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BULLETIN

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Royale d'Astronomie
du Canada

Reflections: Why I Like to Gaze

Glenn Skene
Vancouver Centre
reprinted from *NOVA*

Here are ten reasons why I like to gaze into the night sky.

10 The challenge. There is something satisfying about accomplishing a particularly challenging task.

I recall the first time that I tried to locate the Ring Nebula. I was using my first telescope, an 80 mm refractor, and the sky was fairly brightly lit with that all-too-familiar orange glow. After about fifteen or twenty minutes of searching I was getting somewhat frustrated. Determined to find it, I continued on. Finally, about fifteen minutes later, I saw it. A very faint donut of light, just barely visible. I was elated—not so much by the fact that I had seen it, but rather that I had persisted and accomplished a fairly difficult task.

9 The tranquillity and serenity. In today's busy world, it is getting more and more difficult to get away from the hustle and bustle of everyday life. Even those traditional get-away places are being infiltrated by telephone beepers, cellular telephones and ghetto-blasters. For me, the still of the night is one of the best places to get away from it all. Where else can you get light-years away from the hustle and bustle?

8 The variety. Amateur astronomy involves such a wide range of activities. Whether you want to build things with your hands, discover things that no one has seen before, learn about the universe you live in or simply sit back and enjoy the beauty of it all,

or a combination of the above, astronomy has something for you.

7 Astronomers collect originals. What if I told you that you can collect a real part of the Andromeda Galaxy? No tricks, no gimmicks—you can collect the real thing. All you have to do is train your scope on it. The photons that enter your eye are a real part of the Andromeda Galaxy. They have travelled many years and vast distances to get to you and now they are yours, forever. Best of all, you do not have to worry about depriving others. There are plenty to go around.

6 The planets. We all know there are other planets out there circling the Sun. We all learned about them in grade school and we all had someone point out Venus, Mars or Jupiter to us in the night sky. However, there is something more gained than knowledge when you actually see the disk of a planet yourself. For me, it was like a final step in really understanding the solar system and our own planet's place in it. (So what if I was looking at Mars and thought it was Jupiter.)

5 The equipment. For me, there is something special about owning and using a quality piece of equipment. I found this to be especially true of my telescopes. Maybe it was all the long nights we have spent together (I hope this is not taken out of context!) or maybe it is because a telescope is an extension of my own sense of sight. Whatever the reason, it feels good.

4 The science. Astronomy is where many different sciences come together. It is where the science of the very small meets the science of the very large. It is where the small building blocks of all matter get crushed in the cores of gigantic stars. It is where the

elements that you and I are made of were formed. It is where time and space itself come together. For me, the science is one of the most fascinating aspects of astronomy. There is so much that we know and so much more that we strive to know.

3 The Moon. To some observers, the Moon is simply something that interferes with their observing. I beg to differ. Imagine being in orbit around the Moon, less than a Moon diameter from its surface. Who cares if the spacecraft window distorts the view a bit, it is still fantastic. Back here on Earth, you can get the same view by popping a 110 power eyepiece in your scope. Again, who cares if the window (the atmosphere) distorts your view a bit, it is still fantastic. To those who say they are tired of looking at the same old thing, I say look again. Nothing in the heavens varies as much as the Moon. I particularly enjoy the very early and very late phases. The long surface shadows at these times give a sense of depth that you cannot see in any other celestial object.

2 Saturn. I still remember the awe I felt the first time I saw that dazzling little jewel just hanging there in space. There is something about seeing it with your own eye that is just not there when you look at a photograph.

1 Sharing all of the above with others. One of the best things about astronomy is the people that you get to share it with. With other things, sharing means diluting the best of that item. With astronomy, sharing means increasing the benefits you receive. It is like capturing a little bit of the awe that someone else feels as you show them Saturn for the very first time. To me, sharing is what the R.A.S.C. is all about. ☪



BULLETIN

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Supplement to the *Journal* Supplement au *Journal*

Cover Picture: the Narrows and Signal Hill in St. John's. Cabot Tower can be seen at the highest point.

