



NOVA

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Looking Ahead

Remember, you are always welcome to attend meetings of Council, first Tuesday of every month at 7:30 PM in the G.S.O.

March: Martin Connors of the U of Athabaska (the same guy who spoke to us last year on his trip to Mongolia), speaking on his trip to see the Leonids.

April: Lee Johnson doing a meeting long in transit on observing the spring sky.

May: Randy Attwood, National President.

Next Issue Deadline

Material for the May Nova should be submitted by Monday, May 1, 2000.

Send to **Bob Parry** at robpar@ballard.com or **Gordon Farrell** at gfarrell@home.com

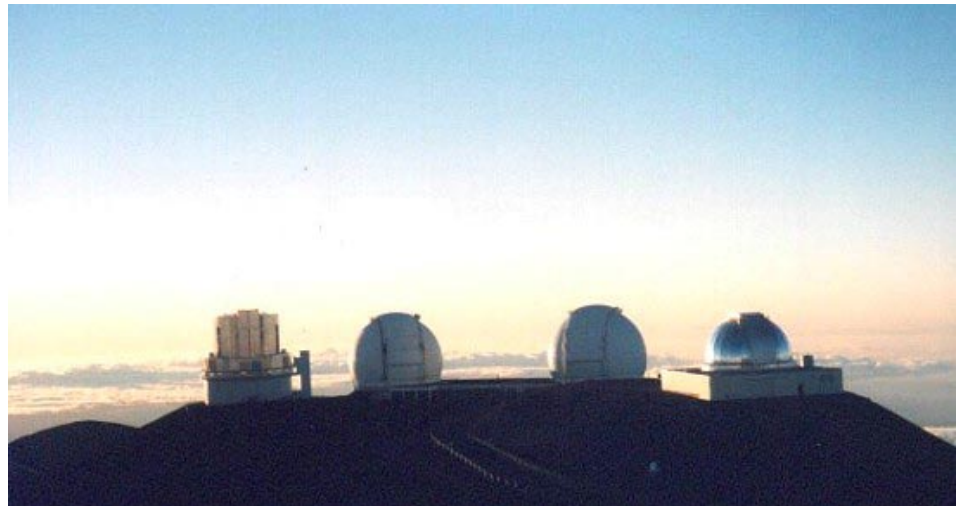
A Visit to Mauna Kea

by Helene Studer

On a recent holiday on the Big Island of Hawaii, I had an opportunity to make a trip up to the summit of extinct Mauna Kea (Hawaiian for "White Mountain," and for good reason—lots of snow up there!). At 13,796 feet, this is the perfect venue for some of the world's largest telescopes. (Actually, the

ous observatories we would see on the summit.

A dirt road winds its way up the remainder of the way, and soon you encounter snow on the ground, making a stark contrast in colour—blinding white on pitch-black lava. And then they slowly come into view, all those world-famous telescopes lined up along the summit ridge, white against a deep blue sky—awesome! 40% of the earth's atmosphere is below you, making stargazing



mountain is the tallest on the planet if you measure its total height from the ocean floor - 32,000 feet). The trip up is a bone-rattling experience, and the "road" is murder on your car's suspension; only 4-wheel drives are permitted to make it to the summit, so I chose to visit the mountain with a group, guided by an astronomer. A 2 1/2 hour drive, slowly winding our way up the mountain, past ancient volcanic cinder-cones in hues from black to red, old lava flows, black rivers of rock, and rolling hills cattle country in between. Halfway up there is even a U.S. Army base.

a treat. This, of course, also affects the amount of oxygen available. Breathing becomes laboured and the simplest tasks, like closing a zipper on your parka, take on a difficulty you'd never dreamed of. At this altitude, the winds are extremely strong and the temperature...let's put it this way: with about 4 layers of clothing plus a thick parka and gloves, I was still shivering!

At the 9,000 ft. level we had to make a half-hour stop at the Visitors' Centre to acclimatize ourselves to the altitude, where our guide took the opportunity to fill us in on the vari-

But what an experience, to be standing next to these beautiful instruments...names I'd known for years and dreamed of seeing—Keck, Subaru, Gemini—their white domes stark against the dark blue sky and the black lava on the ground. We stayed on the summit for the sunset, at which point you can actually see the shadow of the massive mountain itself thrown against the clouds

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The Battle for the Stars in Langley

A report by Angela Squires with Patricia Hiob

May 13/99. The new flying saucer-shaped Famous Players Colossus (the largest multi-theatre complex in Western Canada), starts beaming out advertising searchlights, four powerful moving beams of light crisscrossing the night sky over Walnut Grove, Langley, every night. Colossus is located right next to the Trans-Canada Highway at 200 St. and is also right next door to this residential community of 20,000+. Resident Patricia Hiob and her husband Mark Watson quickly found out that Colossus fully intended to operate these searchlights, which can be seen from as far away as the Port Mann bridge, Aldergrove and Maple Ridge, on a permanent, nightly basis. They also learned from Township staff that there are currently no bylaws that address the issue of searchlights, and furthermore, that none of the planning documents for Colossus that were passed by Township Council had ever mentioned these searchlights.

Hiob/Watson immediately started a door-to-door petition, eventually collecting 600+ signatures from residents. They also contacted RASC-VC and the PSC for support. I have been our liaison ever since and we sent a letter to Langley Township Council and Hiob/Watson July 2/99 outlining our concerns.

July 5/99. Patricia Hiob, Mike Pendleton, and David Dodge made the presentation to Township Council. They presented the petition (652 signatures) which asked for a ban on searchlights (except for special events, for which permission must be requested) and each made a 3-minute speech about why the lights must be shut off. David's was especially brilliant. Council members and media were each given a thick information package, which included samples of bylaws from other jurisdictions that had banned searchlights. Township Council's response was reasonably positive, with unanimous approval of a motion to bring in a bylaw that would regulate searchlights.

July-November/99. The battle raged in the media with for and against letters and articles/TV coverage. We had concerns that

the result might be a diluted bylaw that would set an unfortunate precedent by officially allowing searchlight use on some kind of regular basis (on weekends only, or on cloudy nights only, for example). We couldn't help wondering if Famous Players views this as some kind of "test case" to set this kind of precedent.

October/99. Senior Township staff told us that this bylaw had been ready for several weeks. Unfortunately, Township Council did not see fit to introduce it, and it appeared that the reason for Council's inaction may have been their concern that Famous Players will mount a legal challenge to any such bylaw. It is difficult to imagine how Colossus could succeed, considering that the planning documents approved by Council never mentioned any searchlights. Famous Players appears to be trying to bully Council by threatening legal action.

