
NATIONAL NEWSLETTER

Royal Astronomical Society of Canada

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Honoured guests at the unveiling of the historic plaque marking the location of Ontario's first observatory: Dr. John Downie, Dean of the Department of Applied Sciences of Queen's University; Dr. A. Vibert Douglas, Founder and Honorary President of the Kingston Centre and Past President (1943–1944) of the R.A.S.C.; and Professor Victor Hughes of the Department of Physics of Queen's University. *Photo by Leo Enright.* (See article page L3)

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Editor: IAN G. MCGREGOR

Mailing Address:
McLaughlin Planetarium
100 Queen's Park
Toronto, Ontario M5S 2C6

Editorial Staff:
HARLAN CREIGHTON, DAMIEN LEMAY, BETTY ROBINSON, STEVEN SPINNEY
University of Toronto Press Liaison: AL WEIR

Deadline for June issue is April 15.

Editorial

by Ian G. McGregor

In this year of Comet Halley, our Society will welcome many new members to its ranks. If you are a new member who has joined since last June then this is your first issue of the *National Newsletter* and its sister publication, the *Journal*. We hope you will enjoy them as they are, with the *Handbook*, the Society's three major publications.

1986 promises to be an exciting year in astronomy despite the Shuttle Challenger disaster. The Voyager flyby of Uranus and the spring observing of Comet Halley will be well reported but previously scheduled launches of spacecraft to Jupiter and the Sun and the eagerly-awaited Hubble Space Telescope may now be delayed. If you like to get together with other amateurs, our Society's annual convention will be hosted by the Winnipeg Centre in late June while International Astronomy Day in April is a major activity for many Centres. Numerous regional events will also be taking place including the Mount Kobau Star Party (British Columbia), MASCON (Manitoba), Starfest (Ontario), the twice yearly meetings of the Niagara Frontier Council of Amateur Astronomical Associations (Ontario), the Congrès de l'Association des Groupes d'Astronomes Amateurs (Quebec), and the COW (Nova Scotia).

You may note several changes in the appearance of the *Newsletter* as well as some changes in the Masthead where the names of Frank Shinn and Peter Jedicke no longer appear. Both individuals have stepped down after commendable and recognizable service to our publication. Franklyn was the *Newsletter's* fourth Editor and with his first issue (February 1978) took the major step of separating the *Newsletter* from the inside pages of the *Journal*. Most of the current format was also established by him. After stepping down as Editor, Franklyn continued as an Assistant Editor providing advice, ideas, and several informative articles. Peter became an Assistant Editor in October 1982 and his deep interest in inter-Centre communications resulted in what is now a regular feature, the *Across the R.A.S.C.* column. Last October, he assumed a full-time teaching position at Fanshawe College in London, and this along with frustration in getting news from Centres (Centre Secretaries and Editors, please note) brought about his decision to step down. Thank you Franklyn and Peter for your generous contributions of time and effort to make the *Newsletter* a success. I am sure the society will continue to enjoy your support.

Historic Occasion for Astronomy in Kingston

by Leo Enright
Kingston Centre

It was a beautiful autumn afternoon, the kind more typical of late September rather than early November, and Kingston's City Park was the setting for an historic occasion commemorating the first astronomical observatory in this part of Canada. On Sunday, November 3, 1985, about thirty astronomers and interested citizens gathered for a pleasant afternoon of activities honoring the establishment of the first optical observatory in Ontario. On a site that had been overlooked for many years and was almost forgotten, an historic plaque would finally be unveiled marking the location where the first observatory in Upper Canada was erected in 1855 – one hundred and thirty years ago.

As a result of the work done by a number of people particularly Professor Victor Hughes of the Queen's Physics Department, the Ontario Heritage Foundation had set up a plaque to preserve the memory of this important location, and representatives of various levels of government joined the astronomical community in saluting the pioneers of a hundred and thirty years ago for their enthusiasm and dedication to what was, certainly, in its day a very significant undertaking.

Guests at the occasion were given copies of an early map of the city of Kingston – one showing the observatory structure located in the west end of City Park about fifty metres east of the junction of Barrie and Stuart Streets, almost exactly where the plaque was located. The original structure, a frame building, and its replacement, a brick one of a later period, have both disappeared, but just to the south-east of the site, guests could easily see four large cylindrical pieces of limestone which were once part of the massive pier that proudly supported the original telescope.

Dr. Duncan Sinclair, Vice-Principal of Queen's University, acting as master of ceremonies, welcomed all present for the occasion.

Mr. Robin Elliott, of the Ontario Heritage Foundation, spoke of the observatory that was being commemorated as one of the area's many historic sites, all of which were important to the history of Canada.

Mr. John Gerritson, the mayor of Kingston, remarked on both the observations done at that location by the "gentlemen astronomers" of the Kingston area, and the profound changes in the science of astronomy that had occurred since the observatory's construction was undertaken over a century ago. "It would be," he said, "very interesting to speculate on the tremendous changes that might transpire over the next 130 years. Or, could one, in fact, even begin to imagine what they might be?"

The Honorable Ken Keyes, the Solicitor-General of Ontario, referred to the observatory's original connection with the military who were serving in the area and whose officers collaborated with the local amateurs in establishing the facility, and regretted that no members of the current military establishment were present for the occasion; however, it was an important site that should be better known by the residents of the area.

In a very interesting review of the history of the observatory, Dr. Hughes, the speaker for the occasion, noted that it was local interest in the total solar eclipse of May 26, 1854, that led the astronomers of the area to undertake the project to set up an observatory. The land and materials were acquired for about \$600.00 and an equal amount was spent for a 6½" Alvin Clark refracting telescope. Observations of many kinds were made using this refractor and later a transit instrument was employed in determining precise time of day; some of the early observations assisted in determining the longitude of cities further west in both Canada and the United States – even the "location of Chicago was not known to within forty miles" at the time the observatory opened. Among the duties of the astronomer in charge was that of seeing that the clock on City Hall was precisely set from the observations. Besides the "gentlemen astronomers", as the documents of the day called the local amateurs, any member of the public, "for two cents", could use the instrument. A warm applause followed Doctor Hughes' interesting talk and many noted that their interest had been aroused to learn more about the history of the site.

