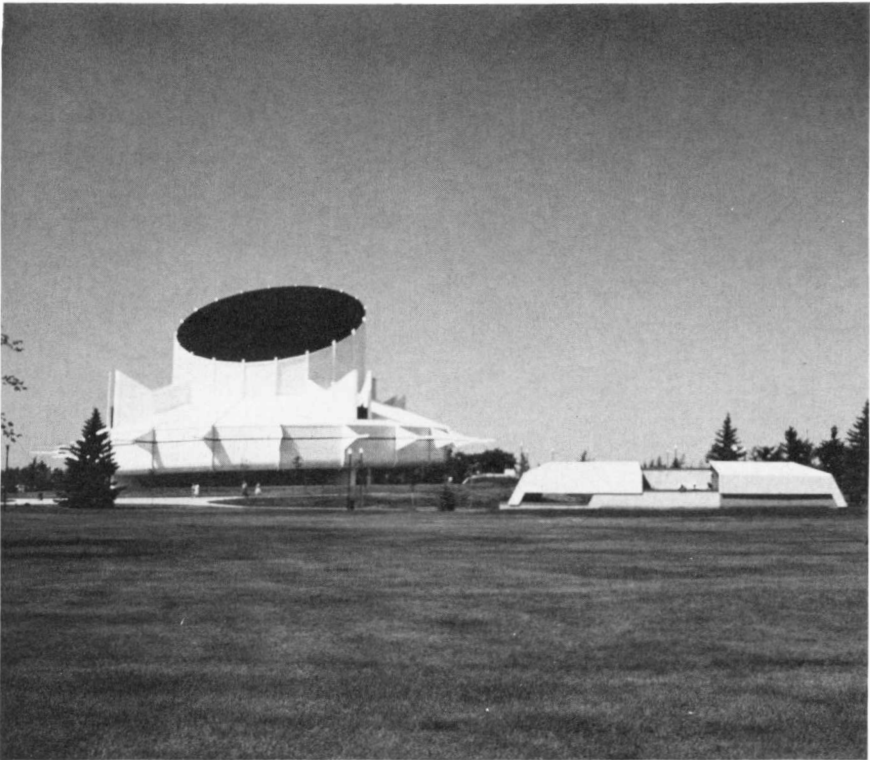


NATIONAL NEWSLETTER

April, 1985

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Visitors to this year's General Assembly at Edmonton will have their first chance to see the new Edmonton Space Sciences Centre at Coronation Park. To the right is the observing deck for telescopes. Information on the 1985 General Assembly is on page L32 of this issue.

Photo by F. Mooney, E.S.S.C.

NATIONAL NEWSLETTER

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Fifty Years of Public Viewing Notes on a 12-inch Cassegrain on Mount Wilson

**by David H. Levy
Kingston Centre**

In 1932, the Western Hemisphere was suffering through its worst depression, Franklin Roosevelt was preparing for his first campaign for President, Los Angeles was a city whose lights were beginning to cause problems for astronomers, and the Mount Wilson Hotel was installing a 12-inch Cassegrain reflector. While a comparison of these three events may seem incongruous, the last seems in retrospect to be a lonely note of optimism, and an admission that while the planet changes, the stars that shine on it do not. Built by Tinsley, possibly his largest instrument up to that time, the telescope was bought by the hotel for its public viewing nights.

Even on Mount Wilson, the event is almost lost in the records of that special mountain that began when James H. Holmes bought three square miles of the Sierra Madre Mountains during the 1880s for some \$3 per acre. When the Mount Wilson observatory site was leased to the Carnegie Institute (for 99 years for the sum of one dollar) early this century, the lease reflected an already present and growing concern about light pollution: no outside lights stronger than 60 watts would be permitted within view of the observatory.

The Mount Wilson Hotel had an ambitious astronomical programme, of which the telescope was but a part. Astronomical exhibits and nightly lectures were to be given, according to a contemporary advertisement, "in the hall of the Hotel, when sufficient number of persons are present; at the 12-inch telescope when number is small." The nightly observing sessions were also advertised: "Every night,

when the sky is clear, the 12-inch telescope, located at the Hotel, is open to the public for observation of interesting objects in the sky.”

The Tinsley telescope was installed during the summer of 1932. Since Mr. Tinsley was more of a telescope builder than an observer, he needed assistance in setting up the instrument. Horace W. Babcock, then an assistant at the Mount Wilson Observatory, aligned the polar axis and helped with other adjustments. The tube and pedestal were mounted in what is now one of the parking lots, in full closeup view of the two solar tower telescopes.

The twelve-inch Tinsley may have been useful for public viewing, but its mirror was not perfect. Dr. Babcock noticed the mirror's defects in 1932, but for its intended purpose of education, the mirror would do well, and no attempt was ever made to refigure it.

As a public telescope on a mountain top so close to Los Angeles, this instrument provided hikers, vacationers, and the astronomically curious a chance to see the heavens from a good site. The Mount Wilson Hotel was a popular retreat, and its telescope, along with the far more impressive 60-inch, were the only instruments that offered regular visitor's nights. Obviously, the smaller instrument, with shorter lines and more observing time, had the opportunity to provide a healthy first look at the sky for many people. According to advertising literature, all the astronomical events at the Hotel were “free to all” although the Hotel minutes occasionally listed modest income from the telescope. A booklet published in the mid-thirties shows the twelve-inch as well as the sixty-inch with visitors in queue for celestial viewing.

After James Holmes' death, the “hotel resort” was operated by his daughter and son-in-law, Angie and Albert Childs, who, according to Henry Schaefer “did a beautiful job of entertaining his audience.” In 1954 Henry Schaefer accepted the responsibility to show objects through the telescope on public viewing nights. By now, Childs had lost his earlier enthusiasm and suggested that Mr. Schaefer take over. Now the observing was different. Each person was encouraged to take a leisurely, intense look at what this telescope had to show. A night of observing with what seemed like a large telescope at the site of the world's most important observatory must have been an inspiring thrill for those who made the trip to the Mount Wilson Hotel, and under the direction of a guide who knew his material, the visitors would have had the added pleasure of learning about what they saw.

