NATIONAL NEWSLETTER

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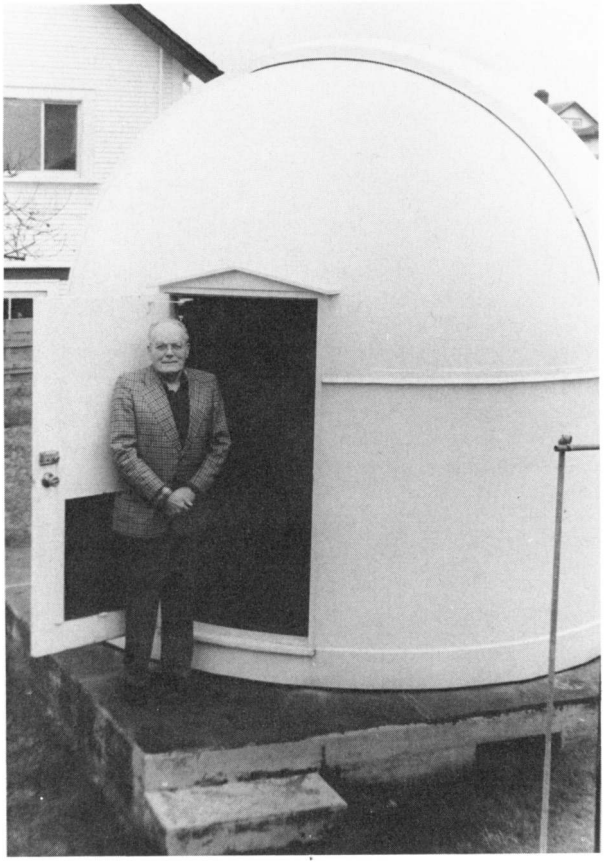

George R. Ball in front of his observatory at Victoria, British Columbia. *Photo by F. Shinn.*

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Deadline for October issue is August 15.

Editorial

by Ian G. McGregor

In addition to the many international events relating to space which have captured the headlines this year, Canada has also been active in announcing new initiatives which will have effect in the years to come. In a series of announcements in recent months, the federal government has made a major committment to Canada's future in space.

On March 18 Prime Minister Mulroney announced that Canada would participate in the U.S. Space Station program with a committment of $800 million over the next 15 years. Canada will provide the Mobile Servicing Station which will operate two moving cranes similar to the existing Canadarms used on the space shuttles. This structure will help build the Space Station, pick up satellites for repair, and dock shuttles using two remote manipulator arms. However, most of the money will come from the "rearrangement of priorities" rather than adding to the approximately $200 million we currently spend on space activities.

A few days later, on March 25, the National Research Council in Ottawa announced the creation of a NRC Space Division to be responsible for Canada's contribution to the Space Station, the astronaut program, the development of industrial capabilities for space-based manufacturing, and the space research programs previously coordinated by NRC's Canada Centre for Space Science.

Finally, on May 12, Frank Oberle, Minister of State for Science and Technology, announced an additional $476 million would be committed to the space program by the year 2000. This included committment to the construction of a mobile communications satellite (MSAT), committment to the astronaut program beyond the three scheduled trips, more funds for space science, and cooperation with the European Space Agency.

Whether this new $1.3 billion 15 year space plan will result in the establishment of a national space agency similar to NASA in the United States or the new British National Space Centre formed only a few months ago we will have to wait and see. But in June over 100 representatives from government, industry and academic circles are gathering in Winnipeg to help formulate a national space and technology policy for Canada. It will be interesting to see what happens.

A Visit to the Ball Observatory

by B. Franklyn Shinn
Victoria Centre

A kilometre or so to the west of downtown Victoria, British Columbia, stands an observatory that would stretch the imagination of most amateur astronomers. Built by George Ball, the observatory shows the inventiveness of a person whose professional career was in electronics.

The first demonstration of the quality built into the observatory occurs when you step inside the door. George stoops down and loosens a couple of turnbuckles, giving a gentle push to the upright beams supporting the dome. The result is the entire observatory rotates smoothly to whatever position desired for viewing.

George has supported the observatory on a ring of individually sprung wheels set on the perimeter of the floor. The bottom of the walls enclose a ring of steel channel forming the track that travels over the wheels instead of the usual system of flanged wheels rolling along a rail. "That way," explains George, "dirt doesn't fall into the track. It faces downwards and stays clean. I'm afraid you'll find it a bit greasy down there!" Asked if it was difficult to get a curved length of channel for the purpose, George explains that he bent it himself. "I built a tool for bending it," he says, and leaves it at that.

While describing the building, George is seated on an observing chair. In front of him is a crank handle by which he can elevate himself or lower himself for a comfortable position at the eyepiece. "Oh yes," he says, "I built that years ago. Never got around to painting it yet, but it doesn't seem to rust. I suppose it's reasonably dry." He rolls it out of the way on its castered feet.

As your interest shifts to the pier you encounter a bewildering array of gears, cranks, shafts and remotely controlled electric systems. But everything is in perfect order and meticulously finished.

Set into the top of the pedestal is a pair of drums precisely engraved with the calibration for right ascension and declination, each flanked with a micrometer calibration on the adjacent shield. "I bent them myself from ordinary peices of black iron strap," says George casually. "Just folded them around and welded them, then machined them and nickel plated them in the basement. I calibrated them on the lathe as well as the vernier scales to go alongside."

At one end of the declination axis is mounted a refractor telescope. "Well yes," says George reaching for one of the wheels with handles on it, "it's off alignment right now because I only use it for tracking." He makes a fine adjustment of the alignment shaft, then picks up the remote control. "Of course, the main drive is controlled by this."

The whirring of tiny motors slows as he reduces the speed of movement. The correcting motors of both axes, declination and right ascension drive, are of infinitely-variable speed, so that no hand need touch the instrument during a photographic exposure.

Lately, George has been trying out a new accessory. Mounted on the opposite end of the declination shaft and aimed in the general direction of the dome slit is a lensless Schmidt Camera. It is housed in a plywood box, perhaps 25 cm square in cross-section and about 1.5 m long.