November/99. New Council elected in Langley Township of a more politically balanced and democratic inclination under new Mayor, Kurt Alberts. The searchlights were an election issue. Since then, Township staff met twice with Colossus to try resolving this issue as Colossus did not want a bylaw and continued to bring up their legal threat. This has meant that Council has had to consult their solicitor and Famous Players' spurious tactics are costing taxpayers' money.

January 17/00. Long awaited Staff Report presented to Council. The proposed bylaw received 1st and 2nd reading passing by just one vote. Staff recommended that a public meeting be held to allow input on the issue. The bylaw would allow business searchlights to operate 30 days a year. An excerpt from the Staff Report reads: "As per staff's earlier "in camera" report which contained a legal opinion from the Township's solicitor, Council is reminded that Famous Players has indicated that any attempt to limit or restrict their present use of their property will be resisted and may result in legal action if the Bylaw results in losses to its revenue base".

February 28/00. Public meeting with over 100 speakers! The Patricia Hiob and Colossus delegations had special status allowing them to speak at the beginning. Mr. Geraghty of the Township Planning Dept. gave a brief outline, was asked by the Mayor if the searchlights were on the planning

documents and replied that they were not. Then David Polny, VP Famous Players Western Theatre Operations followed by Mark Smaal, Manager Colossus Theatre, made their scripted presentations. Neither refuted nor made any reference to Mr. Geraghty's statement, a glaringly deliberate omission by the Colossus camp which Council I'm sure noted! Pat spoke passionately for perhaps 30 minutes. Mike Pendleton was going to speak after, followed by myself, but a line-up of speakers leapt in and we decided not to protest but have the last word!

The Colossus camp, wearing yellow buttons with the slogan 'Lighten Up', were almost all employees, mostly young and mostly primed to speak. Several said how great it was to work for Famous Players and that they supported the searchlights but did not give any solid evidence justifying their continued use. Also, most did not live in the area. Councillor Kim Richter asked Colossus employees to identify themselves by a show of hands, which showed all present that almost all Colossus support came from their employees! Several local residents spoke in support of the searchlight bylaw to good effect and with solid reasoning. Those speaking in support of Colossus again gave no real reasons against the bylaw other than that they liked Colossus and they/their kids liked the searchlights.

Finally, Mike made his scripted presentation on his perspective as a Walnut Grove Resident, an amateur astronomer and member of RASC. Kim Richter asked him to evaluate the effect of the searchlights versus the parking lot lights on his sky view. Mike responded that they were approximately equal in effect. I followed Mike as PR Director for RASC-VC and made clear that I spoke officially on behalf of Vancouver Centre. I spoke mostly extemporaneously and was listened to intently by both Council and all present. According to Pat, I came across as reasoned and thoughtful. As the only 'official' type speaker not reading from a script, I felt my presentation had impact and was a welcome respite toward the end of a lengthy speakers' queue! I was able to effectively respond to some of the less spurious bylaw opposition points by demolishing them, and, most importantly, emphasize again that Famous Players did not have planning permission. I made a de-

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PRESIDENT'S MESSAGE

National President's Report
March 18, 2000

Executive Meeting

The Executive met on February 1 to handle several items. The status of activities at the National Office and the MPA system were discussed.

The progress of the Nominations Committee in its important task finding a new Editor for the Journal was discussed. The President said he would monitor the progress of the committee closely and encourage their efforts.

The President reported on the performance reviews that were held with Bonnie and Isaac. A form has been developed for listing an employee's accomplishments over the past year and the next year's objectives. Both employees filled out the form and then they were discussed individually with the President. It has been decided that these reviews will be held annually in December and any salary change will start January 1 to help with the budget process.

CASCA

Last June when I first met with Michael De Robertis, the President of the Canadian Astronomical Society (CASCA), I learned about how CASCA is run. A part-time secretary in Kingston handles their office tasks. I suggested that we investigate bringing these duties into the RASC National Office. If we can handle them, it would be good for both organizations. One result would be that both national astronomy organizations in Canada would have the same mailing address.

On February 15, a meeting was held at the National Office with Bonnie Bird, Isaac McGillis, Michael De Robertis (President CASCA) and yours truly in attendance. During the meeting, the details of transferring the CASCA office duties to the National Office were discussed.

Bonnie and Isaac would share the duties, which amount to 40 days of work per year. This number is a best guess at present. CASCA would be billed at a rate that would pay for the work as well as cover any overhead. Costs for materials and postage would be charged to CASCA.

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or: www.rasc.ca and follow the link to
Vancouver

Advertising

Nova encourages free use of its classified ads for members with items for sale or swap. Notify the Editor if you wish your ad to run in more than one issue.

Commercial Rates

1/2 Page: \$25.00 per issue
Full Page: \$40.00 per issue
Rates are for camera-ready, or electronic files. Payment, by cheque, must accompany ad material. Make cheque payable to:
RASC Vancouver Centre.

ABOUT RASC

The Vancouver Centre, RASC meets at 7:30 PM, in the auditorium of the H.R. MacMillan Planetarium and Vancouver Museum complex at 1100 Chestnut St., Vancouver, on the second Tuesday of every month. Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently \$45.00 per year (\$22.50 for persons under 21 years of age) and can be obtained by writing to the Treasurer at the address below. Annual membership includes the invaluable Observer's Handbook, six issues of the RASC Journal, and, of course, access to all of the club events and projects.

For more information regarding the Centre and its activities, please contact us at the address or phone below.

NOVA, the newsletter of the Vancouver Centre, Royal Astronomical Society of Canada, is published on odd numbered months. Opinions expressed herein are not necessarily those of the Vancouver Centre.

Material on any aspect of astronomy should be e-mailed to the Editor, mailed to the address below, or downloaded via SpaceBase™ at 473-9357, 58, 59.

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liberate effort to place this battle in a wider context by letting people know of global efforts to protect the night sky (e.g., “The International Astronomical Union states that ‘The night sky is the heritage of all humanity, which should therefore be preserved untouched’. The United Nations is enacting resolutions to protect the night sky from light trespass and further pollution.”). I spoke about the two observatories in Maple Ridge and our Aldergrove site. I said that the Bylaw should possibly be strengthened because as written now, it would allow for any number of businesses to use searchlights 30 days a year each.

March/00. It appears that the Searchlight bylaw will come again before Council at their March 20th meeting. I am told that an amendment limiting use to 30 days per year total for all businesses will be proposed. I am also gathering new information that we may be able to submit. I believe that a bylaw regulating searchlight use does not give tacit permission, and their future banishment can be achieved. Members can help by writing Council and/or newspapers right now urging that the bylaw be strengthened. We are holding several powerful weapons in reserve so stay tuned at Pat’s website: <http://www.bc-alter.net/stoplights/index.htm> or call me at (604) 734-9726. Email me at rascvc@vcn.bc.ca or write me at home. Any helpful information would be appreciated and we’d like to hear about other light trespass/pollution potential or existing problems.