The honour of performing the unveiling was given to Mrs. Margaret Cohoe, an avid amateur historian, who has taken a particular interest in the observatory that once graced City Park and who has published a very detailed study of its history.

After the ceremony, all the guests accepted a gracious invitation from the mayor of the city and

joined him in a reception in the council chamber of City Hall, one of the most impressive rooms of its kind in Canada – one that has been restored to the elegance of the 1840's when the city was the capital of the united provinces of Canada. During the reception it was most interesting to speculate on what observing projects were being planned over a century ago by the “gentlemen astronomers” who lived in the area and might have used these facilities.

Members of the Kingston Centre were particularly happy to note the number of Society members present. From the local area, there were Mr. Arthur Covington, National Honorary President; David Stokes, Centre President; Sue and Mark Sorensen, Ruth and Terry Hicks, and Leo Enright. From Ottawa there was Mrs. Mary Grey, National First Vice-President, and Dr. Vic Gaizauskas of the Herzberg Institute of Astrophysics. It was a special delight for everyone to see the Kingston Centre's Founder and Honorary President, Dr. A. Vibert Douglas, in attendance. She was called the “dean of all of us astronomers,” as several of the speakers paid tribute to her pioneering work in astronomy.

Kingston Centre members are delighted that this important location has now been suitably marked and they will be proud to act as hosts for those who may come from other parts of the country to see one of our noted historic sites – one, that is, of particular interest to us as astronomers, whether amateur or professional.

The inscription on the plaque unveiled at City Park in Kingston, Ontario on November 3, 1985 is as follows:

THE KINGSTON OBSERVATORY

The first optical astronomical observatory in the province, the Kingston Observatory, was established in 1855 after a solar elipse aroused public interest in astronomical studies. Under the auspices of a committee of British military officers and ‘gentlemen astronomers’ a frame observatory was built here. It was transferred to the control of Queen's College in 1861 and within a year a new brick structure had been erected on the site. Staffed by Nathan Fellowes Dupuis, an able mathematician, the observatory, in addition to making conventional astronomical observations, produced barometric and thermal readings, fixed meridians for surveying and provided a time service. In 1881 it was moved to Queen's and today four cylindrical stones, former supports for the telescope, are all that remains of the old observatory building.

Our Dr Helen Hogg Remarries

Congratulations to well-known and highly-respected Dr. Helen Hogg who remarried at the end of November. Her new husband is F.E.L. (Louis) Priestly, professor emeritus of the University of Toronto. Both have been previously married and are 80 years of age. Dr. Hogg wrote an astronomy column for *The Toronto Star* for 30 years, authored the popular book, *The Stars Belong To Everyone*, and is a recognized authority on variable star and globular star clusters. She has served our Society in many capacities. We wish them both much happiness.

New “Oldest-Operating” Telescope

With the closing down of the 2.54 m telescope at Mount Wilson Observatory in California, the 1.83 m telescope of the Dominion Astrophysical Observatory in British Columbia is now the oldest still-operating “large telescope” in the world. For six months in 1918, it was the largest telescope in the world although the original crown-glass mirror was replaced in 1970 by a Cer-vit mirror.

International Astronomy Day April 19, 1986

by Leo Enright
Astronomy Day Coordinator

With the celebration of its tenth anniversary in Canada this year, *International Astronomy Day* has come of age, and it could not happen at a better time. 1986, the year of Comet Halley and several other important astronomical events, presents us with a glorious opportunity to mark the occasion in a better way than ever before. As in the past ten years, thousands of amateur and professional astronomers will be using the day to share with the public their interest in the fascinating science of astronomy; and as announced previously in these pages and in the *Observer's Handbook* on page 25, the date this year is Saturday, April 19. All Centres are again urged to have their members join with astronomers around the world in marking this special occasion.

By now, the planning committees in most of the Centres will have been busy organizing numerous different events – all of them around a theme of “taking astronomy to the public”.

With Comet Halley still in our skies, there is an obvious popular interest in astronomy that is higher than usual. Many Centres will surely take advantage of this fact to present correct and realistic information about comets and other celestial objects viewed by the astronomer, as well as information about many aspects of the science. During the day, many Centres will be organizing displays at one or more shopping malls, hosting “open houses” at observatories and planetaria, and organizing public solar observing sessions where, weather permitting, people will safely observe the solar disk. In the early evening the moon, slightly past first quarter and very close to the bright star, Regulus, will be the favorite target as many members of the public have their first glimpse of lunar craters. Then many of the instruments will turn to Comet Halley, 56 degrees away in the constellation Hydra and predicted to be between fourth and fifth magnitude. Its apparent positions that evening will be as follows: R.A.: 12h 5.8m; Dec.: $-33^{\circ} 00'$, that is about two degrees northeast of the star Beta Hydrae, or eight degrees south of the Alpha Corvi. Once again it is possible that many people will be able to catch a glimpse of this fabled object for the first time.

All of the many “tried and true” ways of sharing our interest and promoting our society will again be attempted, but it is hoped that other new, different, or unusual activities will be undertaken, depending on the resources of the individual Centre or group, and the specialized interests or expertise of the members.

More detailed information packages, with specific suggestions for planning observations for that evening and many other ideas, have been mailed to the Presidents and National Council Representatives of each Centre. Included is a “Media Release” form which may be used to inform the local media of planned activities. In return, the Secretary or Astronomy Day Chairman of each Centre is asked to send a report of all activities to the National Office as soon as possible after April 19th, so that these reports may be published in the *National Newsletter* and retained in the Astronomy Day files for future reference.

Let us continue the fine traditions established over the past decade and make *International Astronomy Day 1986* the best one ever held – both a memorable event for our Centres and the enthusiastic supporters who cooperate to make it possible and an exciting way of sharing our interest in the wonders of the sky.

New Home For Variable Star Observers

The American Association of Variable Star Observers (A.A.V.S.O.) has moved to a new and permanent headquarters. The new address is: 25 Birch Street, Cambridge, Massachusetts USA 02138. At the 75th Annual Meeting of the A.A.V.S.O. to be held August 6–9, 1986, the formal dedication of the new building will take place.

Telescopes and Observing

by Peter Ceravolo
Edmonton Centre

In his article "Telescopic Planetary Observing" on page 102 of the 1986 *Observer's Handbook*, Terence Dickinson presents the theory that the decline of planetary observing "may be due more to a change in instrumentation than in observing philosophy". It is obvious to most experienced observers that the majority of the instruments commercially available today are not well-suited for planetary observing for one reason or another. But to say that this reason, more than any other is the cause of the declining interest in planetary observing is not telling the whole story.

