new shoes. They take a good deal of wearing before they feel comfortable. In fact, over the past couple of months I've been feeling a bit like the princess in a recent comic strip. The first panel of the strip shows a frog sitting on a lily-pad and this beautiful princess walking past the pond. The frog says to her "I'm really a handsome prince turned into a frog by a wicked witch. If you kiss me we could live happily ever after." So the princess bends down and kisses him, and the final panel then shows two frogs sitting on the lily-pad, the first one saying laconically "How you liking it so far?"

Well, no, it's not all that bad. But the neophyte Director does tend to look around to see how others have handled the predicament, and what more shining example could one turn to than that Director among Directors, the seventh Astronomer Royal, George Biddell Airy.

Airy the child was without doubt father to the man. By the age of ten he was pronounced clever but thoroughly disliked by his fellows, and, as the *Dictionary of Scientific Biography* succinctly puts it, "even for the time and especially for his circumstances, a young snob." The time was around 1810, and the circumstances were Airy's being the son of a respectable but poor Excise Officer. In order to break out of thes circumstances Airy looked to history. You will recall that virtually the entire Copernican Revolution was engineered by uncles, and to this avenue the twelve-year-old Airy now turned. The *DSB* continues: "He recognized in his [educated and well-to-do] uncle, Arthur Biddell, an opportunity to escape what he considered unpromising surroundings, and secretly requested that he be removed from his family. Arthur Biddell almost literally kidnapped him, without any word to his parents, but because of financial difficulties ... the escape was not blocked. In later life Airy put great value on this connection, especially because of the resulting acquaintances ... who could help his career. It was through these that he was entered as sizar of Trinity College, Cambridge, in October 1819." (A sizar was a student who worked in the College for his living.)

Like many a talented man before him, Airy blossomed academically at Cambridge. "Although his own assessment of his abilities was immodestly high, it was nevertheless matched, albeit sometimes reluctantly, by his tutors and college friends." He would graduate as Senior Wrangler in 1823, "far outdistancing all the men of his year."

At Cambridge Airy began his life-long obsession with minutiae. He became absorbed in double-entry bookkeeping, and for the rest of his life literally every penny he ever spent was entered carefully in his books. No receipt, no memo, no jotting, no scrap of paper was ever thrown away, and they remain preserved to this day at Herstmonceux Castle. Justice de Morgan once said jokingly of Airy that if he wiped his pen on apiece of blotting paper he would carefully note on it the date and circumstances and then file it away. Incredibly, David Dewhirst at Cambridge recently found precisely such a piece of blotting paper, apparently stemming from Airy's days there. Eventually this obsession overcame Airy, and as an old man he would agonize over where his correspondence should be filed while paying scant attention to its contents.

After graduation it was mooted that Airy might become an assistant at the Greenwich Observatory and he travelled there to investigate the possibility. However, "when I found that succession to the post of Astronomer Royal was not considered as distinctly a consequence of it, I took it cooly and returned to Cambridge the next night."

For a while he remained an assistant tutor at Cambridge, until in 1826 he applied for and won the Lucasian professorship there. An interesting salary scale seems to have prevailed at Cambridge in those days, for Airy gave up his £150 a year tutorship for the £99 a year professorship! But Airy was not one to tolerate such a situation for long: in 1828 the more lucrative Plumian professorship fell vacant and "I made known that I was a candidate and nobody thought it worthwhile to oppose me. ... I told everybody that the salary (about £300) was not sufficient and drafted a manifesto to the University for an increase. ... The University had never before been taken by storm in such a manner and there was some commotion about it. ... I had no doubt of success." He was appointed Plumian Professor with a salary of £500.

In the early l830s John Pond had been Astronomer Royal for almost a quarter of a century, and although much good work had been done at Greenwich during his tenure he was now old and clearly losing his grip on the Observatory. The work was becoming sloppy, morale was low, the First Assistant chronically drunk, and Pond himself only appeared on the premises two or three times a month. By 1835 Pond had been pressured into retirement, and the Admiralty began a search for a new iron-fisted A.R. who would restore Greenwich to its former glory. Their collective eye very soon fell on George Biddell Airy.