"The normal Schmidt camera has a spherical mirror primary and a corrector lens at the centre of curvature which corrects the spherical aberration," George explains. "Somebody wrote that you could put a diaphragm at the same point and it would do almost the same thing. I wanted to try it. The usual corrector lens is about two-thirds the diameter of the main mirror, so I am using a diaphragm about two-thirds the diameter of my 9½ inch primary mirror. It seems to work very satisfactorily." George subsequently produced a 35 mm film for examination under a microscope. In the centre was an image of the Ring Nebula in Lyra. Around it, star images stretched to the edge of the field, well over a degree to all sides. Images were point like to the extreme edge. Brighter stars were designated by the diffraction spikes of the support for the camera, and were completely symmetrical as they disappeared from view in the frame.

George opened the side of the tube. "Here's where the film goes," he pointed out. "I'm using round film now that goes in these holders that screw on over the transfer lens. The transfer lens is just beyond the focal point and I have a diagonal behind it so that it is one of the few Schmidt cameras that allows you to look into it and see that you have the image centred. Oh, by the way," he went on, "you might notice that my door is inside the tube, hinging inwards – not outwards as you usually will see it. Sometimes

when you are screwing the camera film holder in place, it could slip out of your hand and then it would fall onto the primary mirror. My door opens inwards, hinged at the bottom, so that it leans across the inside of the tube below where you are working. Then if you drop anything, it just gets caught right there."

Adjacent to the Schmidt camera is a rich field telescope that George made a few years ago and only uses now as a finder. (Many of us who have muttered at the finders on commercial telescopes would like to get our hands on a main instrument equal to George's "finder"!)

"Oh, at the top of the tube is the shutter. You might find this interesting," says George. He pushes a lever adjacent to the bottom of the tubes and a flap at the upper end drops out of the closed position and lies on the lower side of the box. "You only have to push this half as far because I fitted a distance doubler in the linkage up top." The pushrod from the lever connects with a system of a floating gear about 2 cm in diameter running between two racks. "I made the racks out of the big gear from the spring of one of those old big kitchen clocks. I just cut the edge off and straightened it out and it worked."

George moves to the head of the telescope and takes hold of a crank. As he turns it, the slit shutter begins to descend. "It's counterbalanced by a spring. As I open it the shutter gradually moves up the front until it crosses the top, then it descends over the back of the dome. That shifts its weight so that the spring is stretched when the shutter is down, gradually eased until it reaches dead centre, then is stretched again as the weight takes over down the back of the dome." There is also a small shutter closing the lower quarter of the slit. It too has spring loaded assist.

Now if George can come up with a way of closing off the streetlights of Victoria linked to the opening of those shutters he would just about have the amateurs idea of Heaven, wouldn't he? "Yes, deep sky filters do help, but you have to get used to them. I think you miss them more after you take them off than appreciate them when you first put them on. Perhaps the eye takes time to adjust. By the way, come on in the house. I've got something else you might like to see. " George has – a basement full of them! But that's another story.

Trying Astrophotography

by Bill Braithwaite
Toronto Centre

One cool evening alone in my backyard, I pointed my telescope to Saturn: there it was, like I had never seen it before, crystal clear. For the first time in my life I clearly saw the Cassini division in the rings. I can write the words describing what I saw, but words cannot describe the emotional experience. I wanted to bang on my neighbour's door and invite him over to have a look, but it was two o'clock in the morning. What should I do? Astrophotography was my answer.

Some of my first good photographs were taken by using my telescope as a tracking platform for my camera. With only 64 ASA film, a 50 mm f1.4 lens and eight minutes exposure time, I took some fairly good constellation shots. Using this setup to photograph the constellation Andromeda, I was pleased to have recorded a faint smudge of light that came from a galaxy over two million light years away.

Results from using my Celestron-8 telescope at prime focus were disappointing except for photographs of the moon. Long exposures require a drive corrector which I do not have.

With eyepiece projection, I was happy with the results of my Jupiter and Saturn shots. From the twenty exposures I took of Saturn, I selected two for showing at a Centre meeting. Unfortunately, I was unable to record the Cassini division in Saturn's rings. It also seems exposure time is very important in trying to best bring out the subtle colouring in Jupiter's cloud bands. My best result with Jupiter was using a 10.4 mm eyepiece with 100 ASA film for about a five second exposure. With 400 ASA film I tried on Saturn I had good results for about one second with a 17 mm eyepiece and about eight seconds with a 10.4 mm eyepiece.

Finally, as a beginner, what seems good to me may be mediocre to an experienced astrophotographer. My eyepiece projection shots of the moon lack sharpness. These disappointing results are probably due to a combination of taking short cuts, lack of experience and also atmospheric conditions. To those who are just starting out, a recommendation: be sure to keep records of technical data on all your exposures, good and bad. This way your mistakes will be a useful reference in the future.

Reprinted from *'Scope*

How To Choose The Best Sky

by Alan Rahill
Winnipeg Centre

For the past two years I have used the Centre's Glenlea observatory site to do most of my astronomical work. I had the chance to use numerous types of telescopes with apertures varying from 8 to 45 cm at the site. Last spring I had the chance to observe dozens of galaxies in the constellation of Leo using my Celestron-11 and a 45 cm Dobsonian telescope. To my surprise, the larger telescope did not perform as well as I had expected earlier. In fact, my Celestron-11 gave similar images with more contrast than the larger Dobsonian. The reason for this is the site. At Glenlea, the sky is too bright for such a large instrument. These conclusions also applied for smaller instruments.

Last autumn, I had a conversation with William Peters of the Manitoba Planetarium about this subject. He told me of the good performance of an 8 cm telescope he had used in Africa a few years before. He had observed nebulae and galaxies which he had thought were only within the grasp of larger instruments. The lesson to be learned is that if you want to improve your astronomical observations, finding a better site might be preferable to getting a larger instrument. This article may help you find such a site.

As you have probably already realized the first thing to do is to be far away from large cities. For a city the size of Winnipeg, you have to find a site at least 70 km away. I remember a conversation I had with Dr. Rene Racine (former director of the CFHT Telescope in Hawaii) in 1977. We were at the Dow Planetarium in Montreal and looking at the projected stars on the theatre dome. I told him that I lived 70 km from Montreal and that I had never experienced dark skies similar to this one. He replied that skies comparable to the planetarium "sky" existed about 200 km outside Montreal. Therefore, don't be afraid to drive a bit further to do astronomical observations.