Back in the 50's and 60's, the 6" reflector and the 3" refractor were the norm. They were ideally suited for planetary observing, but did not provide impressive views of faint deep sky objects. Most people felt "limited" to the solar system and the brighter Messier objects to see anything of substance. The availability of cheap, portable large aperture telescopes finally placed a greater portion of the universe within our grasp and caused a shift in interest from predominantly solar system to deep space observing. These large telescopes fulfill a desire to see fainter and farther. A desire that was always there.

Terence Dickinson discusses the poor performance of many Schmidt-Cassegrain telescopes for planetary observing. He focuses in on the effect of central obstruction alone. This is only one of many variables that should be considered. Walter Scott Houston, of *Sky and Telescope* magazine stated in one of his Deep Sky Wonders columns that the telescopes of the 50's and 60's performed better because they were better aligned and maintained. Today's observer has to travel far to get away from light pollution and bad seeing. The backyard is no longer good enough. The telescopes are subject to more jostling, and therefore require more collimation adjustments which are sometimes not made. Even perfect optics are useless unless they are held in place properly. Some Schmidt-Cassegrains also tend to be supplied with cheap prism star diagonals which in most cases seriously impair the images. The prisms are not of sufficient quality for the job. These telescopes (and, of course, the Dobsonian mirrors) have to be mass produced to be affordable. To be fair, the quality of the instruments optics should be tested under controlled conditions before appraising the overall design.

The advent of "Dobsonian technology" has revolutionized our way of thinking in regards to telescope construction. A 12.5" instrument no longer needs a massive equatorial mount to be used successfully. The reason these large Newtonians have such short focal ratios is merely for portability. But even for deep sky observing a longer focal ratio is desired. Readers of Walter Scott Houston are aware of his affection for the Porter Turret telescope at Stellafane and his old 10" reflector for deep sky observing. The Porter telescope has a 12.5" f/17 mirror, and the 10" was f/8.6. But the Porter telescope, or a 10" f/8.6 telescope, are just not practical instruments for the average observer.

Dickinson makes some vital comments on the importance of contrast in planetary observing and how little it is related to resolving power. Contrast is just as important in deep sky observing. Dobsonians tend to be regarded as "light buckets", sometimes as an excuse for poor imaging by the primary mirror. Some believe that with deep sky observing, since it usually employs low powers, you can get away with less than good optics. This is a fallacy. One only needs to read the article in the September 1985 issue of *Sky and Telescope*, "The Secrets of Deep Sky Observing" by Alan MacRobert; medium to high powers often bring out a wealth of detail not seen at low powers. While hunting Comet Halley late last summer, Alan Dyer, Hans Thater and myself had to use magnifications in excess of 200 times to bring out Halley's feeble stellar image in a 17.5" Dobsonian. It was invisible at low power.

With the Dobsonian revolution came "aperture fever". Bigger is better. The majority of observers tend to think only bigger telescopes will bring brighter, better images. People are starting to realize that an optimized telescope, that is one with excellent optics, efficient coatings (reflectivity greater than 98% for mirrors and less than 1% for lenses and corrector plates), and well-baffled and blackened tubes and focusers will concentrate more light in the Airy disk, instead of scattering it all over the field and reducing contrast. Instead of using the brute force of more aperture to bring out the faint low contrast filamentary detail in faint nebulae, amateurs should strive to enhance their present telescope's performance (if possible) by using some of the contrast enhancing techniques suggested for planetary telescopes.

(Editor: We have invited Terence Dickinson to reply to Peter Ceravolo's article. His response follows)

Telescopes and Observing: A Reply

by Terence Dickinson

I want to thank Peter Ceravolo for reinforcing and amplifying many of the points addressed in my 1986 *Observer's Handbook* article, which was, of necessity, only a brief review of a subject that I have long thought deserves wider discussion.

Amateur astronomy is increasingly under the influence of faddism and hype on the one hand, and changing observing conditions and the availability of new gadgetry on the other. Consequently, observing priorities and instrumentation trends have significantly altered in the past two decades.

Back in the 1950s, just having a telescope was an accomplishment. A good 60 mm refractor was considered an acceptable primary instrument. As the hobby evolved and expanded – and urban illumination escalated – portable, large-aperture instruments became the vogue. The major turning point in this direction was the introduction of affordable Schmidt-Cassegrains in the early 70s, followed a few years later by thin mirror, large aperture, short-focus Newtonians on minimal mounts.

These two types of instruments, which now constitute the bulk of the amateur astronomy arsenal, are intrinsically the least suited to planetary observing despite their impressive performance on some other classes of celestial objects. It is my contention that people don't spend time looking at planets through these scopes because they reveal only a fraction of the planetary detail that such apertures "should" show, whereas they do meet expectations when directed at deep space targets. Even with perfect optics in perfect alignment these instruments are incapable of yielding high-contrast planetary images, regardless of seeing conditions. In any case, a telescope's optical alignment generally is only an issue of concern in Newtonian reflectors, although Mr. Ceravolo quite properly raises this as a critical factor in all types of observing.

He also makes the excellent point that high-contrast planetary telescopes (long-focus Newtonians and refractors with better than $\frac{1}{4}$ -wave colour correction through the visual range) are surprisingly effective deep sky instruments. This was demonstrated to me shortly after I first spotted Comet Halley on September 13, 1985. At magnitude 13.7, the comet was just detectible in my 10-inch Schmidt-Cassegrain at powers of 195 and 278. A few days later, during a conversation with a colleague in the United States, I was astonished to learn that he too had seen the comet that night under comparable sky conditions and at similar magnifications using a 6-inch apochromatic refractor. Warren Morrison of the Kingston Centre also observed Halley around this time with a 6-inch achromatic refractor.

Aperture may not be as paramount to visual astronomy as it is trendy. As Mr. Ceravolo mentions, other factors are too often overlooked in telescope performance. In any case, aperture is certainly a secondary consideration in planetary observing. There is plenty of light from a planet, it just needs to be imaged perfectly with maximum contrast and minimum scatter. The one factor that can not be controlled is seeing, which is almost never better than $\frac{1}{2}$ -second of arc. What this means is that 9 inches is sufficient aperture to see all there is to see 98% of the time – provided the telescope yields perfect, full-contrast imaging.