For Henry Schaefer, the hours, the nights, and the several years at the 12-inch were happy ones. “Many a night when both the sky and the valley below were clear I would have difficulty closing off the programme, which was supposed to quit at ten o'clock. I met many people, all kinds, from the cynical to the wildly appreciative. “There were many children who would envy the telescope operator and his magnificent instrument. One child insisted on having a telescope for his very own, until Schaefer hung his pair of binoculars around the boy's neck: “Dad,” the astounded child exclaimed, “get me some binoculars like this and we can forget the telescope for a while.” Another child, a five-year-old, was so excited she couldn't stop talking. “It seems,” the sage operator admonished, “that we both have a lot to say, so I'll wait until you're through.” After a minute of awed silence, her six-year-old brother spoke up: “She's through!”

For several years, until he accepted a position as night assistant at Mount Wilson Observatory, Henry Schaefer ran these happy and productive visitors' nights.

Shortly after Metromedia bought the hotel around 1965, the building was torn down. Schaefer recalls that “with no one to operate the 12-inch telescope, they dismantled it, putting the tube in Channe 11's garage, and took a bulldozer to the pedestal, ripped it off the ground and dumped it in the lower parking lot intending to toss it over into the canyon south of the grounds. When we got word of what was happening, we at the observatory took our skip loader and moved the pedestal into the 100-inch telescope dome where it remained for more than a year.”

At the beginning of 1967, Robert Watters acquired the telescope, and moved with it to Arizona that spring. During the ensuing decade it alternated between two owners and several locations. In the spring of 1978 the instrument was mounted in Patagonia, Arizona, and some thought was given to donating it to a local elementary school. But the years of wear, storage, and moving had shown too well on the telescope, and a good deal of work would be required to get the telescope into acceptable condition for any educational purpose. In October 1979, I acquired the telescope, and on November 20 of that year, it saw starlight once more.

On the night of July 5/6, 1982, I gave a party to celebrate the fiftieth anniversary of this unique telescope. Now named in honour of Leslie C. Peltier, one of the century's greatest observers, the

Tinsley Cassegrain stands in my observing yard south of Tucson. It looks from a planet considerably changed since 1932, whose young children may now have grandchildren who also want to look through a telescope. Although it has been painted, the instrument still needs considerable renovation before an observer could do useful work with it, but in the meantime, it is doing what it does best, showing off the sky for a new generation of young astronomers.

Acknowledgements: Although this telescope has had a long history, I found it difficult to obtain much solid information about it. Henry Schaefer's letters about his years with the telescope were extremely helpful and a pleasure to read. I thank Dr. Horace W. Babcock for his insight into the early years of the telescope, Larry Bornhurst of Steward Observatory for his suggestions, and Robert Watters, Victory Stryker, the Pasadena Historical Society, and the Mount Wilson Observatory Association for their assistance.

*Jarnac Observatory
Tucson, Arizona*

International Astronomy Day April 27, 1985

**by Leo Enright
Astronomy Day Coordinator**

For the ninth year in a row thousands of amateur and professional astronomers will be celebrating a special day this year to share with the public their interest in the fascinating science of astronomy. The date will be Saturday, April 27th, 1985 and it will be an occasion for many kinds of popular events.

All of the Centres of the Society are urged to participate this year, when interest in astronomy, in general, is higher than usual because of the imminent appearance of Halley's Comet in amateur telescopes. Many centres will use International Astronomy Day this year to present correct and realistic information about the comet and other topics, and not leave that task to those who hope only to profit from the public interest and who know little about the event itself. As in the past, Centres will be setting up displays at shopping malls, hosting "open houses" at observatories and planetaria, and organizing public star nights. It is hoped that other kinds of activities – some perhaps new and quite different – will be undertaken by some of the Centres.

A detailed information package with specific suggestions for planning observations and other activities has been sent out to the president and secretary of each Centre. Included in the package is a 'Media Release' form which may be used as a way of informing the local media of the Centre's planned events. In return, reports of each Centre's activities should be sent to the National Office so that accounts may be published and ideas may be shared.

With proper planning, International Astronomy Day can be a memorable event in each Centre's calendar and an excellent way of promoting our interest in the wonders of the sky.

Spring and Summer Events, 1985

The Halifax Centre and the Lunenburg County Astronomy Club will hold a joint meeting on 18 May 1985 at the Desbrisay Museum, Bridgeport, N.S. to view the travelling display "Meteorites". The display includes 11 meteorites and several casts, shatter cones and other artifacts. It was created by the Provincial Museum of Alberta, and is touring the country as part of the National Museums Programme. "Meteorites" recently ended its stay at the Royal Ontario Museum in Toronto, and will be at the Desbrisay Museum during May and June.

The 97th Annual Meeting of the Astronomical Society of the Pacific will be held at the Northern Arizona University, Flagstaff, Arizona. Highlights of the meeting include a symposium on "new Directions in Asteroid and Comet Research," a workshop for teaching astronomy in high school and

college, a session on history of astronomy, lectures on recent developments in astronomy, and tours of Meteor Crater, the Lowell Observatory and the Grand Canyon. First 1985 observations of Comet Halley are also expected to be presented. Registration information can be obtained from Summer Meetings, A.S.P., 1290 24th Ave., San Francisco, CA 94122, U.S.A.

Plan to attend the R.A.S.C. General Assembly in Edmonton between 28 June and 1 July 1985. Information can be found elsewhere in this issue.

This year's International Astronomical Youth Camp (IAYC) will be held from 1 to 21 August in Crni vrh near Ljubljana, Yugoslavia. Amateur astronomers between the ages of 16 and 24 will discuss variable stars, satellites, optics, minor planets, meteors and stars and stellar systems. This year's programme is being organized by the Astronomsko Drustvo Javornik of Yugoslavia. Registration for the camp is DM500 plus travel costs, and is limited to 70 participants. The working language is English. For more information write to IAYC Workshop Astronomy e.V., Postfach 2044, D-6750 Kaiserslautern, Federal Republic of Germany.