Now where should you go? North, south, west, or east? To answer this question, we have to consider many criteria such as weather, geography, pollution, etc. An excellent site for astronomy should have low extinction and good seeing conditions. Seeing affects mainly planetary observations and is the term used to denote how well or poorly the atmosphere allows an image to appear. All astronomers know that light is refracted when it passes through different mediums having different densities. An observer looking through a telescope peers through almost 100 km of atmosphere sky-lens. Due to the motion of the atmosphere, at times the sky lens is convergent and later divergent. Thus a star appears to scintillate, or "twinkle". Any air turbulence or variations in temperatures and water vapour densities layered in the atmosphere deteriorate the seeing.

Extinction affects primarily deep sky observations. Even a cloudless atmosphere automatically weakens starlight intensity by 20% at the zenith and approximately 30% at 45 degrees above the horizon. It is related to all kinds of natural or manmade pollutions such as pollen, sea salt, smoke particles, industrial pollutants, volcanic ash and others. Also good deep sky conditions require an atmosphere free of water vapour, stray light, and the moon. The first requirement for a good deep sky atmosphere is low water vapour content. For a pressure of 100 Pascals, and a relative humidity of 100%, there is 100 times more water vapour in the air with a temperture of 30 degrees Celsius compared to a temperature of –30 degrees Celsius. In other words, winter skies in Manitoba are just great for deep sky observations. During the summer months, astronomers should avoid terrain having water vapour sources nearby. The observer should be 40 to 90km away from large lakes and at least 10km away from marshes, rivers and ponds. Also avoid areas covered with heavy vegetation due to evapo-transpiration. In the cold months, open lakes are warmer than the surrounding frozen land. The combination of heat release from the water and the moisture in the atmosphere produce poor seeing, clouds and precipitation on the lee side of a body of water. Consequently, the windward side (the west side of Lake Manitoba, for example) is a better area for astronomical work.

You should avoid a site downwind of a large city because of the manmade pollutants. For southern Manitoba, the prevailing winds are from the north or northwest during the winter months and the south for the summer. Because easterly winds are mainly accompanied by cloudy skies, the only sector left to escape from the smoke of the city of Winnipeg is to the northwest during most clear nights.

The seeing is improved if the observing site is located in an area of high reflectivity and low heat storage. This allows the atmosphere to cool quickly and eliminates vertical motion of the air in the lower levels which produce poor seeing. Light coloured surfaces reflect energy and dark surfaces

absorb sunlight and store heat. Fresh snow has the highest reflectivity with an albedo of 80–85 followed by old snow 50–60, sand and grass 20–30. Canada has an advantage during the winter compared to our friends in the south.

Another phenomena which occurs during the night is very important for astronomers. After sunset, the ground cools faster than the atmosphere and creates the "inversion layer." Usually the thickness of the layer extends up to about 900 m above sea level. One of the characteristics of the inversion is to trap all the moisture and pollutants within the layer. To escape this cool, humid, and dirty air, professional observatories are often situated above the local inversion layer. A hundred metres can make a big difference in sky transparency. According to this criteria, Riding Mountain Park is probably the best deep sky site in Manitoba. In other words, this park has had the highest occurrence per year of excellent transparency of the sky.

For planetary observations, seeing conditions are much more important than the transparency of the sky. Therefore you don't have to drive as far from the city. In planetary work, magnifications of 75–200x are common. Some instruments may surpass 400x when seeing is extraordinary. To benefit from good seeing conditions, the optics of a telescope must be brought to thermal equilibrium with the surrounding air. If this does not take place, disruptive air currents will cross the image path and display a floating image. Also, you should avoid any area where heat is released into the atmosphere, like a city or near a lake having an internal temperature warmer than the air. For the backyard astronomer, best seeing will be accomplished in the early morning hours when chimney and auto emissions are at a minimum. Very good planetary astronomy can be practiced when the upper winds are as motionless as surface winds. This occurs when a high pressure area system stagnates over the area for several days, producing a still atmosphere in all layers. To recognize this situation, listen to the weather reports and if you hear "... a high pressure area will remain stationary over southern Manitoba for the next few days ..." or "... a blocking system will give sunny skies for the next ... ." This might be an excellent occasion to observe the moon or planets.

I have experienced the finest seeing during humid nights with fog patches in the area. The reasons for this are as follows. Under clear skies, fog develops when there is moist air, light winds, and stable air. The humid air near the earth absorbs irradiated heat from the ground and slowly distributes it through the dense atmosphere. As the night progresses, a small inversion appears. Consequently, there are no strong vertical currents and the air is stable. The big problem is dense fog and condensation on the lenses of the telescope.

Many amateurs spend hundreds or thousands of dollars on a telescope, and do most of their observations in the city or nearby. They don't use the full potental of their telescope and are disappointed with the performance. If you want to enjoy astronomy, you need the darkest site with the maximum transparency and excellent seeing conditions.

Reprinted from *Winnicentrics*

Missing February Publications?

The press run for each issue of the Journal and National Newsletter is based, in part, on an estimate of the number of members the Society will have in the current year. The task of estimating the number is difficult, partly because the various Centres usually submit membership lists quarterly, the numbers to the end of December being reported in mid-January. However, an unusually large increase in membership occurred during the early weeks of 1986 and most of these were not reported to the National Office until long after the printing of the February issues was completed. Despite the usual practice of printing many more copies than we expect to use, and through no fault of anyone, several new members now do not have copies of the February Journal and National Newsletter.

Those members who wish copies of the February *Journal* and *National Newsletter* (or even just a few pages from one or both publications) should contact the Society's Executive Secretary, Rosemary Freeman, at the National Office and xerox copies will be sent free of charge.

My Best Night?

by R. J. Kirland
Edmonton Centre

One night, not to long ago, I was driving back into the city from my favourite observing site, a place far away from city lights. I cannot remember the exact date, or what I had seen, but I do remember that it had been a particularly good night at the telescope. I remember wondering if it had been my best night at the telescope, and if it had not been which had. When was my best night of observing? Was it perhaps fifteen or twenty years ago when, as a boy, I first turned my small binoculars toward a faint glow in the sky and discovered the glittering, jewel-like Pleiades star cluster? Was it ten or fifteen years later, when, having rediscovered my interest in the sky and in the stars, I turned my home built 30 cm telescope toward Orion's dagger and saw for the first time the weirdly glowing lacework of the Great Nebula?