My proposal to form the ‘Council for Education in Responsible Lighting’ (CERL)—working title—was passed by our council. I shall do my usual cajoling to get reticent astronomers to minimally participate! The problem is not resistance but lack of education and the astronomical community must get the word out to the public and the authorities using every means possible.

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you’re looking down upon. As the sun was setting, both Kecks started to open their shutters and rotate their domes, ready for a night’s work.

After sunset, we drove down to the 9,000-foot level for 2 hours of the best stargazing I’ve ever experienced. The winter Milky Way a band across the sky, millions of stars

and galaxies—plus a few shooting stars and satellites thrown in for good measure. No “twinkling” of stars here—steady viewing, and a lovely zodiacal light to boot. All in all, a memorable experience and a renewed respect for the scientists working in this hostile environment.

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Modifications to the Society’s computer system would be paid by CASCA. CASCA members would receive renewal notices in late summer and return their membership renewals to the National Office. Other responsibilities will be the production and distribution of an annual Member’s Directory, bookkeeping, ballot creation and distribution.

The RASC executive proposes that we go forward with this arrangement.

CWSF

The Society is participating in the Canada Wide Science Fair in May at the University of Western Ontario in London. The Executive approved the expenditure of \$500 registration/participation fee and \$500 in potential prizes. A prize of \$200 is available for the Junior category and a \$300 prize is available in the Intermediate / Senior level. We will provide judge(s) and attend the presentation ceremony on May 19th. The London Centre is helping out with the judging and presentations.

I hope the Society continues to participate in the CWSF and that when the event comes to a Centre’s hometown, they will plan to participate fully in the proceedings. The CWSF is in Kingston in 2001, Saskatoon in 2002 and Calgary in 2003.

Looking Up

Normally this would be an item for the Publications Committee but since the Executive dealt with it, I would like to handle it here. The remaining copies of Looking Up, which were being stored by the publisher Dundurn Press at a UTP warehouse, were remaindered (destroyed) in November. Our best estimates are that approximately 520 copies were destroyed - over \$20,000 worth of books.

We have inquired with Dundurn Press as to why this happened. Apparently a letter was sent on July 26 informing us that our

books were to be remaindered. It was addressed to Mary Anne Harrington c/o the Ontario Science Centre. Mary Anne is a Past President of the Toronto Centre. A copy of the letter never made it to the National Office, the Executive or Publications Committee.

Michael Watson has volunteered to investigate this further and report at a future meeting of National Council. Given other responsibilities (Finances, Budget) he has not had time to look into the matter before the March meeting.

New Centres

A request from the New Brunswick Astronomy club (NBANB) has been made to become a centre.

I started talking to Adrien Bordage in November and things have progressed well since then.

I visited Charlottetown in November and talked to the Executive of the Charlottetown Astronomy Society and Athena Astronomy Club (based in Summerside). I received a call from Clair Perry of the Charlottetown group March 6. He told me that their group wants to pursue becoming a centre this year. Michael Watson is planning a visit to the Halifax Centre in April on the Speaker Travel program. I have asked him to fly to Moncton and meet with both groups. During this meeting, he will go over all aspects of becoming a centre and ensure that all their questions are answered.

A group in Prince George group plans to pursue becoming a centre later this year.

At the last minute, another inquiry has been received from the Northern Recreation Coordinating Committee in Northern Saskatchewan.

Presidential Travel

I visited Halifax in November. I have plans to visit St John’s in April, Edmonton, Victoria, Vancouver and Calgary during a four-day period in May, and Montreal in June.

J. Randy Attwood
President

CARO News

As many of you may know, CARO began regular supernovae searches, on an experimental basis, in September 1999. Since then, lots of exciting things have happened. Our automation software, CAROBOT, has become more sophisticated. It is now capable of doing automated imaging runs of 50 to 100 galaxies at a time while being limited only by the telescope's pointing accuracy. We think we have a viable plan for implementing a feedback loop into CARO so that the minor errors in the telescope's pointing accuracy can be corrected as they occur. When we get this implemented, the telescope will be able to run for the entire night without human intervention.

A Java-based version of CAROBOT is also being developed which will allow for remote operation by computers running virtually any operating system or CPU architecture.

Thanks to Rick Freeman, Sierrawireless has donated a wireless modem so that we currently have internet access. At the present time, we are operating on a guest account provided by Sierrawireless, but we are negotiating with a major ISP to get permanent access to the internet. As the complexity of CARO increases, so does the time required to solve problems as they crop up. We are planning a major "detailing" effort over the next month or so, starting on Feb 25th. We hope to clean up and document all the interfaces/networked devices to aid in troubleshooting. We also plan a major effort to produce detailed help files for CAROBOT and a well-written operations manual. On the afternoon/evening of April 29th, 2000, we will be holding an open house for RASC members to view the observatory. We are still interested in finding new volunteers and we urge anyone who is interested to e-mail myself (dmunro@sfu.ca) or Steve Whitehouse (stevew@intergate.bc.ca) and we will add you to our regular e-mailing list. If you wish, you can also use the SpaceBase BBS to keep informed about CARO. Spacebase will also be our primary CARO image database.

In related news, Director of Telescopes Phil Morris is negotiating with the UBC MK Research Forest to allow regular access to the CARO site for members who wish to observe with their own scopes. I'm sure Phil will keep us all posted.

Duncan Munro
CARO Director

A View of the Future

It is not often that the national press devotes a whole page to Astronomy. A few weeks ago, one of the national newspapers published a review of a so-called leak to the press of the future plans for research in astronomy in Canada as proposed by some of the major scientific organizations in the country. These plans are formulated as proposals to the Federal Government. There seems to be a deep concern that Canada does not pull its weight in the international astronomical community. Let us have a quick look at the proposals. Keep in mind: these are just proposals made by the Long-Range Planning Panel to develop a program for the future of Astronomy in Canada.

The proposed program is for a period of ten years and the total dollar value is estimated at \$264 million. The report points out that Canada currently spends \$.98 per capita on research in Astronomy. This is to be compared with \$7.24 in the US and \$4.88 in the United Kingdom. That is a very dramatic difference. It is interesting to note that the proposed expense of \$264 million for a 10-year period means \$26 million per year, which is very close to what the federal government was willing to spend to help the professional hockey teams in Canada. Most of the proposals are for Canada to participate in international projects. This of course makes eminent sense. More and more scientific research today is only possible in an international context. It also has the great advantage of providing our astronomers with ample international contacts. We must suspect that often the Canadian contribution takes the form of supplying equipment and services produced in Canada, so that there is a local economic element attached to the contribution. One thinks especially in terms of engineering and technology.