Between 9 and 16 August a convention for young amateur astronomers will be held at the Preston Montford Field Centre, Shropshire, England. The main topic will be the Perseid meteor shower. Cost of registration is £80. Write for information to Anne Barrowcliffe, 111 Millhouses Lane, Sheffield, S. Yorkshire S7 2HD, England.

Starfest '85 will be held at the River Place Campground, 8 miles north of Mount Forest, Ontario, from 9 to 11 August. This is the fourth annual observing convention/camping weekend of the North York Astronomical Association. The programme includes observing sessions, slide presentations, workshops and a "Twilight Talk". For information write to Starfest '85, c/o Andreas Gada, 701-145 St. George Street, Toronto, Ontario. M5R 2M1.

The Vancouver Centre's Mt. Kobau star party is tentatively scheduled for August 15-18. Last year's event had 70 people present as well as two 20-inch and several 16- and 17-inch telescopes in addition to clear skies.

Canada's Astronaut Debuts

by Muriel Enock
Victoria Centre

Marc Garneau, our first operational astronaut, and his back-up Dr Robert Thirsk, spent most of November 19, 1984 at the University of Victoria. The next day, they went to Canadian Forces Base Esquimalt and Royal Roads Military College; Commander Garneau is a graduate of Royal Military College, Kingston. Victoria was only the third stop (after their home towns of Ottawa and Montreal) on their cross-country tour to bring Space to the People courtesy of the National Research Council of Canada.

That Monday, more than a thousand school children packed the University Auditorium in the afternoon, and a similar number of university students and general public attended the later presentation. In the evening, Bob Thirsk narrated the film made of their astronaut training, and then Marc Garneau gave a commentary on a movie taken from the shuttle, including shots taken through the window (port ?) as they took off and whizzed through the cloud cover. After questions from the audience, University of Victoria commemorative cups were presented to the astronauts, and they reciprocated by donating a display to the University.

About 150 physics and other students attended a dinner in the main cafeteria, where Garneau went to each table and chatted for five minutes or so. Brian Whittaker, at the first table, used this as a 'photo opportunity', and group photographs were also taken at each table. Following each of these events, Garneau autographed official photos, until they ran out; then he continued to autograph whatever his fans found for him to sign. Some lined up more than half an hour for this chance.

Forty-three hundred applicants for the astronaut job had been reduced to 68 for interviews last year; 19 were short-listed and six chosen for training: two engineers, two physicians, a physicist and a physiologist. Garneau himself, a career naval officer, is the design authority for all naval communications and electronic-warfare equipment and systems, based in Ottawa. Bob Thirsk is an

engineer turned physician in family practice at a Montreal clinic. Ken Money, the physiologist, has already been involved (at ground control) in space-adaptation experiments on earlier shuttles. That is one of the Canadian areas of concentration in space research. The other is development of a space-vision system for the next generation Canadarm. A light source, video cameras and computers are to be combined to improve the mechanical arm's ability to capture and berth large satellites by calculating their exact position without direct visual observation.

Last year, on shuttle mission 41-G, Marc Garneau did eight other experiments too:

- measurement of the deterioration in space of various nonmetallic composite materials;
- measurement of the glow on and from the shuttle, which might affect the 1988 flight of a wide-angle Michelson Doppler imaging interferometer;
- calibration of the Sunphotometer used by our Atmospheric Environment Service (“the weather office”) to measure constituents of the atmosphere;
- measurement of the reflex of the eyes that enables them to fix on one spot, and the amount of image slip that occurs in weightlessness;
- study of the onset of space motion sickness and the effectiveness of various treatments;
- measurement of the deterioration of sensory function in space, particularly of the skin;
- comparison of illusions of floor motion in weightlessness with those experienced on return to earth;
- study of changes in taste and smell which occur in space flight, for later comparison with those sensed when on the ground.

Back in late 1983, Marc Garneau had chosen to give his oral presentation to the astronaut selection board on the role of the hero in Canadian society. All the reports received on the astronauts' Victoria visit have demonstrated that the thought Garneau gave to the subject had served him well. He and Bob Thirsk were happy and relaxed, obviously keen for us all to understand and support the Canadian Astronaut Program, and feeling strongly that it is worthwhile, and necessary for our national maturity.

Thanks to National Research Council's *Apogee* and to Brian Whittaker for assistance.

Reprinted from *Skynews Victoria*

The Application of Standard Time to Railways (Part II)

by **Omer Lavallée**
Corporate Historian and Archivist,
Canadian Pacific Limited, Montreal

Editor's Note: Part I of this paper presented at last year's General Assembly in Hamilton appeared in the February 1985 *National Newsletter*. In Part I Mr. Lavallée outlined the state of time-keeping prior to the introduction of standard time. For railways the major factors requiring the introduction of a standard time system was the invention of the electric telegraph and its adoption by the railways. Instantaneous long-distance communication brought to a focus the fact that different cities had different local times and the many railroads in operation each operated on their own time standard opening the way for mass confusion in train scheduling. In Part II a solution is sought and found to the problem. Last year also marked the 100th anniversary of the adoption of Standard Time.

Not surprisingly, the British were the first to avail themselves of a standard railway time system when, in 1852, signals from the Royal Observatory at Greenwich were adopted for this purpose. North America was quite another matter. For one thing, the area to be covered was much more widespread than the United Kingdom. Some state legislatures in the U.S.A. tried setting a single standard for a state as a whole but this was not completely successful. In the 1870s, for instance, Connecticut provided that New Haven Time, supplied daily by telegraph from the astronomical observatory at Yale University, should be used exclusively throughout the state. No provisions were made for non-compliance, however, and communities in the southwestern part of the state adopted the time of the city of New York, which was nearby and much more widely used. The early role of the universities in this movement is apparent from the fact that Harvard University provided Boston Time by telegraph on a daily basis. The result was that most northern New England communities used the time of the “Hub City”.

However, the whole problem at this stage was regarded simply as one involving railway operations and connections, and it was left to railway managers themselves to solve. Some standardization was effected, and on the eve of the adoption of Standard Time on North American Railways in 1883, a mere forty-nine local standards were used by 316 railway companies. Considering the possibilities, this was remarkably few.

