



NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC

VOLUME 2000 ISSUE 6

NOVEMBER/DECEMBER 2000

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Looking Ahead

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

November: Jim Bernath brings in an earthbound satellite; AGM notice

December: Annual General Meeting followed by Lee's Amateur Hour

January/February: TBA

March: Dr. Robert Smith of the U of Alberta speaking on Hubble's history & impact on astronomy

Next Issue Deadline

Material for the January Nova should be submitted by Monday, January 1, 2001. Please send submissions to:

Gordon Farrell
(gfarrell@home.com)

or Bob Parry
(robpar@ballard.com)

Aurora

by Marcellus Redmond



I was at a place many have visited; not the barn I live in, but that place of semi-lucidity that envelops you by lying on the couch watching the tube too long. The late night news comes on, your eyes have already closed and your consciousness hinges on the audio droning from the box. I should get up, brush my teeth and go to bed, but if I was to extricate my mind and body from this prelude to REM, it would probably take an hour or more to be back here at the precipice of sleep. OK, the couch wins; all I have to do now is keep the audio link alive until the weather forecast then I'll have an idea of what to be doing with the horses in the morning. I do not remember the weather forecast; the vessel containing my consciousness was skipping across the atmosphere of planet sleep and maintaining the audio link was, well, you know.

Then from the nothingness and static came the call. It was clear, it was loud and it left no doubt as to my next

course of action. "THERE'S A DISPLAY OF NORTHERN LIGHTS HAPPENING NOW" (thank you weather person). Careening off the atmosphere of planet sleep landed me at an open front door. Did I really get up or am I dreaming this psychedelic riot that's cascading along my visual cortex?

Camera—where's the camera? Where's the tripod? Where's the cable release? Shoes, I'll need shoes. Am I really awake? It took longer than usual to set up; the whole process was accomplished without the use of my eyes, which were gorging at the auroral feast.

Now I have seen auroral arcs that pulsed or glowed and even auroral rays over a lifetime of vignettes, but never a display of every form distributed from horizon (WNW) to horizon (ESE) as observed from 23:45 Oct. 4 – 1:00 Oct. 5. The intensity of the auroral display occulted whole swaths of stars. It was the first instance this observer saw col-

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Discovery

by Marc Verschueren

Listening to Prof. Garrison's talk a few weeks ago was like listening to a great musician playing a beautiful instrument, very gently. We have heard so many talks with so many spectacular photographs, or amazing new telescope techniques, or clever new strides of further progress in this or that new field of astronomy. Very often one has the feeling that there is something missing. By itself this is not the astronomy we are interested in. The core of such a presentation sounds a bit hollow. Something very essential is not there. The talk by Prof. Garrison was exactly the opposite. The essence of what we find so interesting about astronomy was very much part of this lecture. It is possible to keep things simple and yet penetrate to the heart of the matter. As one of the subjects of his research, Prof. Garrison mentioned: "looking for peculiar stars." Now that is what we would like to do. Before we start looking we certainly do not even know what the peculiarity is we are going to find.

He also touched upon the magic of discovery. Astronomy would not continue to exist very long if no new big, important discoveries were not made from time to time. But there are other moments of discovery. Very few of us will ever make a discovery that will put our name in the annals of science. But it is discovery that keeps us tied to that small, sometimes not very good, telescope. It always fascinates me to think about people like us observing the sky. It was put very clear: it is the importance of personal discovery that makes us do it. You're just looking around a bit, no particular task at hand, and there, that looks like a double star. Is it? Try different eyepieces; improve the focusing as much as possible. Try to define the location with some accuracy. If you can now go back to the atlas and confirm indeed that it was a double star, that is exciting. That has the full flavour of personal discovery. It does not matter that this double star is very well known—it would not be in the atlas if it weren't—but we

discovered it again, for ourselves.

There was another area of research mentioned that could come as a bit of a surprise: stars in our immediate neighbourhood. It was not really too surprising for me to learn that one actually does not know all that much about stars close to our sun. This is to be suspected. The strong tendency is to build the best instrument possible and then jump forward into new territory, neglecting everything else. One has to jump forward to keep the interest going, to add excitement to life. But one cannot forget about what was left behind while jumping. There may be whole fields where fundamental discoveries can be made. This statement gives support to observatories with smaller instruments. I suppose that it gives us all some comfort that small can be good after all. One does not say that very often any more. Prof. Garrison proposed that a large number of smaller telescopes could be just as good, or better, than one very large instrument.

It is of course a bit dangerous to start philosophizing like this. It cannot be an excuse for staying in the same spot doing the same thing over and over again. We need the bigger picture as well—the picture with the frontier in it. We must look around and look at what could be interesting: where are the questions? That very often also takes us back to basics. And this return can lead to a long voyage in a new territory. Few things are as ancient in astronomy as gravitation. Maybe one would not expect too much to happen in this area any more. We know Newton quite well and even Einstein, but gravitation stands again in the centre of the attention the last few days. On October 20, 2000 at Hanford in Washington State, the new LIGO facility reached "First Lock." This could have been a very important moment in the history of astronomy. I will refrain from using the overworked expressions such as "historic" or "breakthrough," but it is the beginning of a new area in observing, if there eventually are re-

sults, of course, and there is no guarantee that there will be results.