I dug out my notebook and turned the pages, looking for that one special night: the best night.

July 1, 1981 : My first night with a telescope under dark skies. M13 the globular cluster in Hercules fills the eyepiece. A thousand thousand stars compressed into a mammoth ball, glittering like finely ground diamonds against a background of the blackest velvet.

April 29, 1982: The spiral galaxy M51, one hundred billion suns suspended in space. The whirlpool shape of the spiral arms just barely visible yet able to draw you toward the vortex and down.

August 17, 1982: A remarkably clear, dark night and M27, a ball of gas ejected by an exploding star, so brilliant and clear that the wings seem almost as bright as the unmistakable dumbbell shape that gives the nebula its name.

October 8, 1982: My first glimpse of the faint, delicate wisps of glowing gas known as the Veil Nebula, leftover debris from another exploding sun.

December 13, 1982: The Double Cluster in Perseus, seen for the first time in an 11 cm rich field telescope. Two clumpings of hundreds of tiny stars, brilliant and beautiful.

April 5, 1983: My first exploration of the Virgo Cluster of galaxies. Dozens upon dozens of blurs of grey light – that's all. Some round, some long, some spiral, some banded – each blur the collected light of hundreds of billions of stars. The light itself having travelled some seventy million years before reaching my eyes.

Or was it any of the other dates marked in my notebook – March 17, 1984? – April 24, 1985?

Was it that one summer's night, the date long forgotten now, as I waited for the sky to darken and watched a sunset so perfect, so intense, so beautiful, that the rest of the world seemed pale and insignificant in comparison? Or a night when the full Moon appeared low on the northern horizon ... the northern horizon? ... No! wait, now the Moon has grown an arm and is spreading, broadening out into an arc. It's some kind of auroral display, soon it fills the entire northern sky. Was it the night I sketched the Owl Nebula, or the Footprint Nebula? The night I watched the Orion Nebula for nearly three hours, unable to tear myself away? Was it the night I first saw the Ring Nebula, or the dark lanes in M31?, the Andromeda Galaxy.

My best night? Looking through my notebook I finally did find my best night. I cannot put a date to it though. For it could be any night, you see. Any night when you have driven out into the country and your eyes are tired after staring at the road too long. The glare of the headlights seems burned onto your retinas, and you wonder if it really was such a good idea, coming out tonight, driving so far, so late. You get out of the car and look up look up, there are so many stars that you forget to breathe for a while. Auriga, Andromeda and Orion await you. Or the luminous bands of the Milky Way trace through Cygnus and Aquila and tempt you down into the treasure chests of Sagittarius.

My best night like yours could be any night, or every night. You do not need a telescope. You do not need binoculars. As long as you have eyes for seeing, a mind for wondering and an imagination for dreaming. The rest, from the beginning of Time to the edge of the Universe, is already there, waiting.

Look up.

Reprinted from *Stardust*

Observing at the Special Observatory

by W.H. Vehlau
University of Western Ontario

The largest optical telescope in operation in the world is the six metre telescope at the Special Observatory of the USSR Academy of Sciences so a brief report on an observing run there may be of interest.

For several years, Dr. V. Khokhlova and Dr. N. Piskunov, both of the Astronomical Council, Moscow, Dr. J. Rice of Brandon University and I have been mapping the distribution of the elements, and now the magnetic fields, on the surfaces of a special class of stars known as Ap stars. We were given five nights on the telescope for high resolution spectroscopy and this later was modified to eleven partial nights.

The Special Observatory is located near Zelenchuk on the northern edge of the Caucasus mountains at an altitude of 2100 m. The latitude is 44 degrees north and the climate is generally similar to that at my home in London, Ontario. In fact, it was an unpleasant surprise to return from the mild spring-like weather in Zelenchuk and Moscow to blizzard conditions in Ontario. However, the mountain location of the observatory does generally lead to more frequent high winds there.

The telescope has been in operation for ten years and performs very well indeed. Headquarters, including a "hotel" for visitors, is located 800 m below the observatory in the steep valley of the Zelenchuk River. Library, shops, etc. are located there, forming a community of several hundred people, all directly or indirectly associated with the observatory.

While observing, visiting astronomers live at another "hotel" on the same ridge as the telescope and somewhat more than half a kilometre from it. Also on that ridge are two small telescopes – one for testing equipment and the other belonging to Kazan University. The view of the mountains to the south and west was spectacular, particularly at that time of year with snow on the rugged peaks.

The telescope has an altazimuth mounting and viewing it from the control room and a visitors' gallery shows the interior of the dome and the telescope. Its massive size, simplicity of design, and neat appearance are really impressive. Setting and tracking accuracy of a few seconds of arc is obtained by the drive and control system which interprets data on position, temperature, and flexure of the telescope. The building itself contains shops, offices, bedrooms and other facilities also found at other large observatories.

Our observations were made photographically with the "coude" spectrograph, mostly using the long camera. In fact, this spectrograph is mounted vertically in one of the supporting arms of the telescope. The slit is at one Nasymth focus, about three stories above the floor of the dome. Access is by elevator, or during an exposure, by stairs. Medium dispersion spectroscopy is carried out at the other Nasymth focus, and direct photography at the prime focus.

Typical seeing is about three seconds. An appreciable fraction of this is produced in the dome so efforts are being made to eliminate the warm air responsible. An image slicer has been constructed to improve the slit efficiency, but it was not yet in operation when I was there. The site is probably the best in the western USSR with about 1300 hours per year of clear observing time. At the time of construction of the observatory, it was realized that better sites existed further east but the cost of road construction and related expenses would have been prohibitive then. A few nights per year are lost because of high winds. Also the dome is not opened when the difference in temperature between the mirror and the outside air exceeds 10°C, which may also cost a few nights per year (unfortunately, two of them during my visit). Very little time is lost because of telescope problems (only three hours last year) but of course, as at any large observatory, some time is lost because of other equipment problems.