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Letters to the Editor

Closed Captions

I would like to make a comment with regards to the **BULLETIN**. Let me commend you in placing a photo on the cover page. However I feel that readers would like to have a description of it and it should not be too difficult to make room for a caption.

Heinz Berrys

5150 MacDonald Avenue, Apt. 1002, Côte St-Luc, Quebec H3X 2V7

[An excellent suggestion! Starting with this issue, the cover photo will be captioned in the masthead. Captions for the issues in 1993 are: February: The Halifax waterfront as seen from the Dartmouth ferry; April: The starred shape of the Halifax Citadel can be seen in the right foreground with Halifax Harbour in the background; June: The Bluenose II sailing past the Halifax waterfront; August: the lighthouse at Peggy's Cove in winter; October: Peggy's Cove during the summer; December: The Old Town Clock with the Dartmouth shoreline in the background.—PMK]

Survey Comments

In the October issue of the **BULLETIN**, Michael Watson presented some results from the membership survey, specifically those related to the *Journal*. No survey is perfect and, hence, there is always some room for differing interpretations of the results, even when the latter are in the form of "hard" numbers. Here-with are two examples.

1. Question 22 asked members whether they find *Journal* articles "useful". Personally, I find that most *Journal* articles are interesting but very few are "useful" if, by "useful", one means that they contain practical/utilitarian information. Had I thought about it more carefully when previewing the questionnaire prior to its publication I might have recommended removal of this

question. I do not believe that one can use the responses to this question as an argument either "for" or "against" the *Journal*.

2. Michael referred to a comment made earlier by Jeremy Tatum, that the rate of submission of articles to the *Journal* is insufficient to allow it to continue in its present form. Michael concludes that the technical level of the *Journal* ought to be lowered in order to attract more papers [from amateur astronomers]. In fact, there is currently (late 1993) a healthy rate of submission of papers from professional astronomers, largely as a result of the 1993 annual meeting of CASCA. One could argue—and Dr. Tatum would certainly make this argument—that the technical level of the *Journal* ought to be maintained, if not increased, in order to ensure a healthy rate of submissions from the professional community—which does NOT preclude submissions from amateur astronomers. As recent issues of the *Journal* demonstrate, papers by professionals need not be overly technical, and can hold great appeal for amateurs.

Doug Hube, Publications Committee Chair
8930 Windsor Road, Edmonton, Alberta T6G 2A2

Nebula Will Not Be Mugged

Unfortunately, the R.A.S.C. mug which was to have featured a full-color reproduction of the Orion Nebula and which was being pursued by Frank Marino of the Vancouver Centre has been cancelled due to the poor quality of the reproduction. After consulting with other manufacturers, it was realized that the quality of the mug that we were aiming for, combined with the small quantities that we would have needed, would drive the cost beyond a reasonable price.

I would still like to applaud Frank Marino for the time and effort that he expended on this project. If anyone has any ideas for other merchandizing products, please contact Frank through the Vancouver Centre.

Steve Whitehouse, Vice President, Vancouver Centre
7425 18th Avenue Apt. 202, Burnaby
British Columbia V3N 1H6

Too Close for Comfort

The illustration on the cover of the December **BULLETIN** reinforces the unfortunate misconception that the Moon and Earth are relatively close together. No wonder schoolchildren find it difficult to understand Moon phases, and eclipses! In fact, the Moon's distance from Earth is 30 times Earth's diameter. If the Earth were represented by your head in a scale model, then the Moon could be represented by your fist—held 8 metres away!

Dr. John Percy

University of Toronto, Toronto, Ontario M5S 1A7
[The illustration is supposed to show the Earth-Moon system at its closest approach to Venus (i.e. when the Earth would be at superior conjunction as viewed from Venus). A careful look at the illustration shows that the Moon is almost full, with the illuminated part of the Moon showing the features familiar to all of us. Thus, the Moon is on the far side of Earth, as viewed from Venus. As Dr. Percy points out, had the Earth and Moon been at their maximum angular separation for this illustration, the Moon would have been about 1.25 metres away, requiring both a REALLY wide-field eyepiece and a centrefold for that issue of the BULLETIN.—PMK] ☪

A hundred astronomers have left parts of their souls and their hopes in drawings showing the surface of Mars. A score of men have left their stamp in the major theories about life on the strange fourth planet from the sun. The names of ten thousand technicians and scientists rest now on a plaque standing a few feet above the soil of Mars, attached to a spacecraft sent there in 1976. Fifty writers have tried their pen out on Mars and things Martian; sixty movie directors have tried to grasp the magic and mystery... I would like to show you how to fall in love with a planet.