On most nights a 5-inch refractor will show as much planetary detail as a 100-inch telescope, as was pointed out as long ago as 1920 by W.H. Pickering. Steve O'Meara has reported tremendous planetary detail with the Harvard 9-inch refractor (e.g. the spokes in Saturn's rings, details on Uranus). At star parties where dozens of telescopes are available for comparison, the lone refractor almost always provides the best planetary views no matter what the competition.

Why refractors? Even the best mirrors scatter more light upon reflection than an average lens does in passing light. More serious are the problems associated with central obstructions and secondary supports in reflectors and catadioptrics, which are described in the *Observer's Handbook* article. Proper baffling and lack of central obstruction gives refractors maximum contrast – noticeably superior to other telescope designs – provided chromatic aberration is below $\frac{1}{4}$ -wave at focus. Three-element apochromatic refractors up to 7 inches aperture meet this criterion (in theory), as do achromatic $f/15$ refractors up to 90 mm. Larger refractors in each category deviate from the ideal in direct proportion to increasing aperture. Conversely, refractors below 75 mm aperture provide perfect contrast efficiency, but lack the resolution to reveal significant detail. Since apochromatic refractors have only recently become available for less than astronomical prices, and achromatic refractors run into colour correction

problems above about 4 inch aperture, refractors in general have been out of favour as serious hobbyist equipment for more than a generation.

The next-best scopes for planets are Newtonians of $f/8$ or greater focal ratio which can be fitted with small diagonals to minimize secondary "noise". For the last three decades these instruments have been used by the majority of dedicated planetary observers – a group that today constitutes a tiny segment of the total population of amateur astronomers. Thus, it is probably true to say that many, if not most backyard astronomers have never seen a high-contrast planetary image since instruments that produce such images make up a negligible proportion of the equipment now in use.

This is not a one-man campaign against Schmidt-Cassegrains or Dobsonians. I have used and enjoyed both types, and recommend to my students Schmidt-Cassegrains as ideal all-purpose scopes. However, I do feel the significant differences in planetary performance among telescopes in use today is not widely appreciated.

Young Astronauts of Canada

The federal government has announced a nationwide programme for Canadian youth which will use space science as a means of bringing many non-space mathematical and science concepts into focus for elementary and junior high school students. Access to a national computer bank, national competitions, international projects, and regular issues of the *Young Astronaut Journal* will be elements of the programme. Canada's first astronaut in space, Marc Garneau, has been named the honorary president. For more information on the Young Astronauts of Canada write to: P.O. Box 2190, Main Post Office, Vancouver, British Columbia V6B 3V7.

The Dream is Alive

The popular 70 mm film *The Dream is Alive* produced by Imax of Toronto for NASA of the United States played to capacity audiences at the Ontario Place Cinesphere in Toronto and the Devonian Theatre of the Edmonton Space Sciences Centre during the second half of 1985. Cinesphere received 196 000 viewers last summer compared to 135 000 patrons seeing other Imax films a year earlier and for the first time ever, Cinesphere remained open until December to allow people to see the film which features several Space Shuttle missions showing the Canadarm and is narrated by Walter Cronkite.

Supporting Search and Rescue

Since 1982, over 450 lives have been saved by the highly-successful COSPAS-SARSAT international search and rescue satellite system. Four countries participate in the programme: Canada, France, the United States and the Soviet Union. Earth-orbiting satellites such as COSPAS 1 launched in 1982 receive distress signals from the more than 300 000 emergency beacons installed in ships and planes. These signals are then transmitted to LUTs (Local User Terminals) on the ground which can locate the craft in distress within 20 minutes and with an accuracy averaging about 15 km.

At present there are eleven ground stations operating around the world including one in Ottawa but recently, Canadian Astronautics Limited (CAL) based in Ottawa has sold three more ground stations to the Department of National Defence and one to Brazil. The new Canadian sites will be in Edmonton, Alberta, Churchill, Manitoba, and Goose Bay, Labrador. When the new stations are installed a total of fifteen LUTs will be operational including ten built by CAL.

National Library

The Society's National Library located at the National Office in Toronto will be open on the following Saturday afternoons: April 19 and May 24. The hours are from 1 to 5pm.

The Library is also open during regular business hours during the week Monday to Friday 9:30 am to 4:30 pm. The National Office can be contacted at (416) 924-7973.

Dew: What to do about it

by Alister Ling
Montreal Centre

We have all experienced dew in one way or another. We have admired its beauty when it forms as frost on windowpanes, and cursed its steadfastness on corrector plates and spectacles. To cure this irritating problem (at least, in our climate) requires the knowledge of how it forms and under what conditions.

First of all, we must begin with water vapour, a colourless and odourless gas, which is a minor constituent of the Earth's atmosphere. Humidity is measured relative to the amount of vapour in equilibrium over a plane surface of water at a particular temperature. The amount is crucially dependent upon the temperature – the higher the temperature, the more vapour fills the air. If we take a box of air and vapour, and chill it slowly, the relative humidity increases until it reaches 100%, the maximum allowed over water. What happens if there is no water to accept the vapour if we continue to chill the air? If the box is very clean, nothing will happen until the relative humidity reaches 400%! Water will then condense out spontaneously from the collision of water molecules.

In our experience, the humidity never really makes it past 10% because there are enormous amounts of dust, salt, and pollution particles suspended in the air which have a great affinity for water. For very large particles, which can dissolve in water, the resulting droplets can be in equilibrium at relative humidities of even 90%, which, you guessed it, forms haze.

So the first thing we have learned is that to avoid dew buildup, keep your optics clean. Interesting enough, don't bother buying de-mist fluid to keep your glasses from fogging during the winter; soap and water will do equally well!

When a parcel of air is cooled to the extent where it just begins to form fog, it has reached its dew point. The drier the air, the lower its dew point will be. Dew will form on all unclean surfaces when those surfaces (mirror, car window, cold beer) are as cold or colder than the dewpoint.