In the interval, some proposals had been advocated. Charles F. Dowd of Saratoga Springs, NY, published a plan in 1870 which advocated a single standard of time for all railways in North America based on a New York or Washington meridian. This standard would only be used by the railways themselves, each community retaining its own time for public purposes. Thus, a traveller would have to contend with only two times in any given community, the community's time and standard railway time. However, considering that the continental United States extended over about 230 minutes of longitude, the three-hour difference in time which western railroads would experience as compared with the West Coast communities they served was deemed impractical. Dowd was persuaded to modify his plan in 1872 by incorporating four different time zones, each differing by one hour from its neighbour. Interestingly, he selected Washington, DC, at 77 degrees west longitude, for his principal meridian and the center for the time zone extending from easternmost Maine to the 85th meridian. The remaining zones, lying between the 85th, 100th and 115th meridians, were designated "First Hour", "Second Hour" and "Third Hour", meaning that these factors were to be added to Washington Time. In spite of the fact that Dowd subsequently coordinated his zones with those of the prime meridian at Greenwich, his proposal was rejected by the railway time conventions.

In 1876, Canada's Sandford Fleming brought his awesome intellectual powers to bear on the problem. It was typical of the man that he should seek a solution on a world, rather than a local, basis. He assembled his proposals into a privately-printed pamphlet on the subject of what he called "Terrestrial Time". In it, he proposed that the 360 degrees of the earth's circumference, divided into twenty-four parts, each fifteen degrees wide, should be designated by a letter of the alphabet. The time in each zone would vary by one hour from that of the adjacent zone. In view of then-current objections from rival localities, including Paris, for the honor of possessing the prime meridian, Fleming proposed that the Greenwich anti-meridian, at 180 degrees, should be designated as the prime meridian. Its location in the middle of the Pacific Ocean avoided land masses, and hence would be politically neutral. Obviously Fleming had not thought of the concomitant difficulty of the International Date Line passing through Greenwich!

In subsequent years, despite his many other involvements, Fleming wrote and lectured frequently on this subject. As Engineer-in-Chief of the Intercolonial Railway, situated in the Maritime provinces, he decided the argument as to whether Halifax or Saint John Time should govern the railway's operations by designating the time of the 60th meridian as its standard. In this way, what is known today as "Atlantic Time" was originally introduced as "Intercolonial Time", a term some rural localities in the Maritimes continued to use until not many years ago.

As far as North American railways are concerned, the solution was presented to the General Time Convention sitting in Washington, DC in April 1883, by its own Secretary, William F. Allen (1846–1915), an engineer by profession. Allen proposed that the railways adopt the appropriate of each of four zones, called Eastern, Central, Mountain and Pacific, centered on the 60th, 75th, 90th, 105th and 120th meridians. As far as Canada was concerned, the proposal was consistent with Fleming's advocacy of 60th meridian time for the Intercolonial Railway and thus, in this country, a fifth time zone was added, the one that is known today as the Atlantic Time Zone. The proposal was adopted unanimously, and Allen spent the summer of 1883 meeting with officers and securing the support of the managers of nearly two-thirds of the total railway mileage of North America at that time.

The date selected for the changeover, November 18th, was a Sunday, the day of the week with the least number of train movements. The change came about without problems, and that day came to be known as the "Day of Two Noons", because in the eastern part of each new zone, clocks would indicate noon on the old basis, then be changed back to noon again on the standard zone basis.

In an era when railroad tycoons dominated – and sometimes abused – the business world, the press took up the cudgel on behalf of the public. "The sun is no longer boss on the job," commented a New York daily, "People ... must eat, sleep and work as well as travel by railroad time. It is a revolt, a rebellion. The sun will be requested to rise and set by railroad time. The planets must, in the future, make their circuits by such timetables as railway magnates arrange.

"People will have to marry by railroad time and die by railroad time – banks will open and close by

railroad time ... We presume the sun, moon and stars will make an attempt to ignore the order of the Railroad Convention, but they, too, will have to give in at last.”

The *New York Herald* took it in a more lighthearted vein. “Every old maid in Beacon Hill in Boston, will rejoice tonight to discover that she is younger by almost sixteen minutes.”

While Allen’s proposal had been designed primarily for the railways, he had expressed the hope that “local time (of the cities) would be practically abolished”. In this respect he was successful, as the cities of Boston and New York were among those who immediately accepted the time zone system. Other communities followed their lead in short order. However, it was not until 1918 that the United States government first introduced legislation to adopt a set of Standard Time Zones. Interestingly, this came about as a result of the increasing popularity of daylight saving time in the summer months.

The ever-increasing expansion of our capacity to travel quickly, and the diminishing time-distance relationships of the space age have brought about a further step in time measurement using something called “Coordinated Universal Time”. I’m not sure that the word “universal” is appropriate in this application. It seems to me that at some stage, we are going to find ourselves in contact with superior cultures in other solar systems, who will look upon any standard which we use as a mere local time, and impose some truly “universal” time on us. I hope that all of you astronomers will keep your telescopes on the universe and try to give the rest of us a little advance warning so that we can change our habits.

As for we railroaders, I hope that these changes don’t come too soon as I have developed a real affinity for my standard watch – collection! But now I must conclude because I’ve run out of time – standard time.

R.A.S.C. National Archives

For many years, the National Library of the R.A.S.C. has maintained a collection of slides and photographs which depict members and astronomical facilities of various centres. This archive has great historical value, especially for researchers interested in the history of astronomy in Canada, and of the Society itself. In recent years the practice of providing archival material has fallen off. The National Librarian, Phil Mozel, has requested that Centres and members revive the custom of sending duplicate photos or slides of noteworthy members or events, and of members’ and Centres’ equipment to the Society archives. Members wishing to contribute archival material should contact Phil Mozel, National Librarian, R.A.S.C., 136 Dupont Street, Toronto, Ontario MSR 1V2. Your help in preserving the history of the Society will be greatly appreciated.