LIGO tries to observe or measure gravitational waves. LIGO stands for "Laser Interferometer Gravitational-Wave Observatory." Gravitational waves are an inevitable result of Einstein's theory of gravitation, General Relativity. GR is widely accepted today as the modern theory of this basic force of nature. If there is a disturbance in the gravitational field somewhere, for example a star explodes and a black hole is formed, this changes the gravitational field in the immediate neighbourhood and this change keeps propagating from there on. This is very similar to electromagnetic waves (an alternating current flowing in an antenna generates a radio wave) but this effect is very small in gravitation and it has never been seen for sure. There have been some unconfirmed and debatable results published. The interferometer measures the distance the laser light travels in two tunnels perpendicular to one another. The laser beams are brought together and in the absence of a gravitational disturbance they are adjusted to be out of phase so as to extinguish one another—this is the lock referred to above. If a gravitational wave appears, it changes the geometry in the area where it passes and it changes it differently in the two perpendicular directions. The distance between two points changes, and it changes differently in the two directions and so the light will not stay out of phase when a wave strikes because it will have travelled different distances. In this way, the presence of a gravitational wave could possibly be verified. This simple presentation creates the impression that this is easy. It is far from easy because of the smallness of the effect. Almost any other force that has an effect on the interferometer is larger. There will eventually be three of these instruments in operation: the one in Hanford, another in Louisiana and another in Italy. These observatories together should be able

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President's Message

All good things must come to an end, and so it is with my term as President of the Vancouver Centre RASC. I have enjoyed my time as President and would like to thank my council for their support and encouragement over the last three years. When I became President there was a lot of turmoil in the club due to past stressful events and there were serious financial problems. Over the first 18 months or so these, thanks to much effort by the council, were dealt with the result has been that we are now in a very good financial position with two consecutive years of surpluses. Craig Breckenridge, your incoming President, will continue pushing the club forward and I am leaving the club in very capable hands.

At this month's council meeting there was discussion of what services we provide for the members concentrating on the monthly meeting. The meeting format goes back beyond my tenure as a member of the RASC and there was discussion as to whether this met the needs and desires of club members. I have heard suggestions that some want to have a brief, 10 minute or so, description of what can be seen in the sky at the time of the meeting and mention of any special events that might be happening. One of the best-received meetings that I can recall was when Gary Wolanski presented his fabulous 16" light weight Dobsonian scope. There seems to be support for more meetings such as this, so we will try to get more of these coming your way. Bill Ronald, our Webmaster, is putting a "suggestion box" on our web site for anyone to drop off suggestions. This is a rather high tech answer, but I think that most of us have access to the web—if not we could install a conventional box.

I will not be fading into the woodwork as I will be taking up the National Representative Position on council and will be becoming more involved in the CARO project as well. I certainly want to be around when we find our first supernova.

So again my heartfelt thanks to all those who have helped me out on the council for the last three years and to the many volunteers at our special events.

Bob Parry

2000 Vancouver Centre Officers

President Bob Parry robpar@ballard.com	215-8844
Vice-President Craig Breckenridge cbrecken@home.com	437-3103
Secretary/Webmaster Bill Ronald ronaldb@home.com	733-7036
Treasurer Bryan Kelso bryan.kelso@telus.net	261-8292
Librarian William Fearon	939-3154
National Rep./Membership Dan Collier	732-6046
Chair, CARO Committee Duncan Munro dmunro@sfu.ca	826-9523
Telescopes Phil Morris	734-8708
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Web Site

<http://pacific-space-center.bc.ca/rasc.html>
or <http://www.rasc.ca> and follow the link to **Vancouver**.

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About RASC

The Vancouver Centre, RASC meets at 7:30 PM, in the auditorium of the H.R. MacMillan Space Centre 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 \$49.00 per year (\$25.00 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 our P.R. Director.

NOVA, the newsletter of the Vancouver Centre, RASC, 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 uploaded to SpaceBase™ at 473-9357, 58, 59.

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.

Commerical 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.

Proposed Changes to the By-Laws of

The Royal Astronomical Society of Canada, Vancouver Centre

Part 2 - Membership - change as follows:

(NOTE: deletions are marked with “~~strickethrough~~” and additions are in “**bold italic**”)

4. Membership in the Society shall be open to all persons who are interested in astronomy and there shall be ~~five~~ **four** classes of membership, namely:

- (a) ~~ORDINARY MEMBERS. A person may be elected as an Ordinary Member and an Ordinary Member shall pay an annual fee as may from time to time be set and shall have full voting privileges.~~

Changed to:

An ordinary member is a member who has paid the ordinary membership fee under Article 7(a).

- (b) ~~YOUTH MEMBERS. A person may be elected as a Youth Member. A Youth Member must be under eighteen years of age and shall pay an annual fee as may from time to time be set and shall have full voting privileges.~~

Changed to:

A youth member is a member who has paid the youth membership fee under Article 7(a) and who is less than twenty-one years of age at the time of such payment. Subject to Article 3.08(1), eligibility for youth membership terminates when the person becomes twenty-one years of age.

- (c) ~~LIFE MEMBERS. An Ordinary Member or a Youth Member may become a Life Member upon payment of a fee. A Life Member shall pay no annual~~

~~fees and shall have full voting privileges.~~

Changed to:

A life member is a member who has paid the life membership fee under Article 7(a), or a member upon whom the Council has conferred life membership in recognition of specified meritorious service to the Society or to a Centre. A life member shall not pay any annual membership fee other than any applicable surcharge established under Article 7(a).

- (d) ~~HONORARY MEMBERS. Honorary membership may be conferred by the Society in the recognition of noteworthy scientific contributions to astronomy. Honorary Members shall pay no fee and shall not be entitled to vote or hold office in the Society.~~

Changed to:

An honorary member is a person upon whom honorary membership in the Society has been conferred by the Council in recognition of noteworthy contributions to astronomy. A person may simultaneously hold both honorary membership and life membership in the Society.