The proposed participation is treated somewhat like investment decisions. There is a 5% participation in the Large Millimeter Array, ALMA, a US-Europe collaboration in Radio Astronomy. There is also a proposal for a 5% share in the new generation space telescope. This is also currently being investigated by the US and European authorities. It is also proposed that Canada should participate in the Square Kilometer Array. This is a gigantic radio telescope, for which the design still has to be devel-

oped. Canada would then be deeply involved in this design. It is also proposed that Canada should participate in the design of the new very large optical telescope that is being discussed in the astronomy world (25m mirror). And of course there should be a successor to the Canada-France-Hawaii telescope as a complement to the Gemini project. All together this is an impressive list. But there are also plans to expand and maintain local facilities which are essential to train new Canadian astronomers.

It is interesting to try to get some idea of what this 5% participation actually means, apart from the dollar value. Presumably Canadian astronomers would get 5% of the observation time. For a telescope operating 250 nights a year for 8 hours a night, this comes to 100 hours a year. Put that way it is not very impressive. Could an argument be made for more concentration in some areas? But then one has to neglect other projects, most of them very interesting—never an easy decision. Here again we see that Canada sometimes finds itself at a strong disadvantage since it does not belong to a large active scientific community such as the US or the European Union. The total population of Canada is 30 million people, approximately. If this population is responsible for 5% of the total financial burden of a project, then the total population responsible for the whole project is 600 million people. This is, roughly, the total population of North America and Europe. In this sense, our effort on the scale of the western world could be adequate. However, an astronomer from one of the smaller members of the European Union has access to the whole of the European share, not just 5%.

This brings us back to the big problem of how to justify this kind of research. To some extent, this is even true for our own personal expenses in amateur astronomy. It is impossible to justify our own efforts, financial and otherwise, with strong practical arguments. These arguments do not exist. And the same is true for the research aspect of Astronomy. It is a question of culture and civilization. We do Astronomy because it is interesting and beautiful. We like to look as deep into space as possible. It helps us to find where we are. It helps us to see ourselves as members of this Universe. It is impossible to defend this kind of

interest with promises of future benefits. But I cannot resist looking back at history. Copernicus, Kepler and Newton did not have any practical applications in mind when they tried, successfully, to solve some of the problems of the motion of the heavenly bodies. But they were the creators of modern science. It is possible to draw a long, continuous line of discoveries and theories from the days of Kepler and Newton to the modern theories of matter that teach us how to make semiconductor elements for computers and to the modern description of the universe. However, it would be wrong to defend the building of any new astronomical observation tool by using this argument. The forefathers of our knowledge had no idea at all where their interest and curiosity would lead. They did it only because they were true human beings with a keen interest in the universe in which they lived. It was an integral part of their civilization. So it must be with us. The amateur astronomer is closer to the public at large. It is essential for us to defend this view in our society.

This does not mean that society will always agree with this. How long will society be willing, or be able, to provide the financial effort to support cutting-edge research? Society is not really obliged to go beyond a certain limit. In other words: when is it going to become just too expensive to build that next generation telescope? In the talk given to us by Craig Breckinridge of Coast Steel last month, the figure of one billion dollars was mentioned for the next generation of telescopes. Even on an international scale, this could become difficult to accept for the financial wizards in the governments. We are not thinking here of the usual limitations necessary in every budget, but objections in principle. Some other areas of research have already reached that point. This is beginning to happen in the world of high energy physics, (the so-called 'atom smashers'), even in an international context. There is a connection with astronomy here because some astronomical phenomena reach very high levels of energy. But we will leave that for future consideration.

Member Issues

Has Your Address Changed?

Vancouver Centre is now using National Office's database to do our mailing. Don't panic! This is a GOOD thing! It also means you can send in address corrections via E-mail for the fastest service. The address of National Office is very easy to remember:

rasc@rasc.ca

You can still call or mail your address corrections to me at the Centre, but I will simply pass them on to National Office for processing. The mailing list included with this issue of NOVA (March-April 2000) has been compiled from National Office data.

A Fee Increase?

Not necessarily a fee increase, but a fee increase if necessary. Well actually, it looks pretty likely. The national sector of the RASC actually loses money every time someone joins, and there was a deficit in their finances in 1999. Vancouver Centre is doing OK, so we don't really need a fee increase, but the way things work our fee structure is intertwined with National's.

What that means is that 40 percent of the fee increase comes back to the Centre. Suppose the National portion of your fee (currently \$36 of the \$45 total) were increased four dollars to, say, \$40. National keeps \$2.40 and we get \$1.60 back for our budget to add to the \$9 that we surcharge you. That means we would have a surplus, and could hold off inflationary pressures for a few years. Or we could reduce the \$9 surcharge a little.

The National increase could be more than four dollars, however. When Duncan Munro and I go to Toronto later in March to attend National Council, we will be debating the actual amount of the fee increase. The amount will then be presented to the members at the General Assembly in Winnipeg in July. You will have a chance to approve or disprove the increase either by attending the G.A. or by signing a proxy and giving it to your National Rep (i.e. me).

SHOULD there be an increase? As far as I

can tell, yes. We have to be able to pay for the services provided to new members. Is National Office trying to reduce costs? I would like them to. However, members have been expecting a lot more service from the staff at National Office (Bonnie and Isaac) and they have been working more hours than was budgeted. If this continues, we have to raise the fee. It was reasonable to expect the system to work more efficiently this year, and if it didn't, I will be asking why. So will many other Reps.

Vancouver Centre's instructions to me and Duncan are that we must vote against presenting a fee increase to the members that exceeds ten percent over two years. We will probably have to accept a higher increase, though, if enough of the other Reps accept it and outvote us. There is still time to come to our Council meetings (first Tuesday of the month) and air your views to the Centre's Councillors.

Dan Collier

Artificial Star Party

12 noon, Sunday 26 March 2000, (rain or shine)

Gordon Southam Observatory

Steve Whitehouse and I are proposing that the Vancouver Centre hold an 'Artificial Star party', on Sunday 26 March. We can guarantee steady seeing and an easy-to-find target. Included in the activities would be a lens and mirror cleaning workshop held indoors and the use of the artificial star outside for optical tube alignment, and critical testing. Although just outside the Gordon Southam Observatory is not ideal, it does have the following:

1. A relatively flat stretch of grassy field, about 100 metres long; (more about this in a moment).
2. It will hopefully be free of pedestrians crossing the light path from star to scope.
3. Inside we can utilize the desks and running water.
4. There's lots free parking and members all know the location of the GSO.

The star party is intended to help members get the best performance from their equipment. By the way, we do not wish to point out any defects in manufacturing nor any

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lack of care by a scope owner. However, a star test may reveal some defects you didn't know were there. In some cases this can be remedied, in other cases it cannot.