Just how does a body get colder than the surrounding air, which is warmer than the dewpoint? To answer this, we shall delve into the realm of radiation, specifically the infrared. All objects, including humans, radiate this kind of radiation, and our temperature reflects a balance of ingoing and outgoing radiation. Inside a room, a corrector plate of a Schmidt-Cassegrain telescope emits and receives essentially equal amounts of energy because everything is more or less at the same temperature. Outside, however, the situation is different in one crucial factor: the ceiling of our room has been replaced with the open sky, which has an equivalent temperature of roughly -75 degrees Celsius. It is not absolute zero since the atmosphere does absorb some infrared, though not all of it. Our corrector plate is now receiving less energy in return, so its temperature must fall until it reaches a lower equilibrium. Usually this is below the dewpoint and hence dew (or frost if the glass is below freezing) will form.

As the amount of infrared radiation decreases, the processes of conduction (the flow of energy through a substance from a higher- to a lower-temperature region) and convection (the transfer of energy from one location to another of a substance) become more important. In fact, if the air temperature is about zero and there is little wind, the ground can actually cool off to -20 degrees under a clear sky! Clouds intercept infrared and reradiate it at a temperature in the -10 to -30 degree range, much warmer than -75 degrees, which explains the fact that it gets colder under a clear night sky than under an overcast one.

The mirrors of Newtonian-design telescopes seem less afflicted than the corrector plates of Schmidt-Cassegrain telescopes when it comes to dew as they are shielded from most of the sky by the long tube. This permits them to receive radiation from the tube itself, rather than the colder sky. Therefore, the mirrors take longer to cool down. Similarly, the sides of a car receive energy from its surroundings whereas the roof does not, so it always dews up first.

One must keep in mind that a telescope secondary still cools off rapidly, especially considering the fact it does not have much ability to retain heat in the first place. A dewcap of roughly two tube diameters will significantly retard dew formation on either secondary mirrors or corrector plates, even finderscopes. A fringe benefit from this simple operation is that stray light will be kept to a minimum by ensuring that only light from a small patch of the sky is reaching the eyepiece.

A sure fire method of dew prevention on the wettest or frostiest of nights is to “hot-wire” the telescope by placing nickel-chrome heating wires within conduction range of the optics, say the cell containing the mirror, and gently warming the surfaces to ambient air temperature. If one overheats there is the risk of creating turbulence. One of my friends placed a series of resistors around the outside of his 210 mm telephoto lens with an elastic band, used a 6 volt battery for power, and the images have never suffered. Under normal circumstances, the lens may have dewed within 10 minutes. A distinct advantage here for observers is that one does not have to ruin one’s dark adaptation by getting out the dewgun repeatedly to warm the optical surfaces under a brighter light.

Dew ruins photographs, scatters light in the eyepiece thus reducing contrast and constraining the limiting magnitude of the instrument, and simply irritates us. Therefore, just remember to keep those optics clean, use a long dewcap, and if necessary, gently cook those assemblies of precision glass.

To Build A Space Station

Last November, the Canadian Institute for Advanced Research issued a report to the government urging a “meaningful, long-term” commitment to the Space Station which is being planned by the United States. The Space Station would be a joint venture of the United States, Canada, Japan, and the European Space Agency. It would be as large as three football fields, orbit about 400 km above the Earth, and be placed in orbit in the 1990’s. The Report was prepared by the Space Station Committee chaired by the University of Toronto’s James M. Ham and included government and industry leaders.

First Telescope: An Unexpected Universe

**by Matt Bourdeau
Windsor Centre**

In September 1984 I received a \$90 optic set and by the next February I had completed my first telescope, a 4-inch f/9.5 Newtonian mounted on an inexpensive \$35 pipemount and which worked quite well. Saving up every cent I had had been the hardest part of getting the telescope together – after all, how much money does a 13-year old have? But even before I had finished the telescope a couple of fellow amateurs had warned me against getting my hopes up high about the abilities of a 4-inch reflector, but I ignored their comments.

My first deep sky views with that ‘scope shocked me, not because they didn’t look as I had expected, but because the objects were much more beautiful than I had ever dreamed. The star cluster M41 in Canis Major thrilled me to no end – its stars still shine in my mind. The galaxies M81 and M82 in Ursa Major probably thrilled me the most of all the objects I have ever observed. I thought it would be impossible to see those two galaxies from my polluted skies, but after about five frustrating minutes, they moved into the field of view. I was very stunned, all I could say was “Wow, I don’t believe it.”

I continued to observe almost every clear night until about sixty-five Messier objects had been checked off my list. I had almost exhausted all the Messier objects which could be found in a 4-inch under my skies. Tackling all of these objects was certainly a great experience, one which I will never forget.

Now, for you planetary nuts, let me say that a view of Jupiter’s bright cloud belts and the Saturn’s rings is quite impressive with a 4-inch. As for the Moon, the view is fantastic!

Unfortunately, I had to recently sell that telescope to help pay for my next project, a 10-inch f/5.6 Newtonian, which will probably not be completed until the late winter. Selling my 4-inch was very hard to do, especially after all the things we’ve been through, such as braving sub-zero temperatures and voyaging through the Milky Way.

I am sure you have heard the expression “A 6-inch f/8 is the best telescope for the beginner.” This may be quite true but I would like to say to all amateurs who preach about the merits of a 6-inch that a 4-inch f/10 can be just as good for beginners. Not only is the tube a bit shorter, but the cost can be under \$300 if you build it yourself.

I have learned a great deal about telescopes and observing since “first light” in my never-to-be forgotten 4-inch.

Across the R.A.S.C.

VANCOUVER: Following the good response to the Centre's promotional video on astronomy *Stargazer* shown at last summer's General Assembly in Edmonton, production started up in the autumn on a second, longer production using a script by Karl Miller. A joint meeting with another local club, the Maple Ridge Astronomical Society is being planned. Ken Nelson, Gary Harland, and Boyen Tic have proposed construction of a radio telescope for observing the Sun and Jupiter and are looking for other interested members.

NIAGARA: Ron Gasbarini has resumed the editorship of the Centre newsletter *Niagara Whirlpool* after a newsletter committee was formed which would share the production workload. The November Banquet at the Skylon Tower had 71 people present for a talk by Mary Grey of the National Museum of Science and Technology in Ottawa.