Our visiting observing team consists of Drs. Khokhlova and Piskunov and myself. The staff astronomer for our visit was Dr. Glagolevsky, an expert on the measurement of stellar magnetic fields, assisted by two astronomers of his group who participated fully in the adjustment of the spectrograph and the observing. In the dome at night, in addition to these astronomers, were three other staff members responsible for telescope operation and any maintenance that might be required in the mechanical, electrical, or computing systems. There were also several other staff members there who had no direct involvement with our observations.

The language of communication at the observatory is Russian! Some of the people there do speak English – from very good to very poorly. French appeared to be considerably less used. Fortunately, my two observing partners speak English fluently. Of course, most of their discussions with others had to be in Russian, which effectively prevented any direct participation by someone who does not speak Russian. This also limited some of the scientific interchange as well.

Although poor weather limited the observing, this visit allowed me to discuss our current research efforts and future plans with my colleagues there. While in the USSR I was a guest of the Soviet Academy of Sciences. For the very kind hospitality shown me, I thank my colleagues at the Astronomical Council, other members of our observing group, Dr. Snizhko, the Associate Director, and members of his staff.

Reprinted from *Cassiopeia*

European Amateur Astronomy

The Belgian Vereniging Voor Sterrenkunde (Astronomical Association) is organizing an International Meteor Weekend to be held on October 3–6, 1986 in Hingene, Belgium. These weekends have been held in Germany (1980), Belgium (1982), the Netherlands (1983) and again in Germany in 1985. Their aim is to stimulate international cooperation among amateur meteor observers by holding lectures and informal talks.

The V.V.S. Meteor section also publishes an international circular with reports on meteor observing from different groups around the world. For further information about the V.V.S. contact:

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Belgian, Dutch and French amateur astronomers have been observing since 1984 in Puimichel in the Haute-Provence in the south of France. There is equipment for astrophotographers available as well as some larger instruments (e.g. 406 mm Newtonian). A l-m mirror is under construction and will be operational by 1987. Amateur astronomers can stay in Puimichel in a house renovated as a residence for amateur astronomers. The meals are provided by the caretakers of the house and about 20 beds are available. The price for meals, the use of the instruments and the overnight taxes is about $20 a day. It is hoped that an international camp for meteor observers in the summer of 1987 can be organized. This camp would last at least 2 or 3 weeks. Amateurs interested in staying in Puimichel at any date can get further information from:

Dany Cardoen
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Puimichel, France

Halley from 35,000 – A Great Success

by Steve Dodson
Science North

Looking at the bright faces and hearing the lively chatter of the hundred people of all ages who gathered at the Sudbury Airport between 11:00 and 12:00 it was hard to believe that it was near midnight, and not late morning. These men, women and children, from all over Ontario, gathered in what would otherwise be a near-deserted northern Ontario airport, were not preoccupied with a quick trip to the comforts of home. They were out to devote the whole night (or whole morning of Saturday, April 5) to an unique once-in-a-lifetime scientific adventure – a DC-9 flight in search of Halley's comet that brought together in partnership Air Canada, Science North, and veteran Halley-observers from the Sudbury Astronomy Club.

During the two-hour pre-flight information session held two weeks prior to the flights, participants were told that, when at its best, would never come higher than 14 degrees below the horizon for would-be watchers in Northern Ontario and most of Canada. But only an hour and a quarter of flight time southwards to a point east of Cincinnati would produce a 7 degree latitude advantage, and the flight's 35,000 foot altitude would actually cause the horizon to drop away about 3 degrees. Together these effects would bring the comet 8½ degrees above the horizon – well up into clear dark sky for easy visibility. Moreover, Comet Halley appeared to be smiling upon the venture, appearing in late March to be running nearly two full magnitudes brighter than the best predictions available in the eight months before when planning of the expedition began.

At 1:00 a.m. Saturday, April 5 the flight participants, with boarding passes and 18 page flight logs in hand, were reminded of all the key points and observing techniques in a final briefing. The log book provided for each participant's recording of observations, data, and impressions at all phases of the flight. It was also a manual containing all the information, explained fully at an information session in March, needed to make the flight a success. The energy and enthusiasm that charged the atmosphere at the airport during the final briefing seemed to assure that the flight was already a once-in-a-lifetime thrill. The Air Canada Captain and the meteorologist on duty (Jim Newcombe and Monique Lapalme) completed the briefing with the relevant aeronautical and meteorological updates.

Security check and boarding began at 2:05 a.m. EST and lift-off came at 2:33. The lights of small towns along the Georgian Bay coast and the glow of southern Ontario towns slipped swiftly beneath the DC-9's wings, and soon the huge bright grid of Cleveland's lights lay broadly spread-out ahead. At 3:20 a.m. the cabin lights were extinguished and the dark adaptation period began. Further aids to night vision in the form of Mars bars provided by a local grocer were distributed. At 3:30 a.m. Steve Dodson and Sudbury Astronomy Club Vice-President, Greg Beach, conferred and took turns checking for the comet's visibility through the cockpit windows. The beautiful star cluster Messier 7, normally glimpsed dimly through the horizon-haze in northern Ontario skies, glowed fiercely as it floated high up above the horizon. Astronomy Club President Fred Boyer saw stars as faint as magnitude 6.2 but the comet's location lay hidden in high cirrus cloud belonging to a major storm system approaching from the west. The lights of Columbus, Ohio loomed ahead. Hopefully the next 15 minutes of southward flight would coax Comet Halley to rise out of the clouds! At 3:38 am. lady luck broke into a broad smile and in quick succession Greg Beach, Gerry Bourque, myself, and several others spotted the comet.

At 3:45 a.m. Captain Newcombe turned eastwards placing Comet Halley squarely out the windows on the right hand side of the aircraft. Five members of the Sudbury Astronomy Club stationed themselves up and down the dark aisle, each assisting at four windows, helping each participant to make the most of his turn. In about 5 minutes a 180 degree turn brought the comet to the other side of the plane. The excitement mounted as more and more of the people reported seeing Comet Halley. Before the airplane completed the second 180 degree turn it became obvious that the personal success rate would be 100%. A total of four turns accompanied by seat exchanges provide a 5 minute turn at viewing the comet for each person. Most people also traced-out the tail structure of Halley with binoculars. At any given moment, many more people than those at the 20 window seats were able to position themselves for a peek. Enthusiastic cooperation was the hallmark of this company of adventurers. At about 4:20 a.m. as the aircraft turned northwards and the cabin lights returned there was great cheering and applause as all aboard celebrated their success.