- (e) ~~ASSOCIATE MEMBERS. The spouse and children of age 13 years and younger of any member in good standing may be elected as an Associate Member. Such Associate Member shall be entitled to attend meetings of the Society and shall pay an annual fee as may from time to time be set, but shall not be entitled to vote or hold office and shall not receive any publications of the Society.~~

Add:

- (e) *Only ordinary, youth, and life members are voting members of the Society.*

- 7. (c) ~~The Annual Fees shall be due and payable on the 1st day of October, and shall entitle the person paying the same to membership in the Society and the parent organization for twelve months commencing on the 1st day of October and upon payment as aforesaid such member shall receive all publications of the Society and parent organization for the ensuing calendar year. A new member who has filed his application for membership after June 30th in any year may either pay the full fee and receive all the publications for that year, or request that his membership becomes effective on the first day of October next.~~

- 8. ~~Upon payment of fees, the Secretary of the Society shall supply the newly accepted Member with a copy of the Constitution and By-laws of the Society and of the parent organization. The Treasurer shall forward to the Treasurer of the parent organization the name and address of each new member quarterly.~~

Changed to:

Upon payment of fees, a copy of the Constitution and By-laws of the Society and of the parent organization will be made available on request to a newly accepted member by the Secretary of the Society. The Treasurer shall forward to the Treasurer of the parent organization the name and address of each new member.

- 35. ~~A nominating committee shall be appointed in September of each~~

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National President Bob Garrison's Visit to Vancouver Centre

by Craig Breckenridge

I would like to thank all who were involved in the organization for Dr. Bob Garrison's recent visit to Vancouver Centre. In particular, I would like to thank Bill and Linda Ronald for hosting Dr. Garrison at their Bed and Breakfast in their home. While Dr. Garrison was with me on Friday, he couldn't say enough about the kindness and hospitality he was shown. I would also like to make a special thank you to Angela Squires for all the difficulty in organizing Bob's visit. The task grew in proportion as the event approached and Angela managed to stay on top of it all.

Dr. Garrison's talk on Thursday night was well attended with the auditorium being about half full. I felt attendance was pretty good since it was not one of our regular meeting nights and the weather outside was not very good. The subject was quite interesting and shed some light on our new President's past and his work. I look forward to hearing more from Dr. Garrison in the future and his views on what a telescope can do even in very light polluted surroundings was quite eye opening.

Friday morning we left Dr. Garrison to rest a bit after his very busy Thursday. In the afternoon I picked him up from Bill and Linda Ronald's

home near UBC and took him to meet with David Halliday, Vice President of AGRA Coast and Chairman of the Canadian Astronomical Society's Long-Range Planning Panel. Dave and Dr. Garrison had worked together a couple of times in the past, notably on the CFHT Telescope design and a proposed Boule Telescope that did not achieve sufficient funding. The two sat together for about an hour and then I drove Dr. Garrison up to our CARO facility.

Eric Fuller was to meet us at the gate, but I took advantage of an attendant's reprogramming of an entry card to pass through. We met Eric as he was coming down to let us in and followed him up to the observatory. Dr. Garrison was very interested in the equipment we have assembled and had nothing but good things to say regarding all the work that has taken place. He did suggest a few things that would make life at CARO a little easier and Eric made note of them. Eric, Bob and I were standing and talking in the dome when another unexpected visitor arrived. Duncan Munro was supposed to go for dinner with Dr. Garrison later but had had to make a change in his plans. Duncan took advantage of this to come up to CARO and demonstrate the software that he has been

instrumental in organizing. Dr. Garrison seemed very impressed with all the work Duncan has done and feels that the approach being taken is sound in its theory. He hopes we will enjoy success.

As 5:00 pm approached, we made our way down from CARO, and I drove Dr. Garrison to his dinner engagement with Rajiv Gupta, Bob Parry and Pomponia Martinez. Unfortunately Duncan Munro and Lee Johnson had other arrangements that could not be changed. From all accounts, dinner at the Boathouse in New Westminster was a great success and Dr. Garrison was able to finally get some rest with his friends nearby before making the flight home to Toronto.

Dr. Garrison was able to meet a fair cross section of our membership and executive during the course of his stay with us. This introduction to a wide assortment of Centre members is what we had wanted to achieve. I think we were able to put across a good impression and would like to thank all those who 'went the extra mile' for his visit. I am sure we will hear from Dr. Garrison in the near future and I look forward to his insights into our voyage of discovery together. *

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~~year to draw up the official ballot for the officers and additional directors and to suggest nominees for each position, ratification by the Council and presentation to the general membership at the first meeting first meeting in October.~~

Changed to:

35. ***A nominating committee shall be appointed in September of each year to draw up the official ballot for council for ratification by the Council and presentation to the general membership at the first meeting sixty days before the***

Annual General Meeting.

Correction:

50. The President shall ex-officio be a member of every committee of the Council, **any and** may vote as such member unless he is in the chair, when he shall exercise the right of giving, if necessary, a casting vote.

Addition:

56. The Board of Trustees shall be appointed, by the Council, consisting **of a minimum** of four members, including the President and Director of Telescopes. The Board

of Trustees shall have charge of all property of the Society including the telescopes and shall make a report of its transactions to the Annual Meeting of the Society.