R.A.S.C. Computer Network

At the 1984 General Assembly, Council established a Committee to study the possibility of establishing a microcomputer network which would link all Centres with the National Office. The Committee, under Past President Franklin Loehde, recently reported to Council that such a network can be established at minimal cost, and would be useful for rapid communications between Centres and with National Office. In order for this electronic network to become a reality, Council has asked for a list of members who would be willing to participate in the project.

If you are interested in joining the R.A.S.C. microcomputer network, please send the following information: name, address, telephone, computer make and model, and if available, modem make and baud rate, and printer make. Ideas on uses for the network are also welcome. Technical details will be sent to respondents after the General Assembly. Please write to:

Mr. Franklin C. Loehde, Chairman,
R.A.S.C. Computer Utilisation Committee,
11107 63 Street,
Edmonton, Alberta,
TSW 4E3

Science on Ice: Astronomy at the South Pole

by Steven Morris
Calgary Centre

The Amundsen-Scott South Pole Station is a busy place during the four months of austral summer. Planes land almost daily, construction work must be completed, and in a steady flow, scientists and other visitors stream in, complete their tasks, and stream out again. However, in early February this bustle ceases abruptly, as the last plane leaves and the winter-over begins. Only nineteen people remain to keep the station running and the scientific equipment in working order. Many of the science projects, summer and winter, are connected with astronomy, and they provide an interesting view of the work that is possible here.

Dr. Martin Pomerantz of the University of Delaware is conducting several experiments in submillimetre (infrared) astronomy, mapping galactic emissions, studying the dust emission of nearby spiral galaxies, and the fluctuations of the cosmological background radiation. His conclusion about the site: "The South Pole is ten times better than the world's best infrared observatory – Mauna Kea", due to the cold temperatures, high altitude and resulting low water content in the air. He is also collaborating with a team of French scientists, studying solar seismology by careful radial-velocity measurements of the solar disk. The long-period oscillations of the Sun's surface provide crucial information about the solar interior, but these oscillations are very complex and require long periods of continuous observation. The experiment has already provided 6.5 days of essentially uninterrupted data, setting a new record. The almost constant altitude of the Sun adds to the stability of the measurements. Dr. Robin Stebbins of the Sacramento Peak Observatory is also studying the Sun's oscillations by analyzing the solar limb-darkening for brightness variations. When fully reduced, both sets of data will provide valuable information about the Sun's internal rotation and physical processes.

There are many experiments on station to study the magnetosphere and upper atmosphere. Charged particles from the Sun can spiral into the atmosphere through the boundary between the Earth's open and closed magnetic field lines, called the polar cusp. The cusp rotates into a position above the South Pole every day, and data are routinely collected that provide information on the behaviour of this region and the particles in it. Fluctuations in the galactic cosmic rays that reach the South Pole are also studied to provide information about the solar wind and its effect on Earth.

Several experiments collected data studying the Earth as a planet. The South Pole has some of the least polluted air anywhere in the world, and long-term measurements of its constituents will tell us how the atmosphere is changing. Ice cores have also provided a history of the South Pole climate and atmosphere. My own research at UCLA involves measuring the long-period tides and planet-wide oscillations. The twelve-hour tide visible elsewhere on the Earth gives valuable information about our planet's rigidity, but these tides are so large that they mask the longer-period tidal oscillations. The twelve-hour Earth tide is effectively absent at the Pole because the Earth's rotation does not move us towards and away from the Moon and Sun, and so the Earth's response to the two-week and monthly tides is clearly visible on the gravity meters here. After a large earthquake the Earth rings like a bell, and the studies of these free oscillations with periods of several hours can also be done at the South Pole without interference created by the twelve-hour tide.

Some experiments will study the Aurora Australis during the winter and Dr. William Cassidy of the University of Pittsburgh will collect samples of airborne submicroscopic cosmic dust, as the polar plateau is uniquely situated for dust sampling of these particles. I will take part in an experiment to test the South Pole astronomical observing conditions, if I can get my hands on the equipment necessary. Deep-sky astronomy is unfortunately under-represented among the South Pole projects, but this could change in future years if favourable seeing and cloud cover can be demonstrated.

Finally, the South Pole Station has one last rather surprising contribution to make to the space sciences. During the summer, the station functions as an ordinary scientific outpost. The weather is no worse than an ordinary Calgary winter, and there is a large population and good communication with the outside world. The hardships that do exist are offset by many novelties, such as cooling your drinks during the Christmas party with 3,000-year-old ice from a damaged ice core. But during the

eight-month winter, the station becomes an 'Earth-bound spaceship', with no new faces, and no possibility of returning to family and friends. Winter-overs are asked to undergo testing before and after their Antarctic experience, and the information may help understand how humans react to the unusual and constrained conditions that will characterize space travel for many years.

Editor's Note: Dr. Steven Morris is presently serving as Station Scientific Leader of the South Pole Station. He is indisputably the most southerly located member of the R.A.S.C.

Totality in Hula

**by Randy Attwood
Toronto Centre**

During the past six years, it has been the custom for several Toronto Centre members to travel far from home to witness total eclipses of the sun. Totality was observed in Manitoba (1979), Kenya (1980), Siberia (1981), Indonesia (1983) and near totality last May in North Carolina. Expeditions to Quebec in 1972 and the Atlantic Ocean off the west coast of Africa in 1973 were also made to glimpse a few minutes of totality. The latest trip was in November when five Toronto Centre members observed 52 seconds of totality from the village of Hula in Papua New Guinea (PNG).

Betty Robinson, Robert May, Anne Waterhouse, Michael Watson and I, along with Dianne Caldwell, arrived in Hula two days before the eclipse. Hula is 110 km east of the capital of PNG, Port Moresby. In Port Moresby, we met Ben Mayer, an accomplished amateur astronomer from California, as well as Jay Pasachoff, an American astronomer famous for his observations of solar eclipses. Discussion was the same here as it has been for past eclipses – what would the weather be like? and the answer was the same – we would have to wait and see.