What is an artificial star? My wife wondered that too. "Why do you guys have to make a star when there are already zillions up in the sky? Are you that desperate?" The answer is no. An artificial star is used for testing the optical performance of an assembled system: for example, a primary mirror, a secondary mirror and an eyepiece as an aligned system. This star can be an incandescent lamp shone through a condenser lens onto an opaque pinhole, which is placed at a distance of 50 to 100 metres from the scope and aimed at the latter. (Misleading results are obtained if the scope is not focussed at its infinity point, which varies with the scope.) The star can even be coloured by inserting a filter in the light path. The operator observes the projected image of the pinhole using very high magnification while moving the eyepiece just inside and outside of focus. I've made quite an effective artificial star using an old 35mm film strip projector. Originally it had a 150 watt high intensity projection lamp. When this burned out I replaced it with a 12 volt 50 watt quartz halogen bulb. The calculated star diameter is ~0.11 mm, sufficient for ¼ wave testing. Another way of accomplishing this is to use a bright light shone onto a convex reflector, such as a rear-view mirror or a car's chromed bumper. The smaller the radius of curvature, the smaller the star. Small is beautiful here. A fibre-optic would be ideal if sufficient light could be poured into the tiny fibre. I've experimented with this but found it difficult to do. In my basement workshop, I thought my 50 watt star was bright—blindingly so. But the next day, being sunny, I found that it was pathetically dim. Not only could I barely see the diffraction rings, I could barely see the star when focussed. The sun, however, glinting off a silver ornament was excellent; diffraction rings were easily seen. Doing a star test after dark obviously improves the visibility of an artificial star. The only disadvantage is one we're familiar with: stumbling around in the dark. Why not use a real star? There are several important advantages using an artificial star for these tests.

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RASC Vancouver Centre has five telescopes available for loan on our Telescope Loaner Program. Members may borrow one, free of charge, for one month. Contact John Sherritt, Director of the program, in the GSO lobby after the monthly member's meeting. Bring your card to verify your membership. The loan is for one month only! Your telescope must be picked up and returned at the member's meeting on the second Tuesday of each month. Telescopes will not be allowed to circulate outside of these meetings.

ASTROCOMPUTING

SpaceBase™ (473-9357). Affiliated since 1992 with RASC Vancouver, our link to RASC Net, RASC Members only chat area. Future data distribution hub for CARO Project. Features include latest HST images, current world space news and astronomy programs. Provides a file uploading facility for submitting articles and imagery to Nova.

LIBRARY

The centre has a large library of books, magazines and old Nova's for your enjoyment at the GSO. Please take advantage of this club service and visit often to check out the new purchases. Suggestions for future library acquisitions are appreciated.

RASC on the Internet

<http://apwww.stmarys.ca/rasc/rasc.html>

**PACIFIC SPACE
CENTRE**

The Pacific Space Centre Society is a non-profit organization which operates the H.R. MacMillan Planetarium and Gordon M. Southam Observatory. Annual Membership (\$30 Individual, \$65 Family) includes a newsletter, Discounts on Space Camps, special programs and lectures, Vancouver Museum Discounts, and free admission to the Space Centre. Admission to the Pacific Space Centre includes: Astronomy shows, Motion Simulator rides, multimedia shows in

GroundStation Canada, and access to the Cosmic Courtyard Exhibit Gallery. For Membership information, call Mahi Jordao at 738-7827, local 237 for information.

**MEMBERSHIP HAS ITS
PRIVILEGES!**

New members, did you know? The Vancouver Centre has 6 telescopes available for loan free of charge! We have telescopes ranging from 3" to 10" diameter. For more information call Phil Morris, Director of Telescopes at 734-8708, or see him in the lobby of the GSO after the members meeting. The loaner period is for one month only. All telescopes are to be picked up and returned after the members meeting. No telescope will be allowed to circulate outside of these meetings!

Your greatest opportunity as a member of the R.A.S.C. is to take advantage of the company of other enthusiasts to increase your knowledge, enjoyment and skill in astronomy.

The best thing you can do to gain the most from your membership is to get active! Take in the club meetings; engage other members with questions; come out to observing sessions [also known as "star parties"], and, by all means, volunteer to take part in our many public events.

Observing takes place at the Dale McNabb Observatory in the Aldergrove Lake Park, located in Langley, on 8th Avenue, just east of 272nd Street. We are there most clear nights. Contact Mike Pennelton at 888-1505 or Howard Morgan at 856-9186.

Star Party Dates 2000:**Pine Mountain, Oregon:**

May 30 - June 7 approx.

Manning Park:

June 30 - July 3 and Sept. 1 - 4. (3 day weekends).

Mount Kobau, Okanagan:

July 29 - August 6.

(N.B. Public Program at Manning Park TBA)

continued from page 7

An artificial star offers an extremely steady, bright, motionless star to evaluate every type of telescope optics. Further, no motor drive nor polar alignment is required. If you've ever tried this sort of test on a real star, you will know that the sufficiently steady atmospheric condition required for this occurs very rarely, only hours per year. Another benefit is that this testing can be done during the day, provided the artificial star is bright enough. In my (limited) experience, I've found that a cool, overcast day is best, simply due to the lack of competition from our local star, the sun. Secondly, there is much less heating of the ground due to the sun, which destroys the seeing. However, if the sun is shining, my experience has led me to use its enormous light energy reflected from a Christmas tree ornament, or alternatively, reflected from a convex rear-view mirror about 3 inches in diameter. This is much, much brighter than my homemade artificial star. And I've found that the artificial star cannot be too bright, at least for my equipment (a 100 mm f/4 camera to a 150 mm f/10 Maksutov). Certainly we can arrange a dimmer star if those folks testing their 17 inch Dobsonian light buckets find the star too bright.

If the weather co-operates and there is sufficient interest to make it happen we will also need volunteers who are experienced in star-testing of telescope systems. Although some defects (pinched optics) can be easily detected, other defects (such as turned-edge) take a trained eye to recognise. So we are asking for those with some expertise to assist us. Give Bob Parry a call.

If you do wish to attend keep these things in mind:

- it's a free service to RASC members
- plan to have your equipment set up and cooling off at least one hour before we start; tube currents inside a scope make evaluation very difficult.
- try to be prepared to do any optical testing by observing straight through your scope, that is *without a star diagonal in place*. You will get more useful results. (Example: if astigmatism (a serious flaw) is present while using a star diagonal, then it may be the cause. Only by eliminating it can you be certain.)
- we hope to have an optics cleaning workshop too so bring any & all special tools needed to access & adjust

your optics: small screwdrivers, pliers, wrenches, tweezers, hex wrenches, masking tape, notepad, sledge hammer, etc. We simply supply assistance and advice; we cannot supply tools.