Correction:

72. A notice sent by mail shall be deemed to have been given on the second day following that on which the notice is posted, and in proving that notice has been given, it is sufficient to prove that the notice was properly addressed and put in Canadian post office receptacle. *

Local RASC Centre Holds Public Astronomy Night

by Craig Breckenridge

On Friday, October 6th the Vancouver Centre held one of its ever-popular Public Astronomy nights. The location was their favourite at the corner of Denman and Davie, right in front of the English Bay Café. As usual, several members of the local group brought out their personal telescopes and encouraged passers-by to view the heavens, or what one attendee called, the lack of the heavens.

The astronomers were divided into two groups with the majority setting up their scopes just off the beach paved walk, spacing themselves between two lights so as to get the best views possible. The second group set up on the sidewalk right on Beach Avenue, this group's purpose being to entice the passing public to take a quick view through their scopes and encour-

age the populace to take the short trek to the main group below.

As has been the case in the past, a great deal of interest was generated by this event, especially from the restaurants across the street. Several members of the staff of these two popular eating establishments came over to see what the RASC were doing. Being pleasantly surprised that there was no charge to view the skies above, the waiters, waitresses, hosts and hostesses quickly took the message back to their patrons and even more interest was generated.

With the moon rising above the city to start things off, the night sky provided a plenitude of objects to view. Even in the glare of the streetlights, the astronomers were able to find items of interest to delight their guests. The

crowning views for the night were probably provided by Jupiter and Saturn which rose above the apartment blocks to shine in all their glory. The seeing was not too bad, said one member, and they proceeded to "put a little power" on the telescopes to increase the detail visible.

By all accounts the evening was a great success and the executive who were there wanted to express their thanks to all the members who attended. The Vancouver Centre members informed many of the public about their society and encouraged public attendance at their meetings.

Again, the executive would like to thank all who put the time in for this very worthwhile event. Look for more in the future. ★

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our (other than "faint fuzzy" green) in an auroral display.

In the preceding months I had read astrophotography books by Dickinson/Newton and Parker/Dobbins. None of this valuable information could be retrieved under current sensory input levels. It would take time for the film emulsion to drink up enough photons to capture the event, but with the amount of motion displayed I was not sure what would be recorded. So at f/1.8 I tripped the cable release and started to count, ... 30, trip cable release, advance film, trip cable release, ... 30, trip cable release, Oh wow, look at that, compose and frame a shot, trip cable, Look, Jupiter and Saturn,

It was the most heart-racing hour of astronomy in my life, yet no telescope was involved. A knowledge of the sky and cameras acquired through an interest in astronomy was invaluable.

P.S.: Did I neglect to mention I do not even own a camera (it was a friend's on loan) and never used a 35mm SLR in my life before summer '99? ★



Aurora with Jupiter and Hyades

Both this photo and the cover image were taken in Langley on the night of October 4th/5th using Fuji 400 print film for a 30-second exposure.

The camera used was a Canon AE-1 with a 50mm lens at f/1.8.

FOR SALE

FOR SALE

TELEVUE GENESIS
FLUORITE APO REFRACTOR
100 mm F 5 EXCELLENT COND.

TELEVUE EYE PIECES

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RA & DEC. MOTORS

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E Mail william_iden@sunshine.net

FOR SALE: 6-in f/12 refractor manufactured by D&G Optical in East Petersburg, Pennsylvania, about 3 years old, hand-figured 1/20 wave MGF2-coated achromat doublet, fully-baffled tube assembly with large brass rack-and-pinion focuser, 1-1/4" and 2" adapters, DG-150 German equatorial mount (28 lb.) with 1-1/2" dia. solid stainless steel shafts, 4.65" Beyers gear RA drive, 4" steel pier with detachable legs and struts (very solid), 1x led-projection finder, lens cover, dew shield, foam-lined varnished-wood carrying case. Asking \$3500. Located in North Vancouver. Contact Lee 604-983-3101 or email at: leeandvee@home.com

WANTED

I would like to buy a used 4 - 6 inch dobsonian mount telescope with lenses, in good shape.
Lesley Cummings (604) 980-0390
g&lcummings@telus.net

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.

RASCVC on the Internet

http://members.home.net/ronaldwp/rasc_vc/index.html

H.R. MACMILLAN SPACE CENTRE

The Pacific Space Centre Society is a non-profit organization which operates the H.R. MacMillan Space Centre 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 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. You can also reach them on the Internet at <http://www.hmacmillanspacecentre.com/>

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 Penndelton at 888-1505 or Howard Morgan at 856-9186.

National Council Report

by Dan Collier

Highlights of October's Meeting in Toronto

- Montreal to host 2002 General Assembly
- Virus ravages National Office computer
- RASC to begin E-commerce trials

Fees and Finances

The Society's finances continue to run in the red even with the recent fee increase. Although 2000 revenues are stronger than expected, National Councillors were concerned enough about costs to approve a cost-cutting exercise on the Annual Report. What made my mind up was an anecdote about an Imperial Oil executive who rated our 1999 Report over that of his own firm. Gulp!

Considerably more significant was an admission by the Finance Committee that another FEE INCREASE was being considered. This would have to be approved by the membership at the 2001 General Assembly (hosted by London Centre) and would take effect as early as next September. A fee increase would protect *Sky News* and the *Journal* and allow us to continue funding astronomy activities, such as grants to Centres for research, without worrying about the bank balances. How much of an increase? Not more than five dollars, I should think.

Terry Dickinson, owner and editor of *Sky News*, has allegedly been complaining that readers have been dropping their subscriptions to join the RASC. This may partly explain why our membership has grown to nearly 5,000. It's my guess that future negotiations for the wholesale price of *Sky News*, currently \$6.42 per year, will be affected.