We were concerned that the drive to Hula along the bumpy dusty road would ruin our optics. Fortunately, the passengers and equipment survived. There are no hotels, electricity or running water in Hula; we had to bring everything. It was really a two-day camping trip just south of the equator 14,000 km from home. We were the guests of the schoolmaster Henry Arisa and his wife Paula. They made us feel at home and allowed us to camp in the schoolyard. In exchange for their hospitality, Michael and I instructed the 300 students on the proper way to observe the eclipse safely.

The night before the eclipse was incredible – we saw our first clear views of the Magellanic Clouds, Omega Centauri, Eta Carinae, 47 Tucanae, the zodiacal light and several other southern sky objects. So clear was the night that Venus cast a shadow! Then, about three hours before the eclipse started, several buses arrived from Port Moresby with more eclipse chasers.

The few clouds that appeared at sunrise disappeared by first contact at 6:22. We set up our equipment on an outdoor basketball court which was protected from onshore breezes from the Coral Sea. Nearby, the other 200 or so observers from United States, Japan, Great Britain and Switzerland prepared for totality.

During this time, the schoolchildren viewed the partial phases through our welder's glass as well as pinhole cameras which they had made themselves. As totality approached, the sky brightness waned although the dry, intense heat from the rising sun did not decrease noticeably. With about a minute to go before totality at 7:22, Betty and I saw shadow bands on a white pillowcase we had brought just for this observation. Although faint, they were quite distinct and the rippling shadows could be seen moving across the ground. The sky brightness dropped right off as the last beads of sunlight were covered by the moon, revealing a spectacular corona and about a dozen beautiful prominences. Totality had begun.

Like a beautiful sunset, an intense aurora, a rocket launch or a double rainbow, the majesty of a total solar eclipse is difficult to describe. The corona on November 23, 1984 was violently misshapen. Coronal streamers were visible at both poles of the sun and the middle corona twisted and turned into the outer corona which stretched out at least five lunar diameters in three broad streamers at the nine-, two- and four-o'clock positions. The prominences were easily visible to the naked eye as pink dots embedded in the silver corona around the black lunar limb. Through the camera attached to the Questar I was using, much more detail could be seen in the inner corona. Before this spectacle had a chance to

sink in, an intense arc of pink appeared on the entire west limb of the moon signalling the upcoming end of totality. A brilliant diamond ring appeared and the show was over.

With only 52 seconds of totality, we had to have a photographic plan which would not only produce the photos but also allow time to look at the event. Our equipment consisted of a C5, C90, 3.5-inch Questar, 750 mm lens with a $2\times$ converter, a 50 mm field telescope plus an assortment of other lenses and binoculars. Fortunately, everyone returned with good results. As for the few missed opportunities which always seem to happen – they are something to capture at the next eclipse.

The Amateur Astronomy Centre

by **B.R. Chou**
Editor

Many amateur astronomers dream of probing the heavens with a large telescope in a private observatory with the resources and amenities of a professional installation, but few ever enjoy this luxury. In northern England, a major new project is under way which will fulfill this goal for many amateur astronomers and increase public awareness of astronomy. This past summer I had the opportunity to visit the Amateur Astronomy Centre.

The Amateur Astronomy Centre (A.A.C.) was conceived by British telescope manufacturer Peter Drew several years ago. With his colleague Robert Miller and astronomy teacher Linda Simonian, Drew developed his original plans for a small home observatory available to the public into a major astronomical institution which, when completed, will offer public education programmes as well as observational facilities for advanced amateurs. As project managers, Drew, Miller and Simonian were faced with three problems: what facilities would the A.A.C. offer to amateur astronomers and the general public, where would it be located, and how to pay the bills.

The equipment planned for the A.A.C. is impressive. The telescopes (listed below) were designed by Peter Drew, and many are completed or near completion in his workshop at this time. The most

A.A.C. TELESCOPES*

120 mm binoculars (gimballed chair mount)
 3½-inch Maksutov
 5-inch solar refractor
 12-inch f/13 refractor
 17-inch Newtonian reflector (altazimuth mount)
 30-inch Newtonian reflector (Dobsonian mount)
 40-inch Newtonian/Cassegrain reflector

*All designed and built by Peter Drew.

ambitious project is the 40-inch telescope and its observatory. Designed for both visual and photographic use, the telescope will have f/4 Newtonian and f/20 Cassegrain foci, and be equipped with an enhanced video system. It will be housed in a two-storey observatory building equipped with a darkroom and a lecture room. At the time of my visit in August, the pier and building foundations had been poured for this observatory. Other facilities already in use for the A.A.C.'s public education programme are the camera obscura, which gives an excellent panoramic view of the surrounding moorlands, and the Goto ES Planetarium which was purchased from nearby Bradford University and is in its own building. Four forty-foot mobile homes provide overnight accommodation for visiting observers. The future public exhibition building will house a lecture room, shop and library.

The A.A.C. complex occupies a 12-acre site midway between the towns of Bacup, Lancashire and Todmorden, West Yorkshire, about 20 miles northeast of Manchester. With good public transportation nearby (a local bus and train connections at Todmorden), Drew explains, the A.A.C. offers a geographically central (to the U.K.) accessible smog-free location with minimal light pollution. The



The A.A.C. site seen from the west. The camera obscura building overlooks two of the mobile homes used by overnight visitors and the Goto Planetarium dome located on a concrete terrace above the Bacup–Todmorden road. The public exhibition building will occupy the roadside terrace at the lower right corner of the photo, while the observatories are located on the upper hillsides off the left side.
Photo by B.R. Chou.

property was occupied originally by a now demolished brick factory. The thousands of bricks from the bulldozed buildings were used to construct the buildings housing the camera obscura and planetarium, and more are being salvaged as the land is cleared. The steep south-facing hillside was terraced, providing level areas for construction of the A.A.C. buildings.

The costs of the land and initial construction phase were met with proceeds from sales of telescopes made by Peter Drew and Robert Miller, as well as private funds. In October 1982 A.A.C. memberships were offered to the public, and to date over 1900 amateur astronomers have given their support, including Patrick Moore and Nigel Henbest. Construction materials have been provided at cost, and with enthusiastic volunteer labour it is hoped that most of the facilities will be ready within two years.

