



# Winnicentrics

The Journal of the Winnipeg Centre of the Royal Astronomical Society of Canada

## Comet Machholz, the Event of the Season

If you haven't gone out yet to look for Comet Machholz west of Orion, you're missing the big sky event of this holiday season. The comet is a fine sight in binoculars, glowing at 4th magnitude pale greenish gray — a large fuzzcloud with a brighter core set against a background of pinpoint stars. In a dark sky the comet has been easily visible to the naked eye; through moonlight or light pollution it's visible to the naked eye with greater difficulty if at all. Basically, if you can see the Andromeda Galaxy, you can definitely see Machholz.

Being near the celestial equator, the comet is currently visible during the evening from all the inhabited parts of the globe. There's really no rush, though. The comet will continue to be an easy binocular target during evening all January and probably all February. It has been running a little brighter than originally predicted, suggesting that it will peak at about magnitude 3.6 during January's first week — when the sky will be free of moonlight. Enjoy!

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# MEETINGS

**Room 118, St. John's College**

January 14 Friday            **Beginners Session with Sean Ceaser 7:00**  
   **Regular Meeting 7:30**

## **Astronomy One Saturn Year Later by Kevin Black**

Kevin will take us on a reflective journey into the field of Astronomy, from his initial foray into the hobby, through his growing love and dedication to where he finds himself today, some 30 years later. Along the way, Kevin will show us some of the changes in the technology and practice of both amateur and professional astronomy, and highlight how much change can occur in just one orbit of the great gas giant that captured his imagination,--- just one Satarian year ago!.

Also: Gail's Constellation of the Month looks at Cassiopeia the Queen, "What's New" by Jennifer West and coffee and cookies during the break.

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February 11 Friday            **Beginners Session with Marlene Wallace 7:00**  
   **Regular Meeting 7:30**

## **"Building Your Own Backyard Observatory" by Gord Tulloch**

Ever dreamed of having your own private observatory? You can! In this presentation, Gord will describe what kinds of observatories amateur astronomers have built, why you might want to consider one, how much it will cost, and the benefits and drawbacks of city observing. Gord will also describe the process of building the Rainbow Cove Astronomical Observatory, his own backyard roll-off roof shed observatory.

Also: the regular features: "Explore the Universe" Observing Certificate by Lindsay Price, Picture of the Month by Terra Jentsch, "What's New" by Jennifer West and coffee and cookies.

As always, many of us will be heading out to Boston Pizza after the meetings, and everyone is invited.

## Members Observing Nights Glenlea Observatory

Saturday January 15

7:00 p.m. to ???

Your hosts: Lindsay & Fred

Saturday February 12

7:00 p.m. to ???

Your hosts: Marlene & Sean

Come one come all to our Members Observing Nights, weather permitting.

We will take a look for Comet Machholz as well as work on our observing certificates. As always, the 12" will be operational and coffee, tea and hot chocolate are available in the warm room.

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# ***PARTY, PARTY, PARTY !!!***

One of our main annual highlights is the January Pot Luck. It will be at the home of Judy and Jay Anderson, 189 Kingsway on Saturday, January 22, starting at 7:00 p.m.

What to bring: some eatables and drinkables,  
your wife/husband/girlfriend/boyfriend/significant other/insignificant other/mum/dad/anybody else  
photos and/or slides to show off  
a sense of fun

And a great time will be had by all!