- bring a lunch. This sort of thing is not accomplished in 15 minutes.
- bring rain gear; it has been known to rain on Sundays in Vancouver.
- for the comfort and ease of Dobsonian owners: bring, if possible, a *stable* table or platform 30 inches high on which you can set up your scope since you will be looking at the artificial star which is close to the horizon. A chair would be useful too.

Questions? Bob Parry, President
[942-0524] robpar@ballard.com

Seamus Dunne
dogstar@interchange.ubc.ca

A Belated Book Review

by Dan Collier

Star Testing Astronomical Telescopes by Harold Suiter. Willmann-Bell 1995, 362 pages, ISBN 0-943396-44-1, \$39.95.

Few members are familiar with Suiter's star-test monograph, judging by how rarely I see his principles applied. More's the pity since this book is a tour-de-force of applied optics and an extremely valuable addition to the amateur's bookshelf. There is much more here than a mere primer on star testing. If you own a telescope, read the copy in the Centre's library as soon as you can if only to pick up the author's pointers on collimation. These alone will multiply your telescope's value, and if you ever have to buy another one you'll be much better prepared to evaluate its construction and optics.

If the book is not available you can refer to a review by Alan MacRobert in Sky and Telescope for March 1995 in which some of the more interesting star-test diagrams were reproduced. But be advised that MacRobert keeps the spotlight off the very readable chapters on the diffraction of light and the collimation and adjustment of telescopes. Suiter knows what he's talking about, and the reader would do well to try and absorb this stuff directly from the source.

Suiter says that once you have absorbed some of the theory of diffraction, you begin to see its effects all around you to the point where they may even become a distraction. That statement hit the nail on the head, as should be obvious to readers who saw my incomprehensible article on diffraction in NOVA a couple of years ago. (It was in the May 1998 issue, and yes, it was inspired by MacRobert's review. The two images which I computed for the article were accidentally omitted, however. They have been included here as proof of my own distraction.)

Out-of-focus stars can tell you a lot about your telescope in a Zen-like sort of way. The star test is a ruthless but arcane reality check in the same way a listening test is for sound systems. Moreover, as with sound systems, hardly anyone has the tools for lab-testing a telescope. The star test may be the only practicable quality check available to you. Unfortunately, in all but the simplest cases, it isn't possible to draw reliable conclusions from the star test until some experience is gained, and not all of us have had the chance to examine several hundred telescopes as Suiter has.

On the other hand, a little knowledge is a dangerous thing. Few amateur astronomers have the training to understand the theory of star testing and its limitations, and the telescope that tests out exactly as shown in the diagrams is rare. Mirror manufacturers must have cringed when this book came out, not so much because of the poor quality of their optics but because it could have ignited backlash that goes beyond criticizing such practices as deceptive surface error claims. Improperly interpreted, Suiter's comments would put the pros on the defensive. He knows that the industry can't be expected to produce high-quality optics at low prices, and he constantly reminds readers that as long as the telescope in which they are mounted is properly designed and assembled, quarter-wave optics are perfectly

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acceptable. In large reflectors, the observer has to accept even poorer optics if the price is to be less than astronomical. Why? Two words: atmospheric turbulence.

Some of the software used has been made available by Willman-Bell (for a fee) but I think it might have been more apropos to bundle-in a collimating device. Suiter deals at length with misalignment before he touches the ground-in aberrations. The chapter on collimation will strike

readers as one of the clearest ever written, exceeding even the treatments in reliable works like Texereau and Ingalls. Adjustment of the Newtonian secondary is especially well covered. It's the last word for most situations that the reader will ever encounter, and is almost worth the price of the book. Did you know that the real reason you shouldn't bear down so hard on the screws on a Schmidt-Cass is that your tool may slip off and gouge the corrector plate?

Suiter's instructions impressed me so much that I immediately made my own Cheshire "eyepiece" (ready-made ones are available but cost as much as an eyepiece, which should tell you something about the wages of offshore optical technicians). The Cheshire is an improvement on the drawtube peephole used by many to collimate telescopes. Among its other advantages, it can be used in the dark, something you can't do with just a peephole. Ironically, my Cheshire didn't work on the first scope I tried it on, the Centre's 8" f/6 Dob, because its primary mirror is held in with a large-diameter bolt right through the middle. But never mind. It works very well on my Schmidt-Cassegrain and on Southam Observatory's Cassegrain and refractor.

The Cheshire eyepiece may indeed be useful, but the sharpest collimation can only be achieved—especially if the mirror is f/6

or faster—with the star test. Experienced amateurs do it every night. When I first checked the collimation of my Schmidt-Cass I wasn't so experienced. The instructions said to defocus the star to fill a quarter of the field of view at 75 power. This is

absurd, and Suiter produces a series of simulations to show that doing so will conceal even the poorest collimation. In reality the eyepiece is clamped a few millimetres outside the focused position and the image is examined with at least

200 power (the focus knob can be turned instead to produce the equivalent degree of defocusing). Suiter's data can be used for a wide range of telescope configurations, but it is not instantly obvious how much defocusing to use in each case. Since the diagrams are all normalized with a formula ($8\lambda F^2 \delta n$), I suspect many Schmidt-Cass users will turn in frustration to the step-by-step recipe in chapter 6 and will almost certainly make the same mistake I did.

An increasingly popular tool of dubious value, the laser collimator, is not mentioned at all. You'll find that the laser collimator is just a glorified Cheshire eyepiece and hence no substitute for the star test. Worse, a single-beam laser is unsuitable for Schmidt-Cass scopes despite claims to the contrary. The beam just gets reflected back into the

eyepiece holder without touching the primary. The holographic types that project a target pattern might be more useful, but they are twice the price. I'd advise you to save the money for a wide-field eyepiece or a few books.

We readers are encouraged to use rough approximations to build confidence. His breezy procedure for setting up Christmas-tree ornaments as daytime artificial stars is a delightful read, and the amateur will be well served by it. Playing with artificial stars is instructive and fun even if the set-ups aren't always kosher. Take for example the artificial binary star, which can be produced by pointing a pair of floodlamps at a small reflective sphere. Suiter doesn't actually denigrate such practices, though he does caution us about taking them too seriously and backs it up with rigorous computations.

Another part that gave me a strong deja-vu feeling was Suiter's condemnation of the Ronchi test. I once made a Ronchi screen and used it to test a number of telescopes under the stars, and found it to be useless on optics faster than about f/8. Only one scope ever showed Ronchi shadows that were bent, and it was my observatory's big f/16 Cassegrain. Finding this disturbing, I wrote a raytracing program that simulated

the Ronchi test on this telescope and indeed, was able to confirm Suiter's contention that only the grossest problems would be revealed. Indeed, when a quarter wavelength of simulated spherical aberration was introduced, it produced only a slight curvature in the Ronchi shadows on my monitor. This would certainly not have been detectable in life. If I had read Suiter's book before these events, I would never have tried the Ronchi test at all—and missed a valuable lesson.