One especially pleased adventurer was 80-year-old Dorothy Forster of Sudbury. Comet Halley had made one complete journey around the sun since she witnessed it as a three-year-old girl on a farm in the Niagara Peninsula in 1910. For her, the flight was the exciting climax of a series of second apparition sightings that began in November 1985 at a comet party with telescopes set up by Science North and the Sudbury Astronomy Club.

As soon as the lights returned the flight attendants speedily served a splendid gourmet dinner with imported wine – a victory feast compliments of Air Canada! This and other special hospitality was coordinated by Bernie Reid of the local Air Canada office.

During the pre-dawn dinner all on board circulated their log books for autographing by their companions. The pilot representing the flight crew and myself representing the astronomical crew signed each passenger's certificate of participation. No doubt these logs and certificates will be carefully kept and shown to grandchildren as Halley approaches again in 2061!

At 5:30 a.m. the lights of Sudbury punctuated the morning twilight and Captain Newcombe set the DC-9 down on the runway within a minute of the planned three hour flight duration. A great cheer and applause went up for the crew, the flight attendants, and Air Canada who made this a flight like no other.

On disembarking, the passengers assembled in front of the aircraft with the crew for a group photo taken by Carl Hoeg. Colour prints of this photo and a photo of the comet would be distributed to all participants at a post-flight debriefing session to be held later at Science North.

Incredibly, the April 5 flight was followed 24 hours later by an equally successful flight in almost identical circumstances by another 100 comet seekers. The second group was equally successful and enthusiastic, and the only difference between the two flights was the light rain encountered Sunday morning April 6 when disembarking in Sudbury. On the second flight another twice-in-a-lifetimer, Alice Cameron, exuberantly expressed the excitement of her airborne sighting as she received a certificate recognizing this rare accomplishment.

These flights were a stunning success and an unforgettable once-in-a-lifetime experience for all involved. That everyone experienced the thrill of the sighting was possible in a special way because of the enthusiastic and skillful volunteer assistance of the astronomical crew members Alan Ward, Wilf Meyer, Fred Boyer, Greg Beach, Carl Hoeg, and Gerry Bourque.

Comet Halley: A View from Arizona

by Angelika Hackett
Kingston Centre

This past spring many people headed to the southern hemisphere in order to observe Comet Halley. As I live in Vancouver, I decided to travel south for a better view and took advantage of an opportunity to visit well-known Canadian amateur and fellow Kingston Centre member David Levy on his "telescope farm" near Tucson. It also turned out that I could not have chosen a better time than the March 20–22 period to observe the comet. It was just before the moon began to interfere with observing and the dark, clear skies offered excellent naked eye views of Halley.

From my observing site I had to wait until about 4:45 a.m. for the comet to rise high enough above the mountains (about fifteen degrees from the horizon) for it to be observed and photographed. The comet's tail extended about five degrees and the comet was a magnificent sight through David's 40 cm reflector. Quite a change from two months earlier when I had seen it from a light-polluted suburb of Vancouver! It was an exciting feeling to view this famous object after having heard about it since childhood.

In the late spring I am going to have a baby who may one day be interested to learn that he or she was actually present at these observations. May this new little person have the opportunity to observe Comet Halley during its next return, a lifetime from now!

Across the R.A.S.C.

KINGSTON: Congratulations to President David Stokes who is the first recipient of the Centre's new award, the Dr. A. Vibert Douglas award. The citation recognizes David's leadership in running the Centre and contributions to promoting interest in astronomy. Another Centre member, Warren Morrison, has been awarded the Society's prestigious Chant Medal for his contributions to astronomical research including the discovery of Nova Cygni in 1978, discovery of the latest outburst of recurrent nova RS Ophiuchi in 1985, and almost 14,000 variable star estimates between 1979 and 1983 alone.

WINNIPEG: The spring was spent getting the last details of the General Assembly (June 26–June 30) worked out. The new Ash Dome for the observatory at Glenlea was scheduled to arrive at the beginning of May and the old wooden dome is now surplus. Centre President and *Winnicentrics* Editor, Stan Runge, is working on a thematic basis for each newsletter. The January-February issue highlighted deep sky observing programmes and the March-April issue focused on astrophotography.

CALGARY: Highlights of the upcoming summer programme will be the Third Annual Camping Outing at Camp Gardner in July and the annual summer Barbecue at the Wilson Coulee Observatory in August.

HALIFAX: Longtime active members, Diane and Randall Brooks, have moved to England as Randall pursues his doctorate in historical astronomical instruments. New Centre Treasurer, David Tindall, noted in the March-April issue of *Nova Notes* that membership has increased from about 25 members in 1972 to over 100 today but it is unclear whether hosting General Assemblies in 1975 and 1980 had any effect. Gordon Hawkins reported in the same issue that a new Centre observing site had been located outside Halifax.

EDMONTON: Dave Beal, Keith Janke, John Savard, John Sylvester, and Mike Noble as well as other members helped out the Space Sciences Centre with observing Comet Halley from late December to January 20. Some 10,000 people attended and almost every night was clear. An Observing Activities Committee under Bruce Foster has been formed to propose new observing activities and make recommendations regarding a permanent observatory or site. Diana Wood reports the formation of a new astronomy club in Fort McMurray, Alberta.

HAMILTON: Toni Quinn reports that a field night organised by Mike Jefferson was held in March at the Centre's observatory with 14 people in attendance. A number of new members came out for the first time and were treated to a slide show by Clive Gibbons and Barry Sherman. Similar evenings are planned for the future.

MONTREAL: Plans to get a Centre telephone number linked up with a telephone answering machine are reported in a recent *Skyward* by President Mario Caluori. An Open House was planned for the spring to let the news media see a real astronomical observatory and learn about the activities of astronomers. A new Observations Committee has been formed with nine sections each under an experienced observer.

VANCOUVER: Centre President Karl Miller reports that plans for incorporation are proceeding satisfactorily. Recent talks with the manager of the Centre's present observing site at Campbell Valley Park were encouraging but incorporation is necessary for development of a permanent site. David Dodge, Gary Wolonski, and Greg Soderling are completing a 25 cm f/13 Cassegrain reflector for use by members. Also, David Dodge spotted a very bright fireball on February 18 which exploded while under observation. He is looking for other people who saw the event with the possibility in mind of recovering some meteorites.