HALIFAX: At the request of the Provincial Public Archives of Nova Scotia, the Centre has donated back issues of its newsletter *Nova Notes*, general correspondence, minutes of meetings, etc. to the Public Archives of Nova Scotia. At the annual council elections there were few changes of faces. Norman Scrimger (President), Ralph Fraser (Secretary), Patrick Kelly (Editor), David Chapman (Library), and Gordon Hawkins (Observing) are continuing in their positions. Darrin Parker (Vice-President), David Tindall (Treasurer), Doug Pitcairn (National Rep) are starting new terms.

EDMONTON: Peter Ceravolo reports a successful observing session was held on November 15 at Elk Island National Park with over thirty members in attendance. It provided an opportunity for members to show off their eyepieces and filters. A 19 mm TeleVue wide-angle drew rave reviews, a 7 mm Nagler was unsatisfactory on small telescopes but was satisfactory on the Centre's 44 cm Dobsonian telescope for which it was designed. Comparison of three light pollution filters belonging to Craig Markarowski, Allan Dyer, and Mel Rankins showed little difference in performance.

MONTREAL: Mario Caluori has succeeded Stew Marschall as Centre President and Dr. John Glaspey of the Physics Department of the University of Montreal is the new Director of Observational Activities. Special thanks went to Stew for his efforts during his 3-year term in office which went far beyond his official duties. In his final President's Report, Stew reported on a successful year for this active Centre.

SASKATOON: Congratulations to Walter Fernets who is the new Centre President. In a commentary appearing in the December Saskatoon Skies, Walter described plans for new initiatives to increase community awareness of the Centre, build membership, and strengthen existing activities. Three National Film Board films were shown at the November meeting – *Comet*, *Starlife*, and *Satellites of the Sun*, and were well received.

TORONTO: Membership in the Centre is skyrocketing with almost 1000 members on the membership rolls including over 230 new members. Fortunately, the addition of a computer has eased the enormous task of processing all these memberships and mailing over 1000 newsletters every two months. A membership questionnaire distributed with the annual invoicing showed much satisfaction with the activities of the Centre and the services (such as the *Observer's Handbook*, the *Journal*, and the *National Newsletter*) provided by the Society as a whole. As an experiment the regular March meetings are going to be held on Wednesdays instead of Fridays to see member response to an alternate night. Congratulations to Phil Mozel who in September became Director of the Seneca College Planetarium in North York. Doug Gies and Alex Fullerton at the McDonald Observatory in Texas were the first reported Centre members to see Comet Halley on August 28. Paul Markov, in charge of the Centre's astronomical trading post "The Exchange", reports that about \$12 000 worth of new and used equipment has changed hands since the beginning of 1985.

L12

KINGSTON: Leo Enright received reports from about sixteen people reporting an extremely bright fireball (perhaps magnitude – 15 to – 20) moving from south to north across eastern Ontario at about 2:32 UT on October 24. Leo is again sponsoring his annual Spot the Errors in the Handbook Contest to check for any errors in the 1986 *Observer's Handbook*. The Centre's 25th Anniversary Banquet and Meeting with National President, Dr. Roy Bishop, as guest speaker was held on January 23.

OTTAWA: Sets of 30 slides taken at the Indian River Observatory are being sold to the public for \$30 to raise money for new observing equipment. Max Stuart is building a telescope of an unusual design called a Schiefspiegler. Congratulations to Observers Group Chairman Doug George who was married in October and to Rolf and Linda Meier on the birth of Matthew also in October.

VICTORIA: Congratulations to Centre President and *Skynews* Victoria Editor Muriel Enock who has become the public relations coordinator for the National Research Council based at the Dominion Astrophysical Observatory. National President, Dr. Roy Bishop, will be speaking to the Centre at its February 12 meeting.

WINNIPEG: Monthly star parties are being held on the third Saturday of each month at the Glenlea Observatory in cooperation with the Manitoba Astronomy Club and the University of Manitoba. Because of winter conditions, a two-car rule is in force at the Observatory between November and May for the protection of observers whose cars break down.

Across the R.A.S.C. is a regular feature of the *Newsletter*. We need your contributions and reports of Centre activities if this feature is to be of interest and relevance to our readers. Deadline for June issue is April 15.

MASCON '85 A Success

by Guy Westcott
Winnipeg Centre

The annual Manitoba Astronomy Conference (MASCON) was a great success last year with almost 4,000 participants. The year's programme started on July 27 and ran through to August 1. Weather was reasonable for the star parties and solar viewing at the MASCON site at Riding Mountain National Park (the clearest skies in Manitoba!).

Principal participants responsible for running the observing and lectures were Mike Rossier, Jim Loudon and myself. With the public interest in Comet Halley and Parks Canada Centennial Year also occurring, MASCON experienced a bumper crop of avid observers.

At 10 am in the morning of July 27, we had three telescopes set up for solar observing and by the afternoon we had guided 1100 people through the telescopes, slide shows, and lectures. For the next few days we were very busy.

July 28 Daytime solar viewing. Attendance – 870
Evening observing and lecture at Lake Katherine Outdoor Theatre until 2 am. Attendance – 274
July 29 Daytime solar viewing. Attendance – 529
July 30 Cloudy (A day of rest)
July 31 Daytime solar observing. Attendance – 584
Evening observing until 2 am. Attendance – 102
August 1 Daytime solar observing. Attendance – 430

The setting for MASCON was the shore of Clear Lake at the Interpretative Centre Museum, one of the most beautiful areas in Manitoba. But perhaps one of the most amazing aspects of the daytime observing was that throughout most of the solar viewing, there were only four sunspot groups to be seen. In a way, you could say it was a very "quiet" solar week.

World Astronomers Meet In New Delhi

by John R. Percy

Department of Astronomy, University of Toronto

The nineteenth triennial General Assembly of the International Astronomical Union was held from November 19 to 28, 1985, in New Delhi, India. There were over a thousand visitors from 50 countries, as well as three hundred Indian astronomers. The IAU awarded over two hundred travel grants, primarily to younger astronomers, in order to encourage a broad cross-section of the astronomical community to attend. In this way, it helped to achieve its stated purpose: “to facilitate the relations between astronomers of different countries, where international cooperation is necessary or useful”. Individual membership is an important aspect of the IAU (unlike in many international scientific unions). The election of nine hundred new members brought the total membership in the I.A.U. to over six thousand.