The Finance Committee is also considering scrapping the RASC's fee-sharing system, the so-called 60/40 structure. It isn't clear how this would affect Vancouver Centre, but a likely outcome would be as follows. On your last renewal form, the National fee was \$40 and your Centre surcharge was \$9. In actuality we kept \$25 and sent the

other \$24 (60% of \$40) to National. In the proposed structure, Vancouver Centre would charge you \$25 outright for our services, and National would charge whatever they want—\$30, say.

This new structure would leave National Council free to propose the National fees in a transparent manner without having to explain how, under the 60/40 structure, 40% of any increase goes to the Centres. It was admitted that the Centres would be in jeopardy because many of their members might decide to drop out and re-join at the National level. I support the view that the 60/40 structure prevents this. Our 300 members clearly regard Centre attachment to be well worth the extra \$9. However, if everyone received a renewal notice offering the *Journal*, the *Handbook* and *Sky News* for only \$30, Vancouver Centre would have a difficult time persuading people to pay a \$25 premium to join the Centre. And to add insult to injury, many of the \$30 guys would still come to our meetings.

Proposals are expected to be debated at National Council on March 10th, and my successor (probably Bob Parry) will report the proceedings to you at the Centre's March 13th meeting. If publications sales continue their good showing, these proposals, if any, will be mild. We have Rajiv Gupta to thank for this because of the very good work he is doing with the *Observer's Handbook* and the *Calendar*.

National Office Business

An E-mail virus known as "Pretty Park" trashed National Office's computer last month, forcing Bonnie and Isaac to restore the hard disk from a backup that was a few days old. (The latest Norton Anti-Virus could have detected the virus but it had been released only a few days beforehand. Pretty Park attacks Outlook E-mail servers.) PLEASE allow them a week or two before complaining that you haven't received a 2001 *Handbook*, which was recently mailed with the August/October *Journal*. They're working hard to identify the members

whose payments were not backed up. Council approved \$700 for the purchase of a 15-GB tape unit so Isaac can back up everything daily.

Speaking of E-stuff, David Lane and Colin Haig will be trying some inexpensive E-commerce software to see if we can flog publications and merchandise on the Net. Don't laugh. We collect more revenue from sales than fees, so it would be stupid to neglect this new field.

It was leaked by National President Bob Garrison that Vancouver Centre is considering hosting the 2003 General Assembly. The cat got out of the bag before it was even being discussed seriously at Centre! London Centre is well along with preparations for "2001: A Space R.A.S.C." (June 29 to July 1). Leaflets will be available at our next meeting, or try www.rasc.ca/ga2001. Mark Bratton officially confirmed that 2002's G.A. is to be held at McGill University in Montreal, most likely on May 18-20. It's going to be a gas, with both Montreal Centres contributing. Do not miss it. That is an order!

Publications

Rajiv Gupta (Vancouver Centre) handed around a sample of the 2001 *Observer's Handbook*. You should have received your copy by now if you paid your fees by September. It's stunning. Rajiv took over as editor from Roy Bishop with complete competence, period. All he would say about the production work was "it was an intense period for me." No amount of congratulations would do justice to his achievement.

Additional items in brief:

- Heide DeBond was appointed Recorder to replace Peter Jedicke, who was elected National 2nd V.P. in July.
- Council voted to disband the *Journal's* editorial board. The Publications Committee will take over its duties.
- Total membership is expected to reach 5,000 in 2001.
- Our RASCals server was blacklisted

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Planetary Imaging for the Lazy (Don Parker lecture at the 2000 G.A.)

by Dan Collier

“CCDs combine the objectivity of film and the dynamic sensitivity of visual observing,” says Donald C. Parker. His lecture at the Winnipeg G.A. has gone almost unreported so I’ll try to summarize it, beginning with an executive summary of CCD characteristics.

The CCD is a type of detector consisting of rows and columns of tiny crystalline silicon “pixels” or *photosites*. When photons of starlight fall into a photosite, electrons are freed from the crystal and trapped in an electric field. At the end of the exposure, the electrons are scooped out by an amplifier and counted by an *analogue-to-digital converter* (ADC). The counts are stored as a table of integers which can be viewed on a computer screen in the form of an image. The two main advantages of the CCD are (1) a far greater *quantum efficiency* than film, which means shorter exposures, and (2) the ease with which the images may be manipulated by computer. In even the best films, most of the photons are lost and only a limited range of contrast is recorded. This is often apparent in photographs of the Orion Nebula in which faint wisps are lost in the skyglow and film grain while the bright core region is burned in. Film images can be digitally manipulated to an extent but the information in the burned-in areas cannot be recovered. In contrast, as it were, a CCD can record details over a wide range of brightnesses—a high *dynamic*

range—with minimal burn-in, and even the ugliest skyglow can be subtracted away like magic. Why is film still used? Two reasons: (1) colour images are acquired much more easily with film, and (2) a CCD detector as large as a frame of film is very, very expensive.

Executives, stop reading now. For the rest of you, read on for the details of Don’s lecture.

The CCD’s efficiency allows you to grab deep-sky exposures in minutes instead of hours. It may also be utilized to shorten exposure times on planets. When exposures are very short, images are less affected by turbulence in our atmosphere, what astronomers call *seeing*. In fact, the CCD can achieve what the human eye has always been able to do: record fine details during the rare instants when the seeing is better than average. Moreover, the CCD is objective. A CCD never sees the “canals” on Mars.

You can think of CCD pixels as being much more sensitive than similarly sized grains in film emulsions. This suggests that CCDs can be used with higher f-numbers and shorter exposures. Where the CCD falls down badly is the cost of sky coverage. Most CCDs are being used on small targets like stars, planetary nebulae, compact galaxies, and Solar System objects.