TORONTO: Mary Anne Harrington and Kathleen Fall organised a successful New Members Night in May to orientate the hundreds of new members who have joined the Centre since last year. As with other Centres, membership has exploded with the "Halley madness" and efforts must be made to retain some proportion of these when Halley is but a memory. On May 24, the Centre hosted the spring meeting of the Niagara Frontier Council of Amateur Astronomical Associations (N.F.C.A.A.A.) with distinguished amateur observer Warren Morrison as guest speaker.

VICTORIA: Members organised a public Astronomy Day Star Party on May 10. It was followed a few days later by Activities Night on May 14 when members gave a series of short talks on their observing activities. Starting in April, the Dominion Astrophysical Observatory will be holding its annual public observing nights with support from telescopes of the Victoria Centre. Centre President and *Skynews Victoria* Editor, Muriel Enock, reports that the annual series of public lectures titled "Summer Evenings with the Stars" will be running on August 6, 13, 20 and 27.

OTTAWA: The Centre has a new mailing address. Correspondence should now be directed to: Ottawa Centre R.A.S.C., P.O. Box 6617, Postal Station J, Ottawa, Ontario K2A 3Y7. In February, the Centre's radio telescope at the Indian River Observatory picked up its 7th and 8th radio sources identified by it so far. These are Perseus B, a faint galaxy, and IC 443, a supernova remnant. Kyle Nunas has proposed a Planet Race observing competition (similar to the Messier Marathons conducted by some Centres) which would consist of observing all the planets and as many moons as possible within a three month period.

Across the R.A.S.C. is a regular feature of the *Newsletter*. Centre Editors and/or Secretaries should send reports and newsletters to the *Newsletter* Editor. Deadline for the October issue is August 15.

Nouvelles du Centre de Québec

par Damien Lemay

Pour les amateurs d'astronomie de la région de la ville de Québec on rappelle que l'adresse du Centre de Québec de la S.R.A.C. est: C.P. 9396, Saint-Foy, Québec G1V 4B5.

Même si l'adresse est toujours la même, plusieurs changements sont venus affecter l'opération du Centre de Québec. Le plus important est la signature d'un protocole d'entente intervenue avec le Collège de Lévis, à l'effet que le Centre peut utiliser l'Observatoire du Collège localisé à St-Nérée, l'accès leur étant réservé pour tous les samedi et dimanche, plus plusieurs autres soirs dépendant des disponibilités. Cet observatoire accessible à l'année longue, est équipé d'un Celestron-14, d'une caméra Schmidt de 200 mm (8 po) d'ouverture ainsi que d'un télescope guide de 150 mm f/lS. Le tout est entraîné par une monture équatoriale de haute précision qui fait l'envie de plusieurs amateurs.

Le deuxième changement d'importance est l'endroit des conferences mensuelles, qui ont désormais lieu 1'Amphithéâtre de l'Aquarium de Québec. Ce changement a été rendu nécessaire à cause de la difficulté de plus en plus grande d'obtenir une salle de cours a l'Université Laval et les problèmes de stationnement sur le campus.

Ceci marque la fin d'une longue affiliation du Centre de Québec avec l'Universite Laval, plus spécifiquement le Département de Physique. Ces changements sont survenus après une longue évolution sans douleur et le Centre de Québec remercie sincèrement l'Université Laval pour les nombreuses années passées sous sont toit. Ce déplacement ne signifie pas que tous les ponts sont coupés, l'Observatoire de l'Université Laval à St-Elzéard continuant à recevoire le Centre de Québec occasionnellement.

Searching For Early Perseids

by Peter Brown and Mark Zalcik
Edmonton Centre

Meteor activity in the early summer is represented not only by a steadily increasing rate of sporadic meteors, but also by a host of minor showers that are hardly noticeable because of their low rates (see 1986 *Observer's Handbook* pp. 146–147). However, in late June, the leading elements of the most widely-observed meteor shower, the Perseids, make their first appearance in our skies.

Unlike the other major annual meteor showers, the Perseids are a summer long event. Starting in late June, the peak of activity does not occur until the early morning of August 12 when the single observer hourly rate is about 50. At this time the Earth is passing through a stream of rock or dust – debris from an old comet – which is orbiting the Sun. Though the Perseid stream may not be the most consistently prolific in respect to peak rates, as observers of the December Geminid shower are quick to point out, few will question the dominance of the Perseids in the longevity department. Whereas the Geminids fleetingly come and go in a two-week period, the Perseids significantly boost meteor rates for many nights on either side of the peak and may announce their presence in our skies for weeks on either side of the August peak.

It is because of the stream's duration and strength that observers sense its power for so long. With their orbits inclined greatly in relation to the ecliptic, the material in the Perseids are generally unaffected by the gravitational pull of the planets, assuring good displays for some time into the future. Proof of this is found in the manner in which the Perseids adhere to their radiant as it moves relative to the background stars while other showers near the ecliptic have radiants resembling extended circles rather than points.

With the motion of the Perseid radiant being a speedy 1.35 degrees eastward per day (see Table below) and Perseids visible for many weeks, it is not surprising that only for a short time do these meteors actually emanate from the constellation of Perseus. In late June the radiant is in the constellation of Lacerta, by mid-summer in Perseus, and by October, in Ursa Major. But in June and October, the rate is only a few meteors per night.

EARLY PERSEID RADIANT POSITIONS

Date	R.A.	Dec.	Constellation
June 24	22 10	+52°	Lacerta
July 1	23 04	+52	Andromeda
8	23 59	+53	Cassiopeia
15	0 08	+53	Cassiopeia
22	1 03	+55	Cassiopeia
29	1 12	+56	Perseus
Aug. 5	2 07	+57	Perseus
12	3 01	+57	Perseus

Positive detection of such low shower rates is perhaps easier said than done. For most meteor streams, their members slowly creep out from the background sporadic rate in a most subtle fashion and only when a rate of 3–4 meteors per hour is a shower's individuality secured. Many experienced observers are skeptical about reports of low activity from any shower, preferring to work with larger numbers where observer subjectivity will be a less dominant factor.