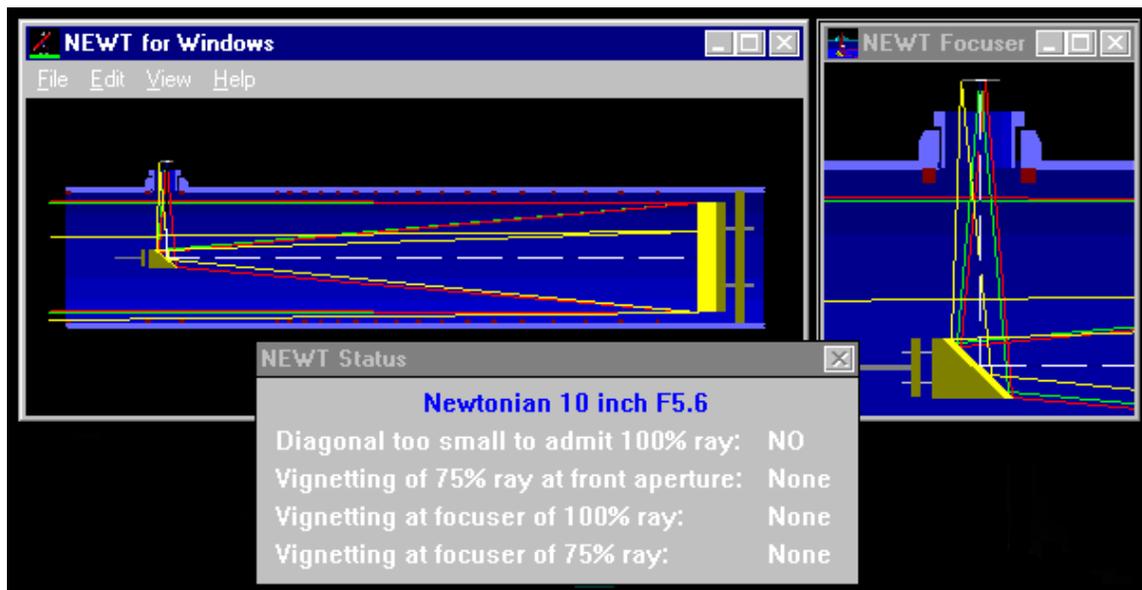
## ATM Journal 11: Sizing Your Secondary Mirror

By Gord Tulloch, RASC Winnipeg

Assuming you've either ground your own mirror or bought one, the next major component of your telescope is the secondary assembly, which in a Newtonian telescope reflects light from your primary mirror out the side of the telescope into a focuser where the observer views the image through some suitable eyepiece.

Even for a complete do it yourselfer, secondary mirrors are normally one of the items that are not worth the both of making yourself. Quality secondary mirrors are problematic to make and relatively cheap so it's definitely suggested to just go out and buy one.

First of all, let's review how Newtonian Telescopes work, with the aid of the Dale Keller's excellent NEWT software package (see references below). As you can see below, the optical tube assembly of a Newtonian reflector consists of a paraboloidal primary mirror at the bottom of the tube plus a 45 degree flat mirror near the top end of the tube which redirects the light from the primary mirror out the side of the tube into a focuser.



The parameters that the ATM must consider when designing an optical tube assembly for a Newtonian telescope are primary diameter and focal length, diameter of the telescope tube or secondary cage, and size of the secondary mirror. The size of the secondary mirror must be large enough to intercept the light cone coming from the primary without allowing light to spill over while remaining small enough to minimize diffraction, which robs the telescope of image contrast. Another parameter you will need to consider is the height of your focuser – the lower the better to prevent vignetting. NEWT provides an excellent mechanism to play with these parameters until you get the result you're looking for.

But how large should a secondary mirror be? An important consideration is the desired fully illuminated field of the telescope. This is not set in stone – for example, a telescope used primarily for planetary observation would opt for a smaller secondary (and thus experience some loss at the edge of the field) because minimizing diffraction by using a smaller secondary mirror is far more desirable than having a fully illuminated field because objects are generally centered in the field, making edge illumination irrelevant. Obviously the converse is true for short focus designs where a fully illuminated field is critical and secondary size is of less importance. As well, consider whether you plan to use 2" eyepieces in the telescope, which require a larger fully illuminated area. To calculate the minimum diagonal size required to catch all of the light from the primary (e.g. 100% illumination) use the following formulae:

FR = Focal ratio of primary

L = Distance from secondary mirror to focal plane

Calculating L for an existing telescope is easy, simply put some tape across the focuser and point the telescope at the moon. Rack the focuser in and out until the image focuses, then measure L. For a telescope that's not built yet this becomes more difficult – assume you use half the focuser travel available and measure the distance from the center of the tube to the point inside the focuser where you want the focal plane to fall.

To determine the minimum secondary size simply divide L by FR. Here's a small table of minimum secondary sizes based on L being ½ the diameter of the primary, plus 2" to the outside of the tub, plus 3" focuser travel.

	Diameter (in)									
	8	9	10	11	12.5	13.1	14	16	18	20
F-ratio										
4	2.00	2.13	2.25	2.38	2.56	2.64	2.75	3.00	3.25	3.50
4.5	1.78	1.89	2.00	2.11	2.28	2.34	2.44	2.67	2.89	3.11
5	1.60	1.70	1.80	1.90	2.05	2.11	2.20	2.40	2.60	2.80
6	1.33	1.42	1.50	1.58	1.71	1.76	1.83	2.00	2.17	2.33
7	1.14	1.21	1.29	1.36	1.46	1.51	1.57	1.71	1.86	2.00
8	1.00	1.06	1.13	1.19	1.28	1.32	1.38	1.50	1.63	1.75
9	0.89	0.94	1.00	1.06	1.14	1.17	1.22	1.33	1.44	1.56
10	0.80	0.85	0.90	0.95	1.03	1.06	1.10	1.20	1.30	1.40