Like film, using a CCD to advantage requires experience. Don is still using his first camera, the Lynxx with its obsolete TI-211 chip. He mounts it

on the long reflectors that he has always used for planetary observing because they yield a large image. To further boost the image scale he inserts a \$5 lens from a microfiche reader. Each CCD pixel thus covers only 0.25 arc-seconds of sky, well under the scope’s physical resolution limit. The CCD has to dissect the image as closely as this if the subsequent processing steps are to yield good results.

The effective f-ratio of this eye-piece-projection set-up is 20 to 40. When Don was using film, he exposed Mars at very high f-ratios (typically f/200) in an effort to overcome the grain. At f/200, exposure times for Mars are measured in *seconds*. With the Lynxx he can get away with a fraction of a second at f/50, thus “freezing the seeing”. Planetary photography on film is very frustrating. If one tries to use short exposures in an attempt to freeze the seeing, the slowest films with the finest grain won’t record the planet, while fast films with their graininess won’t record the detail. There is no happy medium. One is very fortunate to produce a film photo of Mars or Saturn with a fraction of the detail that the eye can see.

Film suffers from *reciprocity failure*, a characteristic that shows up with exposures longer than about one second. The longer the exposure, the lower the effective speed or ISO number. Beginners are surprised to learn that “fast” film invariably has a

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to detect the direction that an eventual wave comes from and some other characteristics of the wave. The sensitivity of the meter, as far as frequency is concerned, is in the neighbourhood of 100 Hz. Strong gravitational waves should be produced by very massive objects such as neutron stars or black holes spiralling into one another. It would be the first time that such an event, if it exists, could be studied directly. There are other very interesting phenomena that theoretically produce

gravitational waves, such as changes in the basic matter immediately after the big bang, the energy lost by two or more black holes in orbit around one another, etc. For this kind of event, other instruments are being planned because they are out of the frequency range of LIGO. This very short description of the subject should make it clear that indeed we are seeing here the birth of a new adventure in observing. We will be able to see the universe in a totally different way.

In these days of autumn, Saturn

and Jupiter are very prominent in the sky again. Their presence and their movement are a manifestation of gravity that is well within the range of my small telescope. But is just as important and valid as what is observed with the so much more complicated tools like LIGO. And I am going to have another good look, like we all have done so often. I now know better why we actually do this. We are going to renew once again that personal moment of discovery. ★

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ridiculously low ISO number under the stars. Astrophotographers try to cope with this in four ways: (1) *very* long exposures; (2) using a special camera chilled with dry ice; (3) bathing the film with a weak flash of light just before use; or (4) doping the film with gases or chemicals, a process called *hypering*. This sounds like a messy, dangerous, unpredictable business, and so it is. Some films take to hypering famously; others don't, but perform well in cold cameras. Kodak's Tech Pan film, when hypered, is famous for keeping its fine grain and ISO 25 rating no matter how long the exposure.

Don says his CCD has an ISO "speed" of about 80, which is many times faster than Tech Pan at the best of times. In terms of tactics, CCDs have a huge advantage—you can throw away any number of unsatisfactory images until you get one that isn't blurred by seeing. Film has to be developed when the end of the roll is encountered, and high-performance films like Tech Pan can't be handled by the local one-hour lab. Can we blame the latest generation of astrophotographers if they fail to acquire a taste for basement darkrooms and chemicals that go bad a week af-

ter mixing? (Don didn't say that exactly, but it's obvious.)

Most CCDs, including the Lynxx, use 12-bit ADCs that resolve intensities to one part in 4095. Some users are shy to use the full dynamic range, but Don isn't—he goes as far as 75 percent of saturation, or 3000 ADC units, to reduce noise effects when the images are later processed. He also prefers a camera with a short download time (one second per image or better) because he has to refocus his telescope as it cools down over time. Frequent refocusing may also be required in colour work if the filters used do not all have the same thickness.

When processing planet images, Don usually uses unsharp masking. The raw images that make up his high-resolution colour images are quite disappointing to look at until the contrast is boosted by unsharp masking. As we have seen, he takes dozens of images at a time and processes all of them with the same method. The manual effort is reduced with scripting software. Don uses Richard Berry's package, and since he prefers old software, he runs his MS-DOS image processing library under a DOS shell called ZTreeWin.

Colour imaging with the CCD is usually carried out with the tricolour

Saving Jupiter and Saturn in a Digital Camera

by Dan Collier

Patrons who have brought their new digital cameras to Southam Observatory have been delighted to find that they can take home images of Jupiter and Saturn. All they have to do is hold the camera up to the eyepiece and centre the planet in the viewfinder screen. The Moon is an even easier subject. If you haven't tried this with your own equipment, by all means do so—you'll be amazed.