Two factors aid the early identification of the Perseids before the end of July. First, the Perseids are relatively fast moving meteors (about 60 km/s) compared to the more slow moving members of other summer showers which may be only moving at one-third to one-half the Perseid speeds. Second, the Perseids tend to have more meteors with enduring ionization tails, about one in three seen.

With a little patience and observing practice, it is indeed possible to detect Perseid meteor activity six weeks or more before its triumphant peak in August. Many R.A.S.C. Centres organise Perseid watches around this peak but an interesting observing programme would be to search for the leading members in the preceding weeks. The authors would be pleased to correspond with other meteor observers and can be contacted at their addresses listed in the April 1986 *National Newsletter* page L21.

Conferences East and West

Two major conferences are being held in the mid-summer by amateur groups in British Columbia and Ontario. For Canadians and Americans interested in gathering with other amateurs from many places across Canada and the northern United States for an exciting camping/observing experience, serious thought should be given to attend these annual and well-attended events in dark sites.

Mt. Kobau Star Party, July 31 to August 4

This third annual event is held on the site which about twenty years ago was selected as the best possible site in Canada for a major new telescope. It is about 400 km east of Vancouver and just north of the U.S. border near Osoyoos, British Columbia. Hosts are the Okanagan Astronomical Society.

EVENTS

1 Telescope Making Contest – Five categories including one non-telescope category. Attractive plaques are provided for winners.
2 Astrophotography Contest
3 Twilight Talks – Featured speakers include Simon Hum of Quasar Optics, Chris Purton of the Dominion Astrophysical Observatory, John Dobson of the San Francisco Sidewalk Astronomers, and David Dodge of the Gordon Southam Observatory.
4 Tour of the Dominion Astrophysical Observatory.

For registration and more information contact: Mr. Peter Kuzel, 4100 25th Avenue, Vernon, British Columbia V1T 1P4. Phone (604) 545-1226.

"From the top of Mt. Kobau you can see forever – 90 km on a clear day and 11 billion light years on a clear night."

STARFEST '86, August 8 to 10

The fifth annual observing camping weekend is hosted by the North York Astronomical Association. The site is the River Place Campground located about 14 km north of Mount Forest and about 130 km northwest of Toronto.

The programme includes observing sessions, slide presentations, workshops and a "Twilight Talk" plus dark skies. For more information contact: Mr. Andreas Gada, 145 St. George Street, Apt. 701, Toronto, Ontario MSR 2M1.

Edmonton Centre Telescope Mirror Stolen

by Peter Ceravolo
Edmonton Centre

On the morning of December 24 a thief broke into my van and made off with several personal items (a pair of Sorrel winter boots and a heavy full length parka) and the Centre's 44 cm primary mirror for the large telescope. The mirror was stored in a plywood case that has several blue paint stains on the exterior, the weight of the item is about 20 kilograms. The mirror had one distinguishing feature: a rounded segment of the back edge. The Police were notified and a full description of the items were given. The items are covered for replacement cost minus a $100 deductible. The replacement value of the mirror is approximately $1,000, including shipping, from Coulter Optical. Unfortunately there is a ten month delivery time because of a back log of orders.

After Christmas, I alerted the vendors of astronomical equipment in Edmonton and Calgary of the turn of events in case anyone showed up with a mirror for sale. It was suggested that I contact the newspapers in the city to plea for the mirror's return. The response was so favourable (because of Halley, of course) that I contacted some local television stations. Two stations aired a report on December 30 on the late news with footage of the telescope assembled and an empty mirror cell. The message was basically "you can keep the boots and parka, but we want the mirror back – no questions asked". Articles in both the *Sun* and the *Journal* appeared the next day with the same message.

The mirror did not turn up and is now considered lost. The crippled telescope waits in storage at the Edmonton Space Sciences Centre for its replacement.

The Road To The Stars

by Ron Galna
Edmonton Centre

Why do people become interested in astronomy? The reasons are, I'm sure, many and varied. I wish I could tell you my reasons were exotic ones such as wishing to be at the forefront of exciting new discoveries, even the desire to be published in *Stardust*! The truth, however, is very simple – sheer boredom!

By way of explanation I should mention that I am a professional driver and travel between Edmonton and Saskatoon on a regular basis. If you drive the highways often enough you become tired of reading road signs (if you've read one you've read them all) and soon after that you know every bump in the road so well that you get to be on first name terms with them. It was time to broaden by horizons and elevate my mind – literally!

Since adolescence I have had a natural curiosity with space. I grew up during the infancy of space travel. I was twelve when Yuri Gagarin became the first human in space and twenty when Neil Armstrong stepped onto the moon. This interest was pretty much confined to the solar system and it wasn't until one cloudless night travelling along the highway that I fully realized just how much was "up there" besides the planets.

Looking ahead between horizon and the roof of the windshield (about 25 degrees) I was treated to a beautiful view of the heavens. For a while I was content with this until one night I was walking around the vehicle checking lights, tires, etc. The sky was black as I was far away from any artificial light pollution and it was New Moon. The sight was spectacular! Thousands upon thousands of stars were visible to the naked eye, as was the "fuzzy blob" I know now as the Orion Nebula, or M42. Totally in awe I spent ten minutes just gazing, open mouthed, at that magnificent display. It put me behind schedule but it was worth it.

Looking back on that night, it was probably the incident that made me become involved with astronomy. A couple of books, to help me identify the objects I was looking at, were my first purchase. Of course, the books told me of objects I could not see with the naked eye. So, ... I rushed out and bought a small telescope. As I am sure everyone reading this will know, using a telescope is not as easy as it sounds, so I joined the Edmonton Centre of the R.A.S.C. Although I am still pretty much in the dark astronomically, I am learning and continue what has become almost a symbiotic relationship between kicking tires and gazing at the heavens!

Spacecraft Renamed

NASA has selected official names for two planetary missions scheduled to be launched around 1990. The former Venus Radar Mapper Mission has been renamed Magellan. The spacecraft will be placed in an orbit around the planet Venus which will bring it as close as 250 km to the planet's surface. The second mission is the Mars Geoscience/Climatology Orbiter which now has the less cumbersome name of the Mars Observer Mission. The spacecraft will be used to map the global chemical and geological characteristics of the planet and investigate the Martian climate both past and present.