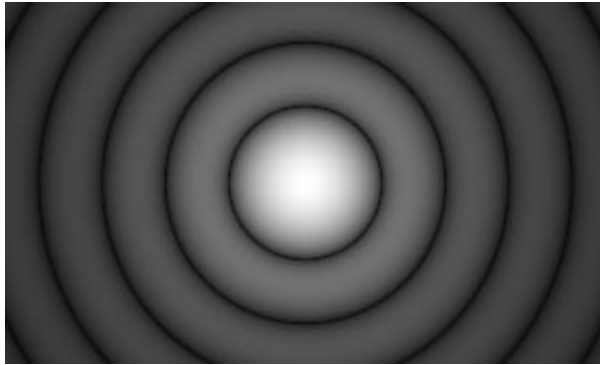


Figure 1. The Airy pattern of an unobstructed aperture as plotted by the author's BASIC program (see NOVA, May-June 1998). A gamma correction of 0.2 has been applied to both figures to bring out the fainter rings. This is what a star looks like in a telescope with perfect optics at very high magnification under perfect atmospheric conditions.

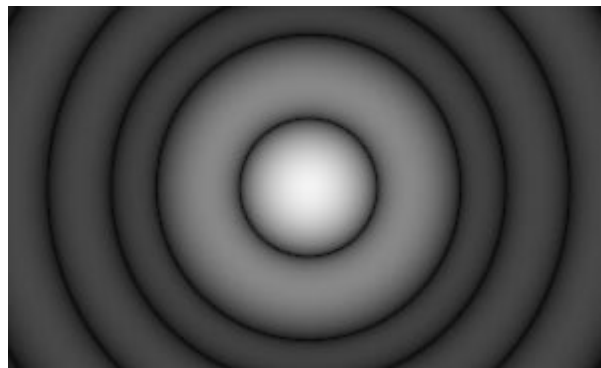


Figure 2. The Airy pattern of an aperture with a 33-percent obstruction. Most Cassegrain, Schmidt-Cass and Maksutov telescopes have obstructions of similar size. The central maximum is now smaller and less bright, while the first ring is both wider and brighter. The fourth ring also gains brightness, though this may not be apparent in the above reproduction.

continued from page 9

Next, I Ronchi-tested the $f/4$ primary at its centre of curvature using a video camera. The video shows a beautifully corrected Ronchi pattern with strongly curved shadows just like the simulated test computed by Suiter for an $f/4.5$ mirror (Fig. A-9, page 295). I got the feeling that even if the primary had had a serious defect, the Ronchi would never reveal it. The book confirmed this suspicion.

Suiter does not mention that changing the spacing of the mirrors in a Cassegrain can correct mild cases of spherical aberration (i.e. under- or overcorrection). Moving the mirrors farther apart tends to cancel undercorrection, though at the risk of sucking the focal plane right into the telescope! A very VERY experienced professional telescope maker once told me the exact opposite—that the focus of a Cass moves inwards if the mirror spacing is decreased. Nope; it works like a tube of toothpaste.

The author does mention that focusing a moving-mirror Schmidt-Cass on a nearby object tends to make its optics look overcorrected. I confirmed this with my Ronchi screen, which ought to be taken as a clear warning to put plenty of distance between your telescope and any artificial star. Interestingly, it is quite possible to test a telescope's resolving power using an artificial binary star at close quarters. As we can see by Suiter's simulation on page 180, optical systems with quite a lot of spherical aberration can have beautiful symmetrical Airy disks and diffraction rings, and so they should be able to split close binaries.

A scope may have lots of resolving power but strike out on contrast performance. Suiter tries to show this by computing the modulation transfer function (MTF) for many of the test cases, and less often, the signal-to-noise ratio (SNR) and Strehl ratio. The MTF is a most sensitive indicator of the damage wrought by common problems like spherical aberration and turned edge. It can show that a large but imperfect reflector might not work any better than a small refractor, even apart from the consideration of seeing. There is less emphasis on the idea that a "light bucket" that isn't diffraction-limited might still perform satisfactorily on faint deep-sky objects, though Suiter admits these objects do not pose the same challenge to the contrast performance as,

say, the Moon.

And now we find ourselves in a can of worms. Concepts like Fresnel diffraction and MTFs are far from easy to grasp and apply. It is necessary to focus on every word to get the most value from Star Testing Astronomical Telescopes. Just the same, you will have fun reading this book if you have ever wondered about the phenomena of diffraction in telescopes.



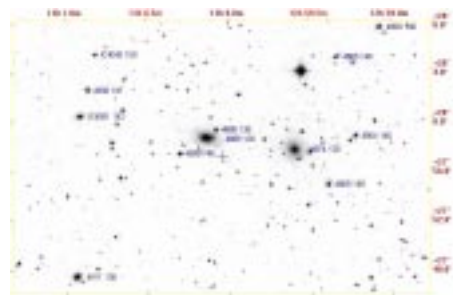
Deepsky Hunting

Spring is in the air and it's galaxy hunting time again. The most obvious choice for galaxy hunting is Virgo, home to the famous Virgo galaxy cluster. (or galaxy clutter, depending on the size of your telescope). But this year I thought I'd take us for a little cruise a few degrees further north of Virgo in the constellation Coma Berenices, where we can find a few other goodies.

Let's start with the most obvious. A large open star cluster called Melotte 111. Better known as the Comma star cluster, it is easily seen in the northwestern corner of Coma Berenices with the unaided eye under most suburban skies. Made up of about 80 5th and 6th magnitude stars, it is one of the nearest star clusters to our own sun. Without optical aid it appears as a loose grouping of fairly faint stars. Under darker rural skies it begins to take on a more "star cluster" look.

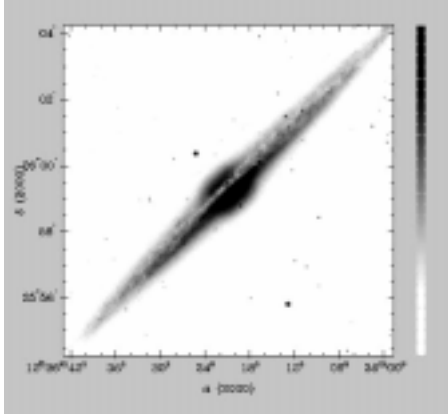
Telescopes have too narrow a field to appreciate this 5-degree cluster, however binoculars will reveal dozens of bright white and blue stars.