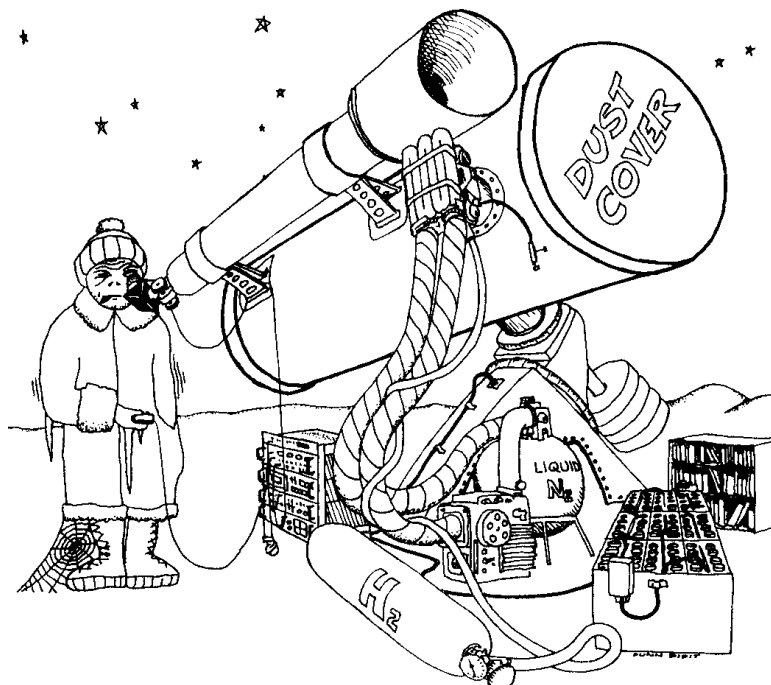
We use the "afocal" set-up because the lens generally cannot be removed from a digital camera. The telescope and eyepiece are focused for visual use, and the camera is simply held up in place of the eye. (You can try removing the eyepiece if the camera is capable of focusing on very close subjects.) What can you expect? Jupiter will be close to 50 arc-seconds in diameter for the rest of this year. With our 500mm Cassegrain working at 250x, the planet appears 3.5 degrees across. Digital cameras are usually considered equivalent to a 35mm camera with a 50mm lens, so Jupiter will take up about a tenth of the frame at 250x for a scale of roughly 0.25 arc-sec per pixel. Saturn's rings will be about the same size.

The planet should be as high in the sky as possible and in the centre of the field. Mount a rubber eyeguard or similar device on the eyepiece to protect the camera. This will also help you hold it on centre. A bracket to hold the camera is better; the self-timer can then be employed to eliminate camera shake. As for exposure and focus, your camera may not leave you many choices. If you can, set the meter on "spot" (rather than "area" or "weighted") to avoid overexposing.

Seeing, as always, is the prime limitation. Since digital cameras acquire colour images in a single exposure rather than three as with the astronomer's tricolour process, you can expect further degradation. All you can do is take many images in the hope that one or two will turn out. Don't expect to see much contrast until a process like unsharp masking is brought to bear. *

From the Archives

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Eric Dunn

Members' Gallery



Bryan Kelso

Partial Solar Eclipse

Kodak E200 slide film

350mm Pentax lens

9pm, 30 July, 2000

Vancouver

Gordon Farrell

Sunspots

Agfa 100 print film

80mm f/5 refractor w/ 2x barlow
(effective focal ratio of f/16) through
Solarskreen filter 1/250 sec.

6pm, 25 September, 2000

Vancouver



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on the Net because of a bug that enabled "spamming" and is to be upgraded.

- \$1,100 was approved for funding student awards at the Canada-Wide Science Fair.
- The former tenant of our Dupont Street suite has paid the outstanding rent bill in full.
- Membership cards were printed. Pick up yours at the next members' meeting.

I'm feeling a little sad now that the end of my term as Vancouver's National Rep is nigh. My only regret is that I couldn't convince more of you to attend General Assemblies. Over the years I got to know all sorts of nice people from the other Centres and they accepted me in spite of my hilarious qualifications as an astronomer. To name a few in no particular order: Tim, Heide, Peter, Patrice, Gary, Alastair, Carol, another Peter, Kim, Dave, Ralph, Mark, Bob, Doug, another

Dave, and Robert. Special thanks to Rajiv Gupta, Duncan Munro and Bonnie Bird for their assistance; to Air Canada for no less than 15 trouble-free flight segments; to Linda and Joan, who worked hard to make bed and breakfast for me after all those red-eye flights and meetings; and to all the members of Vancouver Centre for granting me this privilege. The memories just couldn't be beat. ✨

Adventures in Osoyoos

by Bob Parry

This summer Pomponia and I had a very pleasant adventure during the Mt Kobau star party week. To explain how this came about requires me to back up one year to the previous Mt. Kobau. As those who were there know, that last year was the first Mt. Kobau star party to have been rained out in many years. That week started in Manning Park with a torrential downpour that soaked me to the skin while I was trying to set the tent up. The rain had dutifully held off until the tent was spread out on the ground and I was committed. We spent that night in the mini van with our telescope and equipment in the tent, which was now at least waterproof after the rain fly was installed. The next day we travelled on to Mt. Kobau and set up the tent to dry out. The sky was clear and the day very warm. We continued to sleep in the van as Pomponia looked at the tent with doubting eyes. There were three good evenings of view from Sunday to Tuesday, then came Wednesday night; it rained and the rain continued for the next two days. Pomponia and I had had enough so

we packed up and headed back to Vancouver. Along the way, Pomponia came up with the brilliant idea of spending a night in a warm room and

the hot springs at Harrison—what luxury.

All through the fall and winter Pomponia said how much she liked to look at the stars, but how much she hated being cold. She wanted to view the heavens and be warm at the same

time. I mentioned that Jack Newton was going to have a Bed and Breakfast in Osoyoos starting in May, she thought that that would be a terrific idea and contacted the Newtons. She was so early that they did not have a phone and we had to wait for e-mail confirmation of our reservations for four nights during the 2000 Mt .

Kobau star party week. We made reservations for ourselves and my mother in the Saturn Room, which is a suite with a small fridge, hot plate and sink. My mother had brought her 80mm F5 Orion scope, which we set up outside overlooking the valley. From our room we could see across to the bump of Mt. Kobau.