To date four Star Parties have been held for A.A.C. members. A travelling exhibit on the A.A.C. has been set up at several major astronomical meetings in the U.K. in the last year, and local school children have attended shows in the Planetarium and camera obscura. The local authorities have been very supportive morally, if not financially, in the hopes of increased tourist trade to revive this financially depressed part of rural England.

The A.A.C. project has the potential to become one of the major centres of amateur astronomical activity in the world. Visitors are most welcome. For information on the A.A.C. and membership, write to the Amateur Astronomy Centre, 111 Todmorden Road, Bacup, Lancashire, England OL13 7DU.

Canadian Astronomy News

by Ian McGregor
Managing Editor

Astronomy Stamp: On March 15, Canada Post released a new 32-cent stamp dedicated to Canada's role in space. The stamp marks the space shuttle flight last year which carried Canadian naval commander Marc Garneau into space as Canada's first astronaut.

First Director of CITA: Professor Scott Tremaine of the Massachusetts Institute of Technology will become the first Director of the Canadian Institute for Theoretical Astrophysics (CITA) in July. The Institute is taking over the 12th floor of the Burton Tower of the University of Toronto.

Two Professional Societies To Meet: The Canadian Astronomical Society and the Planetarium Association of Canada will be holding overlapping conferences in Toronto at the end of May. The CAS will be holding its Annual Scientific Meeting from May 27 to May 31 and it will mark the 50th anniversary of the David Dunlap Observatory. The PAC conference will start on May 25 and run to May 29. Its theme, "Telling the Story", will feature special sessions on all aspects of the role of planetaria in astronomy education. On the evening of May 28, the first annual Helen Sawyer Hogg Public Lecture will take place with Dr. Owen Gingerich of the Smithsonian Astrophysical Observatory as guest speaker. The evening is co-sponsored by the Planetarium Association of Canada, the Canadian Astronomical Society, the Royal Canadian Institute, and the Royal Astronomical Society of Canada.

Proposed Astronomy Centre: The Dominion Astrophysical Observatory in Victoria, British Columbia has proposed the establishment of a Canadian Space Astronomy Centre. The Centre would promote the use of data from the Hubble Space Telescope to be launched into Earth orbit in 1986, train young scientists in space-borne astronomy, and provide a space astronomy instrumentation group which would provide a "world-class" design group for ground-based telescopes and test facility for space astronomy instrumentation. The proposal is being studied by the National Research Council of Canada.

Dr. Chant's Observatory: In February, Dr. Donald Fernie, Director of the David Dunlap Observatory in Richmond Hill presented a public lecture in Toronto sponsored by the Royal Canadian Institute. His talk titled "The David Dunlap Observatory: Its Origins, Accomplishments and Future" highlighted the history of the largest optical telescope in Canada in the year of its 50th birthday. The Observatory was the dream of Dr. Donald Chant (1865–1956) and when it opened on May 31, 1935 it was the second largest telescope (1.88 m) in the world. A special feature of Dr. Fernie's talk was the playing of a short 16 mm film (converted after much effort from its original 35 mm size) of a recently-discovered news film of the opening ceremonies which featured an interview with Dr. Chant. Happy Birthday DDO!

Astronomy Education Materials

by R.C. Brooks
Halifax Centre

Every once in a while, I receive a request for sources of information on astronomy. Until recently one could only refer to the Resource Letter published in 1973 by the *Journal of the American Association of Physicists*, as no other comprehensive compilation had been made. The International Astronomical Union's Commission 46 (Teaching of Astronomy) has recently published a listing of materials available to mid-1982 in English, Slavic and other languages. This may be obtained free of charge from Prof. L. Houziaux, Vice-President, IAU Commission 46, University of Liège, Liège, Belgium. It was prepared with the financial assistance of UNESCO.

This work lists organizations involved in the teaching of astronomy, journals and magazines, as well

as books and curriculum materials. The materials are generally classified into three levels: technical (some math and physics required), educational (no math or physics required) and juvenile. In the educational section you will find such sub-headings as activities, books, laboratory materials, atlases, films, etc. Addresses of suppliers, film distributors and publishers are given, including several NASA addresses which are handy to have available. Both the film and book sections are subdivided by topics; however, the booklist only includes volumes published in 1980–81. The IAU intends to reissue this booklet every three years with updates.

The English section is derived primarily from North American resources and runs 68 pages. The compiler of this section recognized this flaw but hopes to rectify the situation in preparing new editions. More than half of the work is devoted to resources available in other languages. It was interesting to read through the short translations to get an idea of the dominant interests in public astronomical education in other countries, particularly the USSR.

Despite the short period covered, particularly in the English book listings, I think teachers would find this booklet quite useful. The price is certainly right!

Reprinted from *Nova Notes*

Across the R.A.S.C.

WINDSOR: The Centre's annual meeting on January 25 featured National President, Dr. Roy Bishop, as guest speaker. His talk titled "The Rainbow – An Atmospheric Phenomena on the Third Planet" used a neon laser as a demonstration tool.

HALIFAX: Dr. Norman Scrimger of St. Mary's University is the newly-elected Centre president. A "Messier Challenge" programme has been set up by the Observing Group to encourage deep-sky observing. Just after sunset on the evening of November 5, Larry Coldwell observed a rare night-time moonbow with an almost Full Moon at his back while he faced a 180 degree arc of white light which touched the ground at each end. The Desbrisay Museum of Bridgewater, Nova Scotia, will be hosting an exhibit of Canadian meteorites during May and June. The exhibit produced by the Provincial Museum of Alberta is touring various museums across the country.

VICTORIA: A survey of the Centre's membership on interests and equipment revealed some interesting information. Interests in order of popularity were: basic astronomy, galaxies/deep-sky, stellar evolution/cosmology/planets, spaceflight, computer astronomy, astrophotography, the Sun, astrophysics/spectrometry, variable stars/exobiology, geology/meteorites, history, climate/atmosphere, radio astronomy, and last, occultations/grazes. Thirty-eight members have telescopes, 35 have binoculars, and 25 have computers. Vancouver and Victoria Centres are looking at the possibility of chartering a bus for the Edmonton General Assembly. Well-known observer Jack Newton has a new address: 202–3277 Quadra Street, Victoria, British Columbia V8X 1G4.