Robert M. Powers

British astronomer/author (1986)

Score One for Astronomy

Randy Pakan
Edmonton Centre

On October 9th I arrived at Blackfoot Provincial Park, one of our observing sites that the public rarely uses. The Sun was setting and I was really pumped for a good observing session—the sky had been clear all day and the forecast was perfect.

A van drove into the parking lot and pulled up to a picnic table. My heart sank when a young couple and their son started hauling armloads of firewood from the woodpile—they were packing enough to fuel a fire for a week! What do you do? Move to another spot? Ask them to move? Ask them to keep the fire small? You cannot ask them not to have a fire—it is a public park.

As I set up my 16" Newtonian we exchanged many glances. I kept a nervous eye on their ever-growing fire and I am sure they wondered why I was assembling a SCUD missile launcher in the middle of the parking lot. After setting up, I wandered over to them and greeted them with my friendliest "Howdy, folks!". I made no mention of their fire and small talk quickly turned to "Is that a telescope? What can you see with it?". I invited them to view the rings and moons of Saturn, I described M31 and M13 and I told them about Comet Mueller, which I had just seen for the first time the night before. After hearing this, the three of them were as anxious to start observing as I was.

As we walked towards my telescope I explained to them how dark adaptation works and I suggested that they might want to keep the fire very small. With no other prompting they returned to the fire pit and extinguished the blaze!

I took them on a two hour tour through several of the showpiece objects. I did not really mind, because although I had several challenge objects to hunt down, it is always nice to revisit the eye-poppers. It was really refreshing to hear the oohs and wows as these new eyes opened up to the heavens. At one point—after the woman had spent at least five minutes hypnotised by the Double Cluster viewed through my 40mm wide-field—she announced "Now I know there is a God when I see things like this!".

Other members of our astronomy club arrived and the family stayed and observed with us for several hours. We all treated them to views through our scopes and welcomed their enthusiasm. Around midnight they decided to head home and thanked us several times for our hospitality. As they walked away the last thing I heard the woman say to her husband and son was "Let's buy a telescope". ☪

Calgary Eclipse Trip

Don Hladiuk
Calgary Centre

As you know, there will be a total solar eclipse over parts of South America in November of 1994. With our last eclipse tour to Mexico in 1991 being such a success, we are already making plans with our partners, the Alberta Science Centre and Let's Talk Travel Ltd., for an excursion to Chile.

The itinerary has just been finalized and I can tell you that the expedition will visit some of the best astronomical observatories in the southern hemisphere! After sunset, we are also planning observing sessions to view the southern sky. Our group has been granted observing time on the University of Toronto's 24" telescope at Las Campanas. The expedition will run between twelve and fourteen days and will be priced at about \$3,600 (\$US 2,700) The cost will be less if you live in the Toronto area or if you would like to join us in Miami. The tour price will include all air and ground transportation, first class hotel accommodations, several side trips, most meals and expert local guides. The eclipse viewing site will be in northern Chile near Putre where weather prospects are excellent.

We are interested in forming alliances with other centres and facilities for this expedition. Were you going to arrange your own eclipse tour to South America? If so, have you started planning yet? If the answer to either question is "no", this could be an opportunity for you to be able to offer a trip package to your membership without the work of arranging the whole thing yourself. Moreover, the possibility exists of earning an honorarium for your centre for each person signed up through your efforts and/or reduced travel costs if you wish to join other members as a tour escort!