Airy, of course, drove a hard bargain. The Astronomer Royal's salary would have to be increased from £600 to £800, the alcoholic First Assistant must be fired, as well as another assistant Airy disliked, and furthermore, Airy coolly informed the Admiralty, the Observatory would not do as much routine chronometer work for them as had been the case in the past. These terms were accepted, except for a refusal to get rid of the second assistant, by name Richardson. Airy coldly noted that he would have to guard against "the ill effects of [Richardson's] imperfect perception of honesty: arrangements in which I expect to have some trouble." Ten years later he was triumphantly if grimly announcing in his diary ... absent today at the Old Bailey before the Grand Jury, on the trial of Mr. Richardson for Wilful Murder of his incest child."

The staff of the Royal Observatory must very soon have been wishing themselves back in the salad days of John Pond. One senior assistant who took a short while off from his routine observing program to get measurements of a newly discovered comet found himself fired the next morning. Observers worked in four-day cycles: first day, 21 hours continuous duty on the transit circle; second day, three hours computing; third day, twelve hours computing followed by night duty on the altazimuth; fourth day, three hours computing. The cycle then immediately began again.

One of the assistants, writing after Airy's death, remarked that Airy's "regulation of his subordinates was despotic in the extreme ... and his treatment of the supernumary members of his staff would now probably he characterized as 'remorseless sweating'. The unfortunate boys who carried out the computations of the great lunar reductions were kept at their desks from eight in the morning till eight at night, without the slightest intermission, except an hour at midday." They were paid as little as £20 a year. And Airy could produce the full chill of Victorian morality. When one of his staff applied for an advance of wages because his wife and child were ill, Airy firmly refused him on the grounds that such advances were impermissible in principle.

The obsession with detail became overwhelming; regulations governed every task. On an occasion when some of the staff were to travel to the northern part of England to undertake geophysical measurements Airy personally "drew up instructions, telling them by what trains to travel, where to change, and so forth, with the same minuteness that one might for a child who was taking his first journey alone; and he himself packed up soap and towels with the instruments, lest his astronomers should find themselves in County Durham out of reach of these necessaries of civilization."

Everything had to be just so, orderliness everywhere. When Airy once happened on a roomful of empty boxes he himself devoted an entire afternoon to carefully labelling each box 'Empty'.

But Airy's ruthlessness was never confined to the precincts of the Royal Greenwich Observatory. I have already written at length in this column about his almost unbelievable role in the discovery of Neptune, wherein his ruthlessness was exceeded only by his imperturbability in the face of thundering criticism.

Nevertheless, there is much to Airy's credit too. An engineer *manqué*, he designed new instruments for Greenwich that would do solid work for a hundred years, and "the whole of the Observatory was full of his inventions – doors which shut by contrivances of his own, arrangements for holding papers, for making clocks go simultaneously, for arranging garden beds, for keeping planks from twisting ..." And whereas his predecessors had generally been remarkably lax in reducing observations and publishing results, Airy's reports were not only models of precision but were also produced very speedily. Simon Newcomb once remarked that if the entire nineteenth century record of astronomy should somehow be lost save for the Greenwich reports, it could all be reconstructed from them alone.

The cost, however, was high. Since no independent thought was ever tolerated at Greenwich in the 46 years of Airy's tenure as Astronomer Royal, no scientists were ever trained there and no great discoveries were ever made there. Worse than that, Airy passed on to his successors this terrifyingly rigid but super-efficient system which these less iron-willed men found convenient to retain. It would lake almost another century before the Greenwich Observatory re-appeared on the frontiers of astronomical research. The cost in personal feelings among his staff was high too, although no doubt not to Airy himself. The fact that none of them expressed the slightest regret at his retirement in 1881 probably troubled him not at all.

The first professor of engineering at Cambridge called Airy a "colossal-minded man, whose ideas seemed to be executed in granite." Perhaps, but I doubt he was the model Director even in Victorian times, let alone the late twentieth century. Still, you might just let me know your preferences in soap-brands – just in case.

From "*David Dunlap Doings*"
Vol. 11 No. 7, September 1978