It should be noted that focuser height is very important in minimizing the size of the secondary mirror. A higher focuser means you'll need a larger secondary mirror, whereas a low profile focuser minimizes the secondary size. For example, a three inch difference in an 8" f4 system increases the minimum secondary size from 2.00" to 2.75"! With NEWT you can also see if the optical system has any vignetting (components (mostly the edge of the focuser tube) intruding into the optical path.) Again, a taller or narrower focuser will result in vignetting of some portion of the light cone sooner than a low, wide focuser.

Using the above formula you can now plug the secondary size into NEWT and see if the combination of focuser and secondary result in an acceptably illuminated field.

It should be noted that going with the absolute minimum size can present problems as well. Many diagonal mirrors are rated to the size of the substrate rather than the usable mirror surface so you lose part of the surface to the bevel. Also, not all secondaries are completely flat out to the edge, so a bit of leeway is useful. Thus, it's normally prudent to select a secondary slightly larger than the minimum.

Another excellent piece of software useful in determining the optical characteristics required of your secondary mirror is SEC from a August 2000 Sky and Telescope article by Alan Adler. This software is extremely useful in making decisions as to what an acceptable level of loss of illumination is when considering secondary mirrors. For example, Alan Adler (Aug 200 S&T) suggests that 100% illumination at the centre of the field and 40% at the edge offers a good compromise between secondary size and image quality. While this difference means a full magnitude drop between edge and centre, for most observers this is acceptable and unnoticeable. Of course, variable star observers may have a different opinion!

For the more advanced ATM, the OSLO optical design program provides an advanced optical design platform for more esoteric types of telescopes.

Next time we'll look at building secondary assemblies to hold your secondary mirror.

References:

Keller, Dale. Newt. computer program, available at:

<http://home.att.net/~dale.keller/atm/newtonians/newtsoft/newtsoft.htm>

Sinclair Optics, OSLO, computer program, available at:

<http://www.sinopt.com/>

Seronik, Gary. SEC computer program, available at:

[http://skyandtelescope.com/resources/software/article\\_328\\_1.asp](http://skyandtelescope.com/resources/software/article_328_1.asp)

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## Calling All Library Books

We have a request from Fred, the librarian. In order to keep the list of books up to date and accurate, every so often, it is necessary to take a physical inventory. Since none has been undertaken in living memory; it is due. Therefore, please bring all library books to the January meeting. If you have not finished reading them yet, you will be able to borrow them again after inventory. So, let us bring them to Fred, and he will get a complete and accurate list of books on the Winnipeg R.A.S.C. website, and that will be good for all of us.



**The following members are working toward their:**

**Messier Certificates:**

Eugene d'Auteuil 41  
 Murray Rennie 19  
 Lindsay Price 32  
 Kris Keller 39

**Explore the Universe:**

Terra Jentsch 30  
 Stan Runge 13  
 Lindsay Price 78  
 Timothy Kennedy 32  
 Judy Starr 22  
 Ray Starr 21  
 Sandy Shewchuk 14  
 Eugene d'Auteuil 12  
 Murray Rennie 6

**Herschel 400's**

Stan Runge 98  
 Sean Ceaser 133  
 Mike Stephens 92

**Finest NGC's:**

Sean Ceaser 67  
 Mike Stephens 76

*The following members have completed their:*

Explore the Universe

Gail Wise  
 Janet Pollock  
 Janice Low  
 Mike Stephens  
 Lindsay Price  
 Ralph Croning

Messier Certificates

Kevin Black  
 Alan Sherlock  
 Mike Stephens  
 Rick Turenne  
 Gail Wise  
 Ray Andrejowich  
 Stan Runge  
 Bernie Plett  
 Sean Ceaser  
 Mike Karakas

Finest NGC's

Kevin Black  
 Stan Runge  
 Gail Wise

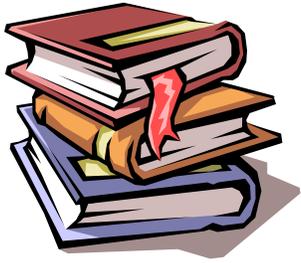
We have the following  
 new members

Darren Gillis, Winnipeg  
 Ian Cameron!, Winnipeg

Welcome to our Club!

a key (\$10.00 deposit required).