If you have any astronomical questions regarding the tour, please feel free to contact me at (403) 256-4480 (evenings). If you have questions regarding the itinerary or travel costs, please call Shawn Noble of Let's Talk Travel at 1-800-661-1335. ☪

I feel sure that the surface of the moon is not perfectly smooth, free from inequalities, and exactly spherical, as a large school of philosophers considers with regard to the moon and other heavenly bodies, but that, on the contrary, it is full of inequalities, uneven, full of hollows and protuberances, just like the surface of the earth itself, which is varied everywhere by lofty mountains and deep valleys.

Galileo Galilei

Italian astronomer/physicist (1564-1642)

Astronomy Week 1994

Sandy Ferguson
R.A.S.C. Astronomy Day Coordinator

This year International Astronomy Week occurs the week of April 11-17, with International Astronomy Day being celebrated on Saturday, April 16th. This is the eighteenth year in which Astronomy Day will be held in Canada. It provides an opportunity for all centres of the R.A.S.C. to promote astronomy and our society, as well as to educate and inform the public. This year centres are encouraged to organize public events and activities with the theme "ASTRONOMY FOR CHILDREN", emphasizing the importance of bringing our interest in the sky to our country's young people.

For an information package to assist your centre in organizing Astronomy Day events in your community, including how your centre can apply for the Astronomy Day Award sponsored by *Sky & Telescope* magazine, please contact:

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E-Mail: sarty@math.usask.ca ☪

R.A.S.C. Promotions

Hello fellow R.A.S.C. members! I would like to take this time to tell you that there are still several promotional items for sale. These can be purchased from your centre's treasurer or can be ordered directly from the R.A.S.C. promotional co-ordinator, Kim Hay.

R.A.S.C. stickers (white on blue)	\$1.25
	(\$1.00 per order)
Turtleneck sweaters	\$20.00
(black or blue with yellow crest)	(\$4.00)
Golf shirts	\$20.00
(white (S,M), light blue (M))	(\$4.00)
Toques (black with yellow writing)	\$15.00
	(\$2.00)

Shipping is in brackets and all taxes are included. If at you have questions or future ideas for R.A.S.C. promotions, please contact me at:

Mrs. Kim Hay
RR#2 Perth Road, Ontario
K0H 2L0
(613) 353-1189

Please make cheques or money orders payable to: Royal Astronomical Society of Canada. ☪

Across the R.A.S.C.

Toronto

Celebrations to mark the centre's 125th anniversary began with the 9th Annual Award Banquet, which was held on April 3rd. Also in celebration of our anniversary, a public lecture was held on November 26th, which was jointly sponsored by the Toronto Centre and the Ontario Science Centre (O.S.C.). The lecture featured Dr. Stephen Maran of N.A.S.A.'s Goddard Space Flight Centre who spoke on the topic of "Science with the Hubble Space Telescope". Dr. Maran detailed a sampling of the work that he and others are accomplishing using the H.S.T. which included the study of globular cluster cores and the rapidly ballooning bubble of gas surrounding Nova Cygni 1992. Many stunning images from the H.S.T. were incorporated into his presentation, which was well received by the full house of 500 public and centre members.

The Toronto Centre is continuing discussions on the possibility of a co-venture between the centre and the O.S.C. in the construction and operation of a public observatory which would be located at the science centre.

At approximately 6:15 P.M. (EST) on the evening of November 12th, a very bright fireball streaked across the sky of southern and central Ontario. The fireball appeared as a bluish-green ball of light slicing through the early evening sky at a brightness that rivalled that of a Full Moon and was travelling in a northerly direction. Centre member Tim Mullings is co-ordinating an effort to gather information on this event and the response to newspaper, radio and TV news requests for public information has been incredible with almost 300 calls to our info line!

Sightings of the fireball have been received from Kitchener to Smith's Falls and from the Niagara Peninsula to Sudbury. Information to date suggests a potential landing site near the western boundary of Algonquin Park, although it is unknown at this time what the possibility is of this meteor surviving the fall. Data collected on this event will be reported to the meteorite and impact advisory committee of the Canadian Space Agency.