Starting back at Alpha Coma, we take a short 1-degree hop north east of Alpha to the beautiful globular cluster M53. Added to the Messier list in February of 1777 this magnitude 7.7 treat is an easy target for binoculars and small telescopes. A 3-inch will show it as a small round unresolved glow. 6-inch and larger telescopes will start to resolve it into hundreds of individual suns drawn together in space by mutual gravitation. A must see for Globular cluster fans! One degree south of M53 lies another interesting cluster NGC5053. Listed in some catalogs as a loose globular, and others as a tight open cluster. This peculiar object was discovered by Sir William Herschel in 1784. At magnitude 9.8, it is a contrasting companion to M53 and well worth a look while your in the neighborhood. Drawing a straight line from Alpha Comma to Beta Comma, you will run across NGC 5012. A 12.2 magnitude spiral glowing softly and easy to miss except in dark skies. Another degree along your way to Beta you will also run into NGC 5016, another small spiral of magnitude 12.8. Comma is home to many small galaxies as you will soon see. Upon reaching 4.3 magnitude Beta Comma, make a sharp 90-degree turn west toward Gamma Comma. Slowly following on this straight line about 2 1/2 degrees from Beta, you will chance upon several galaxies. The brightest will be NGC 4889, a 12.5 magnitude elliptical galaxy. Dark skies and 8 inch or larger telescopes will be required to see this object well. For those with access to these luxuries this is just the tip of the preverbal iceberg. NGC 4889 is the brightest member of the Comma Cluster, AKA Abell 1656, a



large but distant grouping of faint galaxies. The Comma cluster contains more than 72 galaxies under magnitude 15 within a two-degree field of view!

Once we have completed our straight line to Gamma Comma, we are going to draw another straight line from Gamma, southward back to Alpha (forming an equilateral triangle). About 3 degrees into this line we stumble across one of the most spectacular edge-on spiral galaxies the sky has to offer, NGC 4565. This 9.6 magnitude galaxy can



be seen in 3-inch instruments, but 8 inches will start to reveal the dense central dark lane, that makes this one of the more famous of the edge on spirals. A real showpiece object in 12 inch and larger telescopes! Still following our straight line back to Alpha Comma we have one more stop to make. Our straight line sweeps us within two degrees of M64. The Black Eye galaxy shines at magnitude 8.5 and is well within the reach of most telescopes. The nickname comes from the massive dark dust cloud near the central nucleus, so easily seen in amateur telescopes. Charles Messier first sited this galaxy in March of 1780. There are many more galaxies to hunt down in the spring time night sky. Neighboring Virgo boast 17 Messier galaxies alone! Be sure to check them out this spring.

Clear skies...
Steve Whitehouse

My First Telescope

Impressions from a Newbie for the Newbie

For as long as I can remember, I've been interested in astronomy. Yes, it was a casual interest, but through a childhood of books, binoculars, and nights staring up at meteor showers from the backyard, I had managed to carry a spark of interest into adulthood. So, on a cold and rainy November day I decided to finally take the plunge and buy

a telescope. My requirements: something small enough to be easily portable and not so expensive I'd be afraid to take it outside. After perusing the internet and trying out a friend's scope, I settled on a 80mm f5 refractor on an equatorial mount (\$500). Being about 16" long, it easily fits into a backpack and the tripod is easy to fold up and throw over your shoulder. It came with a 25mm eyepiece, to which I added a 2x Barlow lens (\$79) and an anti-light pollution (ALP) filter (\$89) for looking at deep-sky objects. I was all set to go.

Astronomy Lesson #1: The monsoon season is a lousy time to buy a telescope.

Yes, my shiny new telescope looked really nice set up in the corner of my living room... and there it remained for weeks on end. All right, perhaps my timing wasn't the best, but I knew it had to clear up sooner or later... didn't it?

Astronomy Lesson #2: When in doubt, ask.

Once I finally managed to get a clear night, I took my telescope out on the balcony to try it out. The first step was to align the finder scope. I actually ended up having to do this a couple of times due to a silly novice mistake. The mounting bracket for the finder scope had a rubber ring wrapped around its base when I unpacked it, but I couldn't figure out what it was for (the instructions didn't mention it) and promptly forgot about it. I was having some trouble stopping the finder scope from wobbling, but found that butting the focus ring up against the end of the bracket held it in place, but also meant I couldn't focus the finder scope. I mentioned this problem to my friend, and he let me in on the purpose of the ring. It fit into a slight depression near the front of the tube, and the alignment screws fit into a second depression near the back. So I put the finder scope back in (properly), aligned it again and was finally set to go.

By the way, aligning a finder scope is right up there in the fun scale with a root canal, so learn from my example: there are no extra parts.

Astronomy Lesson #3: Turn out that light!

So there I am out on my balcony, all set to go. I try a quick and dirty polar alignment as per the instructions. This involves set-

ting the latitude adjustment to 49°, setting the declination to 90°, and rotating the mount until you can see the North Star through the finder scope. Providing the scope is properly levelled, you should now be able to track objects with just the declination adjustment. A big help if, like me, you don't have a motorized mount. This adjustment isn't precise enough for taking pictures, but more than good enough for puttering around on my balcony.

I first tried looking at a few bright stars in Cassiopeia and the Big Dipper, and found things to be working pretty well. Feeling pretty good, I decided to try looking for some deep sky objects. I took a look at my star chart and found that the Andromeda galaxy should be within my view, so I started searching... and searching... and searching...

I should mention at this point that the background sky seen through my eyepiece was far from black, but a disappointingly light grey. Aha, I thought, this looks like a job for the ALP filter! Well, no, it wasn't. My ALP filter was no match for *this* sky! I needed to find somewhere darker than Kits.

I did manage to find Andromeda, though. I methodically swept the area I thought it should be in for about 20 minutes until I saw its fuzzy ellipse. Through the Barlow it all but disappeared against the background light. Yes, I was going to have to test my scope's portability.

Astronomy Lesson #4: The Great Empty North

Besides being well lit, my balcony also faces north. After perusing my star charts, I found that, well, there just ain't much happening in the northern sky. If you're lucky enough to have a powerful scope (and a dark sky), there are a few star clusters and planetary nebulae to look at, but for the urban astronomer, all the action is south. Yet another reason to take a little trip.

I spoke to my friend and we decided to take a trip up Burnaby Mountain one day after work, me with my shiny new little refractor, and him with his shiny new 8" SCT.

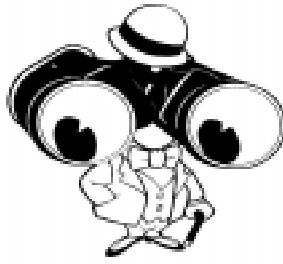
I'll have more about what we saw, and how I dealt with aperture envy, next time.

Gordon Farrell

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