During our wait for the calendar to slowly turn to the much-anticipated date, we listened to several glowing reports on the Newtons' B & B on CBC radio and TV. The plan was to spend three nights at the Newtons', four on Mt. Kobau and two at Harrison Hot Springs. In order to make Pomponia's life in a tent better and to

alleviate fears of snakes, I bought a tent that fit in the back of my pickup and a very warm sleeping bag from Mountain Co-op. To go along with this there was also a cabana with mosquito net-

ting to foil the ravenous mosquitoes of Mt . Kobau. I am happy to report that all this equipment worked well, but more on that later.



M17; Same exposures as M20



M20 Tri-Colour Exposure - 2 minutes Red and Green
3 Minute Blue 2 Minute Luminance

July 20th dawned warm and lovely. I started to pack everything in to the truck, which looked a little like a scene from *The Grapes of Wrath* and off we went to meet my mother at the Husky station in Osoyoos at 3:00 PM. The meeting went according to plan and after a coffee we are off to find Astronomy Road on Anarchist Mt. After one wrong turn resulting in a dead-end, we started winding our way up the highway on the east side of town. We could see a telescope dome, so we knew we were on the right track. The highway wound its way back and forth until we finally found Astronomy Road where we turned in and were met by a lovely Alice Newton at the door of the Bed and Breakfast. She showed us to our spacious room with a priceless view over the valley and Osoyoos below.

That evening, when it was dark, all the guests went up to the dome, which is attached to the house, for Jack's tour of the evening sky. Jack showed us all the fabulous summer highlights through the Meade 16". These included M16, M13, M20, the Andromeda Galaxy as well as the supernova that he and his observing part-

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ners had discovered—this made me very jealous. Pomponia found that as a novice astronomer, it was wonderful to be able to view through the scope, then see Jack's image from the piggy-back CCD of the same object. Then she could once again check out the object through the scope. It really helped "see" the boundaries and detail of many of these great objects. Jack made it look so simple. Of course she did mention a number of times how nice it was to observe in her light summer dress, in the comfort of the observatory rather than in bundles and bundles of clothes atop the windy Mt. Kobau. I assured her that last year was the exception and this year wouldn't be so bleak.



M31 (Andromeda) 2 Minutes @ F6.3

After the hour of observing for all guests, two other guests and myself took a tutorial on CCD imaging. This included a CD-ROM with all the images that we took during the tutorial. All of our exposures were of two minutes or less, unguided. Jack says that he can reach 19th magnitude in two minutes and except for unusual cir-

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process. Many images are obtained with each filter, and the best ones are combined and registered with the "blink" process to produce a natural-looking colour image. The green and blue filters must be selected to minimize a property known as *red leak*. A CCD loses much of its sensitivity in blue light, so a relatively long exposure must be used with the blue filter. If the filter also admits stray red or infrared rays, the final colour balance will be affected.

cumstances, that is good enough for him. He showed us how to process the images and "clean them up" after the exposure was taken. The best thing for me was that the CCD was connected to the 7" apo, not the 16". Jack has all the toys! Most of the guests want to look through the 16" so he leaves the big scope for visual use when guests are around.

After having a beer in the grandiose entertainment centre with the big screen TV and then looking out over the valley, we all went to bed. Next morning, Alice put on an absolutely wonderful breakfast with fresh baked cranberry spice muffins, fruit salad, waffles, eggs and toast. Jack talked about the previous night's exposures as he helped out, according to Alice, with his sole breakfast chore: serving coffee. It was great—and so special looking out over the huge valley. We talked about the night sky and efforts that the Newtons' were making with the local council to encourage full cut off lights. Their dream is to make the whole hillside an astronomers' ridge. After breakfast, we went up for an impromptu tour of the day sky! Jack was almost smug as he showed us Mercury, Saturn, Jupiter at 9:00 am. Just spectacular.

This wonderful experience continued for two more nights, then we went up to Mt. Kobau. I set up the tent and the rest of camping paraphernalia up the road from the "lowlands" which flooded the year before. Craig set up on the other side of the road and Bryan and Verna were just behind us. The

A critical requirement of telescopes used for planetary imaging, particularly Schmidt-Cassegrains, is good collimation. Don's telescopes have higher focal ratios than most large reflectors and are easier to keep in collimation.

Since Don started out, "E-series" CCDs with their enhanced blue sensitivity have come out. In some cases, as when emission nebulae are being imaged, high red sensitivity is an asset, but as already noted it can interfere with colour separation. Refracting

four nights that we spent here were just excellent—the nights were cool but not cold. Mt. Kobau gave us a spectacular display of the "Northern Lights." These displays are always very entertaining to me, although they do brighten up the skies for deep-sky observing.



Comet Linear S4 July 29 2000

We ended our time in the Osoyoos valley with two wonderful days in Harrison Hot Springs. Would we return to the Astronomy B & B? Well, for Pomponia's birthday we returned for two more days in October that were every bit as enjoyable as those days in July. ✱

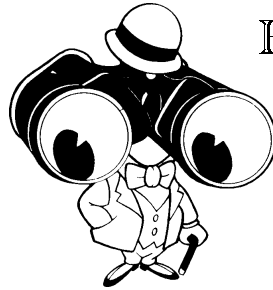
telescopes present another problem for CCDs that reflectors do not: lenses are not well corrected for the infrared rays emitted by luminous red stars and blooming may result. As blue-sensitive CCDs take over, lenses will have to have good correction at the blue end of the spectrum as well.

Don closed by posting his address in Florida (which I have unfortunately misplaced), and said we were all welcome to chase him down. In reference to his bulk, he added, "That should be easy!" ✱

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