The brief and moving Inauguration Ceremony was addressed by Prime Minister Rajiv Gandhi on the birthday of his late mother Indira Gandhi, who had initially planned to open the meeting. Also missing was the late Professor M.K. Vainu Bappu who, as President of the I.A.U. from 1979 to 1982, was instrumental in bringing the 1985 General Assembly to India. A highlight of the Inauguration Ceremony was the unveiling of a postage stamp commemorating the meeting and showing Comet Halley.

The I.A.U. is governed by a President, six Vice-Presidents, a General Secretary and an Assistant General Secretary. Canadian astronomer Alan Batten (a past president of the R.A.S.C.) was elected a vice-president for 1985 to 1991. The work of the I.A.U. is carried out mainly by its many commissions, which deal with the various facets of astronomy – for instance Variable Stars (Commission 27) and The Teaching of Astronomy (Commission 46). Several Canadian astronomers were elected President or Vice-President of various commissions: Sidney van den Bergh (Dominion Astrophysical Observatory), David Gray (University of Western Ontario), Bob Garrison (University of Toronto), Gretchen Harris (University of Waterloo) and Ralph Nicholls (York University). Canadians have always been active in the I.A.U., and the Canadian delegation to New Delhi was one of the larger ones.

The meeting included over 250 scientific and business sessions crammed into seven days, resulting in the inevitable conflicts of schedule. There were three evening plenary lectures, on “Pulsars”, “Venus”, and “Dark Matter in the Universe”. All three were excellent; I was particularly intrigued by the description of the use of Very Long Baseline Radio Interferometry (from Earth) to track the Soviet Vega 1 and 2 balloons through the atmosphere of Venus. There were eight “Joint Discussions” – one-day symposia on current topics in astronomy. Australian amateur astronomer Rev. Robert Evans was an invited speaker at the symposium on “Supernovae”, where he described how he has discovered eleven supernovae – visually. At the symposium on “Epsilon Aurigae” (an enigmatic binary which undergoes eclipses every 27 years), amateur astronomers were highly praised for their excellent photoelectric observations of the 1982–1984 eclipse.

All work and no play, of course, makes for a dull meeting, so a variety of excellent and appropriate cultural and social activities were arranged: a visually-stunning performance of classical Indian dance, a recital of classical Indian music played by a group led by (believe it or not) a fifteen-year-old player of the electrical mandolin, a farewell banquet in a “folk festival” atmosphere, with magicians, musicians, acrobats, and even a dancing bear. There was a half-day tour of Delhi, beginning with a stop at the famous eighteenth-century stone observatory called the Jantar Mantar. There was also a one-day bus tour to the Taj Mahal, which drew mixed reviews. The Taj is as awesome as one imagines (and as overrun by tourists) but – given the quality of Indian roads and the aggressive spirit of Indian drivers – the trip was arduous and hair-raising to say the least.

One’s impressions of India, of course, are varied. Magnificent buildings and boulevards exist side-by-side with grinding poverty. Most noticeable to the ear was the bustling traffic, with seemingly millions of taxis, buses, motorized rickshaws and scooters honking their horns in unison. For the Toronto residents, two weeks of warm, sunny weather in November did not go unappreciated.

Our Indian hosts did an excellent job of organizing the meeting. The facilities of the Vigyan Bhavan centre included a magnificent assembly hall with individual desks and microphones, and virtually all the rooms were equipped with executive-quality chairs for the audience. The buses which took us from

our hotels to the meeting site and to the cultural events ran with clock-like precision. I must admit that my impression of the meeting may be somewhat more optimistic than that of others: I was fortunately not one of the several hundred participants who were treated at the medical centre for assorted ailments – mostly of the stomach. Coughs and colds were also in evidence throughout the lectures.

I am sure that this General Assembly will leave a lasting impression on all of the participants. For the visitor, it gave a new appreciation of the vigorous state of astronomy in a “young” country with a long astronomical tradition. For the Indian astronomer, it gave encouragement, recognition, new contracts, and a sense of true membership in the international astronomical community.

Visiting the Wilson Coulee Observatory

**by Brian Burke
Ottawa Centre**

After last summer’s General Assembly in Edmonton I travelled to Calgary to visit friends and had the opportunity to visit the Wilson Coulee Observatory of the Calgary Centre.

Bill Krosney, Secretary of the Calgary Centre, was kind enough to take me out to the Observatory late one afternoon and gave me a guided tour. The Observatory is located about 25 kilometres south of downtown Calgary travelling along what is mostly a four-lane highway. The site is owned by a private school and is accessed by driving through the school grounds. The main building is about 9m by 5m and here is where the monthly Observers Group Meetings are held. The meeting room seats about 50 people and contains a library. A second room contains a desk, telephone, and bunk beds. A third room is used as a workroom and in fact one member had his computer there at the time. The washroom has a chemical toilet. The basement has plenty of rooms for storage and has a refrigerator, ping-pong table, television set, and couch.

The Observatory itself has two levels. The lower level is the base of the telescope and is used for storage. The upper level houses a 32-cm f/7 Newtonian reflector with a power operated dome.

Outside, the parking lot has room for about thirty cars, and nine permanent piers with power allow telescopes to be mounted on them – a very good idea. Although we did not stay until dark, I was told that the skies were very good.

This very impressive Observatory was made possible through a \$47,000 grant from the Alberta government. The total cost was about \$55,000. It appears that the Calgary centre is booming and they have a very active membership which is great to see. I am sure we will be hearing more from this Centre.

International Astronomical Youth Camp July 12 to August 1, 1986

Since 1969, young people from ages 16 to 24 have participated in the International Astronomical Youth Camps. Running for three summer weeks, the Youth Camps enable the participants to contribute to an international team doing amateur astronomy and to learn about young people from other countries.

The 1986 Youth Camp will be held at Bruder-Klaus-Heim in Violau near Augsburg, West Germany. The site includes a well-equipped observatory, a planetarium, and computers. Activities will include a wide range of working groups studying topics from planetary astronomy to meteors and from celestial mechanics to computer applications. Many kinds of non-astronomical social events will also be included.