HAMILTON: Mike DeVallaer is the new Observing Director. Robin Allen, the editor of *Orbit*, is hoping to return to a monthly newsletter. The new addition to the Centre's observatory will be finished this year.

SASKATOON: Congratulations to Gordon Patterson who spent 10 months rebuilding the sundial located at the Observatory of the University of Saskatchewan and completed in time for the University's 75th anniversary. The sundial had been originally built in 1945 but only the gnomon could

be saved from the original for the rebuilt sundial. Unfortunately due to lack of funds the Observatory has recently been forced to close to the public.

NIAGARA: Both John Dekker and Mel Braun have recently completed construction of their own observatories. John's building houses 16-inch and 8-inch instruments. Bob Winder has finally completed his 26-inch mirror after 6 months of figuring. The complete instrument, named "Son of Lurch", should be finished by the early summer.

KINGSTON: Congratulations to David Stokes who is the new Centre president. David is an active observer with interest in computer applications to astronomy problems. In response to a challenge from Warren Morrison to observe Pluto in a 6-inch telescope (see *National Newsletter*, February 1985, L12), Gus Johnson of Maryland notes in a recent issue of *Regulus* that several observers including the famous Leslie Peltier have reached stars of magnitudes 14.5 to 15 in 6-inch instruments.

MONTREAL: A l'assemblée annuelle de la Société d'Astronomie de Montréal, M. Marc Gélinas de la SRAC/SAM s'est mérité le prix Georgette Le Moine pour ses observations de Mercure et Vénus en 1984.

TORONTO: A major reorganisation of the Centre's Optical Workshop in the basement of the McLaughlin Planetarium is underway. A Saturday course in telescope making is planned for the spring. A well-planned expedition to observe the February 9th occultation of the star Gamma Virginis was clouded out at the last minute. The Observational Activities Committee is holding monthly star parties in Toronto.

CALGARY: Congratulations to Centre past president Neil Laffra and *Starseeker* editor Alison Laffra (née Healy) who were married in December. The January newsletter contains a detailed report on a special meeting held to review the goals of the Centre. National President Dr. Roy Bishop was guest speaker at the Annual Banquet in December.

OTTAWA: While Rolf Meier is now searching for his fifth comet, wife Linda has been active herself and picked up the Observer of the Year Award, the Variable Star Award, and the Best *Astronomer's* Article at the Centre's Annual Meeting. Ken Tapping won the Merit Award. As of December the Centre's membership was 60 ahead of the figure for December 1983. A proposed cable TV astronomy show is being discussed. Out of 61 clear nights in 1984 at the Centre's Observatory, aurorae were observed on 22 of them. Skies were clear for the January Quadrantid meteor shower and between 0400 and 0600 hours on January 3, over 400 meteors were observed by four observers. Frank Roy, a veteran of 10 years of meteor observing described the event as "never have I seen such a spectacular meteor shower." The February 1985 *Sky & Telescope* magazine described Rolf Meier as "North America's greatest living comet hunter."

LONDON: Steven Sharpe's excellent monthly variable star report has returned to the *Astronomy London* newsletter. This column is in its sixth year of existence. Steven notes that in the 13 years he has been keeping observing records, 1984 was the second poorest year for clear skies with only 111 good nights being counted.

VANCOUVER: The Centre's "dark site" at Cypress Bowl is being threatened by the development of a new ski area. Other sites are being checked out including several in Washington State. *Nova* Editor Ken Nelson will be publishing the newsletter every two months instead of every three months. A local city power failure on the evening of a council meeting did not result in a star-filled sky – the faintest visible were magnitude 1 due to haze! Two videos are being produced to promote astronomy and amateur activities. Jim MacGuigan will be moving to Halifax this summer to set up a telescope store.

Across the R.A.S.C. is a regular feature of the *National Newsletter*. Due to the production time needed, deadline for material for the August *National Newsletter* is June 1.

Edmonton General Assembly June 28 to July 1, 1985

The Edmonton Centre is hosting the R.A.S.C. General Assembly, to be held at the University of Alberta, June 28 to July 1, 1985.

The Observing Competition and Display will feature a couple of new ideas this year. See the December 1984 *National Newsletter* for details. We welcome 10 minute dissertations for the Paper Sessions from amateur and professional astronomers alike. Members interested in presenting a paper should write to:

Dr. Douglas Hube,
Department of Physics
University of Alberta,
Edmonton, Alberta T6G 2J1

with an abstract of 150 words no later than April 30, 1985.

R.A.S.C. members are reminded that travel assistance to attend the General Assembly is available from National Headquarters through your local Centre.

For more general information about the Assembly write to:

Membership Committee,
c/o Howard A. Gibbons,
#1606, 9916-113 Street,
Edmonton, Alberta.
T5K 2N3

Assemblée Générale Edmonton Du 28 juin au 1^{er} juillet 1985

Le Centre d'Edmonton sera l'hôte de l'Assemblée Générale de la S.R.A.C. qui se tiendra à l'Université d'Alberta, du 28 juin au 1^{er} juillet 1985.

L'exposition de travaux astronomiques comprendra quelques nouvelles idées cette année.

Nous invitons les amateurs et les professionnels à participer aux séances de communications. Dix minutes seront allouées à chaque auteur qui devra envoyer un résumé d'environ 150 mots avant le 30 avril 1985 à:

Dr. Douglas Hube,
Department of Physics,
University of Alberta,
Edmonton, Alberta T6G 2J1

Nous rappelons aux représentants officiels des Centres de la S.R.A.C. qu'une aide financière pour assister à l'Assemblée Générale est disponible du Bureau National. Vos demandes doivent être approuvées par votre Centre.

Pour plus d'information sur L'Assemblée à Edmonton écrivez à:

Membership Committee
c/o Howard A. Gibbons,
#1606, 9916-113 Street,
Edmonton, Alberta.
T5K 2N3