The Toronto Centre offers its congratulations to the staff of the McLaughlin Planetarium on the occasion of their twenty-fifth anniversary this past October 26th and extend our best wishes for their continued success. ☺

Vacuum I call every place in which a body is able to move without resistance.

Isaac Newton

English physicist/mathematician (1642-1727)

Medium-Format Astrophotography

Rajiv Gupta
Vancouver Centre
reprinted from NOVA

Most astrophotographers are content to frustrate themselves with 35 mm film. I have recently made the transition to the larger medium-format film, which has almost four times the area of 35 mm film. Initially, this was simply an exercise in increasing my frustration level by a factor of at least four, but recently I have been able to get some reasonable medium-format shots. I will explain in this article what the advantages of larger film are, what the problems are and how I overcame these problems.

Large Film Versus 35 mm Film

Put simply, larger film lets a deep-sky astrophotographer record a larger part of the night sky. Medium format (or 120 size) film is a roll film which is 61 mm wide as compared with standard film which is 35 mm wide. The frame of a 120 size negative is about twice that of a 35 mm negative. If this larger film is used in the same telescope, up to four times as much sky can be recorded for the same amount of guiding effort. Talk about more bang for the buck!

The larger negatives allow for the production of large grainless prints. Indeed, this is the reason professional photographers use medium-format or large-format films. If you simply want to record a larger part of the sky, it is easier to use a camera lens or telescope with a shorter focal length. If, however, your mission in life is to produce grainless 16-by-20 inch prints, medium-format is just the thing for you.

Equipment

Vignetting is the first problem that must be dealt with. Because a large film is being used, a focuser with a large inner diameter is necessary. The focuser on my refractor has a 65 mm inner diameter, which gives full coverage on a 48x55 mm medium-format frame. I would recommend a minimum of a 50 mm inner diameter.

Three or four years ago, when I first started thinking about medium-format film, I quickly decided that I was unwilling to hand over the \$1,000 or so for a medium-format camera body. After realizing that all I needed was something to hold the film and that things like shutters and view-finders were dispensable (I could use the telescope lens cap as a shutter, the main guidescope to centre the field and a graduated dial for focusing), I decided to make a home-made camera.

The camera I am now using was built by Gary Wolanski and consists of a light-tight aluminum box with an adapter which attaches it to the telescope focuser. The adapter is threaded to accept 72 mm filters.

Field Curvature and Bending Film

Most optical systems do not focus the image onto a flat surface, but rather into a curved, spherical surface. If the film is held flat, this means that the stars away from the centre will not be in focus. This is not a serious problem for small film, but it is for large film. A field flattener lens, if available, can be inserted into the optical path to correct or partially correct this curvature. I purchased a field flattener for my telescope, but quickly discovered that it only corrected half of the field curvature. There was still significant aberration toward the edges.

In order to rectify this, I decided that the film would have to be bent. The amount of curvature needed (less than a millimetre) was within the range of elasticity of the film, but the problem remained of how to shape the plate that held the film and how to hold the film in place.

I decided to shape the backing plate using layers of ordinary Scotch tape. A compass was used to cut the tape into circular rings, with spacings calculated to give the correct shape. In the near future I hope to have the backing plate machined on a lathe instead.

To hold the film in place, I use a two-sided tape which has one side more sticky than the other. The more sticky side is permanently attached to the shaped backing plate. The film, which has been cut into a piece of the correct size for the camera, is held in position by pressing it against the other side of the tape and peels off easily after an exposure is finished.

Eventually, I would like to get rid of the field flattener lens altogether. This will require shaping the backing plate to a steeper curve than the one currently used and whose shape will have to be determined experimentally.

Conclusion

Medium-format astrophotography is not for the faint-hearted, but then again, neither is deep-sky astrophotography in general. Struggling and striving for perfection, and having fun doing so, is what drives me as an astrophotographer. It has taken much time and effort to develop a working medium-format system, but I now see myself never going back to 35 mm film. I am having too much fun cutting Scotch tape into little rings ☺

The total energy of the universe is constant and the total entropy is continually increasing.

Isaac Newton

English physicist/mathematician (1642-1727)