Participants should be able to communicate in English. The cost for room and full board, programme and one-day excursion will be around DM 530. For free information booklet write to:

IAYC Workshop Astronomy e.V.
Post Office Box 2044
D-6750 Kaiserlautern
West Germany

Winnipeg General Assembly June 27–30, 1986

The membership of the Winnipeg Centre extend an invitation to the members of the Society and other interested parties to attend the 1986 General Assembly. The Assembly will be held at the University of Manitoba in conjunction with the Winnipeg Centre's 75th Anniversary celebrations.

Les membres du centre astronomique de Winnipeg ont le plaisir d'être les hôtes de l'assemblée générale de la S.R.A.C. de 1986. Tout les membres de la S.R.A.C. ainsi que toutes les personnes intéressées sont cordialement invitées à rejoindre à nous. L'assemblée aura lieu à l'université du Manitoba et marquera le 75ème anniversaire du centre Royal Astronomique de Winnipeg.

Each year a different Centre of the Society hosts the General Assembly. Usually a four-day event the General Assembly is more than just the business meeting of the Society. Paper sessions, display competitions, banquets, local tours, and the opportunity to meet members from across Canada and elsewhere provide a varied and exciting programme. For the Winnipeg General Assembly special events will include a river boat cruise, tours of the Manitoba Museum of Man and Nature, the Manitoba Planetarium, and Historic Lower Fort Garry, and observing sessions at the Glenlea Observing Site of the University of Manitoba and the Winnipeg Centre.

Display Competition: Prizes are awarded to winning entries in the twelve different categories. Details of the exhibit categories are found in the *National Newsletter* for December 1985. Applications to enter exhibits can be obtained from Mr. Chris Rutkowski of the Papers Committee.

Paper Sessions: We welcome 10 minute presentations from amateur and professional astronomers. Abstracts of 150 words should be approved by your own Centre Councils before being forwarded to the Papers Committee no later than April 30.

For more information on the General Assembly write to Mr. Lorence Mlodzinski of the Registration Committee at:

R.A.S.C. Winnipeg General Assembly
P.O. Box 174,
St. James Post Office
Winnipeg, Manitoba
R3J3R4

The Questar 12 Experience

by **Walter MacDonald**
Toronto Centre

Since September 1984 I have had the opportunity to use the 12-inch Questar telescope at Scarborough College of the University of Toronto. This instrument has a clear aperture of 12-inches, a nominal focal ratio of $f/15$ and a maximum field of view of 29 arc minutes. Piggybacked on the Questar are a 2.5 cm refractor, a 700 mm $f/8$ Questar telephoto lens, and a Celestron 10 cm $f/15$ Schmidt-Cassegrain telescope. The instruments are supported on a Byers mount and enclosed by a fully-motorized Ash Dome three metres in diameter. I have used this telescope visually, photographically, and photometrically.

Despite being located in a city, the telescope reveals an astonishing number of deep-sky objects, and never ceases to amaze me in what it is capable of doing. Most of my deep-sky observing is done using a 16 mm Clave eyepiece, although I occasionally use a two-inch 55 mm Plossl in conjunction with a Lumicon Deep Sky filter for wider field viewing. The globular star cluster M13 and Orion Nebula are knockouts; the planetary nebula NGC 6210 in Hercules is blue; the Clown Face Nebula NGC 2392 in Gemini shows a fainter, hazy envelope surrounding a brighter, mottled core which has a stellar nucleus; the Ring Nebula M57 in Lyra is filled with nebulosity; the open cluster NGC 7789 in Cassiopeia shows many more of its individual stars (the brightest of which are 11th magnitude); the central star in the Dumbbell Nebula M27 is visible with direct vision; and NGC 2419, a globular star cluster in Lynx, is detectable even over the sky brightness of Scarborough.

My most memorable views with the telescope came the night I went through the Virgo-Coma cluster of galaxies with the campus observer. Using photocopies of sections of the Palomar Sky Survey, dozens of galaxies of all shapes and sizes were seen. The most spectacular finds though were two globular star clusters belonging to the galaxy M87 – clusters thirty-five times farther away than those in the Andromeda galaxy.

For planetary work, the 12-inch is at its best. Jupiter is beautiful beyond description. On good nights, I have easily seen eight bands with numerous irregularities in their edges, along with many festoons. I have watched these features, and the conspicuous Great Red Spot, rotate across the face of Jupiter over the course of an evening. The incessant dance of the Galilean satellites in their revolution about the planet brings with it some fantastic shadow transits and occultations. One night I watched as the shadow of Io centrally impaled Jupiter's disc, making it look like a striped 12-inch phonograph record. Such a wealth of activity makes Jupiter a joy to observe every night.

The first time I saw Saturn in the Questar, I stared for over half an hour. This instrument delivers a very large, bright image of Saturn with a clarity I have never before experienced. Cassini's division is plainly viewed as are the shadows the rings cast on the disc of Saturn itself. An apparent slight difference in brightness between the rings and the disc creates an interesting sort of 3-D effect in the Clave eyepiece.

Finally, the Clave eyepiece also delivers some spectacular views of the crescent phases of Venus and Uranus appears as a bright, green disc. The Moon is seen in a wealth of detail. I have spent many nights watching and photographing the Moon and its earthshine. The only drawback to the Questar is that it cannot fit in the whole disc of the Moon at one time, it must be viewed and photographed in sections. Nevertheless, the clarity of the instrument's images are such that the best lunar photographs I have obtained with my 20cm Schmidt-Cassegrain telescope can only compare with the ones I have obtained with the Questar under conditions of bad seeing.

My experiences with this telescope have left me indelibly stamped. With a now radically altered outlook on observational astronomy, I suffer from an acute case of aperture fever, find it hard to work without any observatory, and I am more perfectionist about the quality of my astrophotos than before. Now more than ever, I am doing as much lunar and planetary work as deep sky. So, although you will never be quite the same afterwards, for anyone who does get the chance, I highly recommend the Questar 12 experience.

Reprinted from *'Scope*

Events Calendar

April 19	International Astronomy Day (<i>see page L5</i>)
May 11–13	Canadian Science Writers' Association Conference, Montreal, Quebec
June 27–30	R.A.S.C. General Assembly, Winnipeg, Manitoba (<i>see page L15</i>)
June 29–	
July 4	International Planetarium Society Conference, Tucson, Arizona
July 12–	
August 1	International Astronomy Youth Camp, Violau, West Germany (<i>see page L14</i>)
August 1–4	Mount Kobau Star Party, Osoyoos, British Columbia