If you would like training on the LX200 Lindsay will be running training sessions, but not on Members Observing Nights. You can contact him at 227-4684 or flprice@mts.net or talk to Lindsay at a meeting.



## *From the Library*

Until the Sun Dies

by Robert Jastrow

Published by George J. McLeod Ltd 1977,

166 pages hard cover

Donated to the Winnipeg Centre by Wayne Hannesson

Reviewed by Lindsay Price

This is the third book by Robert Jastrow that we have in our library, and the third to be reviewed in this column. Although it reads well on its own, the book does pick up on his previous work, "Red Giants and White Dwarfs". Where as Red Giants traced the development of earth and its living organisms through nuclear and chemical biology processes, this one draws heavily on Darwin's Origin of Species, and traces the evolution of life from the creation of amino acids in the seas of the infant planet, through plants, trilobites to fish. Then using fossil records he follows the slow development of fish to amphibian, lizard, dinosaur, and mammal. He talks about apes, Homo Erectus, Australopithicus, and Homo Sapiens – us. It makes a fascinating story, well illustrated with black and white drawings and photographs. It would, however, have been helped by the inclusion of a few more details like labeling the epochs and eras of his chapters; we never see that such and such appeared in the Jurassic or tertiary period. It would have been helpful to have a version of that diagrammatic chart with a time line along the bottom, and pictures of the flora and fauna above it at the appropriate ages, like those posters for sale at the Manitoba Museum, (shameless plug) and other places. Although he explains the niches occupied by rather obscure examples like ancient sea scorpions and modern tree shrews of Borneo, there is surprisingly, no mention of the sequence and overlap of Neandertal and Chromagnon early people. But with its gaps, perhaps to keep it from becoming a huge tome, it is well-organized, easy to read and very instructive of natural selection.

The last chapter leaves the earth, and on the assumption that the laws of physics and chemistry must be universal; he jumps to Mars. Here he talks about the evidence that Mars was once wetter than now, and if wet long enough, had the potential to create life just as our own planet did. He describes the Viking lander tests on Mars in more detail than I had ever heard before. Little Sojourner did far more than I had read in any other books or articles on that mission. The results were fascinating. It is no wonder that we are going back even now for another close-up look!

In summary, it was an enjoyable and informative book, easy to read, but it did leave me wishing for more. Perhaps that was the intent; whet the appetite and get the reader to buy another book.



Lindsay Price 227-4684

flprice@mts.net

Ron Berard 668-6551

rcberard@mts.net

Jennifer West 284-6548

westjl@cc.umanitoba

Gail Wise 253-8297

wgail@mts.net

Jay Anderson 474-1485

jander@cc.umanitoba.ca

Stan Runge 261-9984

stanrunge@hotmail.com

**Councilors**

Lloyel Hull 256-6510

lloyelhull@shaw.ca

Sean Ceaser 797-4509

sceaser@mts.net

Kevin Black 224-0182

cblack@shaw.ca

Marlene Wallace 265-3523

mtlwallace@hotmail.com

Stephen Smyth 837-3579

weatherwisentrentals@hotmail.com

Ralph Croning 885-4326

rcroning@mts.net

**Appointed Positions****Librarian**

Fred Wood 774-3238

fred\_wood@shaw.ca

**Observatory Director**

Ray Andrejowich 667-6896

randrejo@hotmail.com

**Observatory Bookings**

Kevin Black 224-0182

cblack@shaw.ca

**Webmasters**

rcberard@mts.net

gtulloch@shaw.ca

**Winnicentrics Editor**

Gail Wise 253-8297

wgail@mts.net

*Winnicentrics* is published six times each year by the Winnipeg Centre, RASC.

*Winnicentrics* is produced by and for the members of the Winnipeg Centre, and any opinions expressed are those of the author.

If you have comments, questions or concerns about *Winnicentrics*, you can contact any of the councilors or write to RASC, Winnipeg Centre, Box 2694 Winnipeg MB R3C 4B3

**EXPLORING THE UNIVERSE**

**Thanks to Ralph Croning for the questions and Lindsay Price for the answers**

**QUESTION: In the Solar System section there is a list of optional observations. Do these count toward the required 5 observations for this section?**

ANSWER: I was not on the original rules committee, but it seems to me that if any or all listed objects were part of the requirement, then there would be just a list. Optional objects to me are "Treats". ie: if you are in the neighborhood anyway, check out these because they are fun and and personally satisfying. (But maybe I am just an old meanie, ex drill sergeant and all)

**QUESTION: In some sections I may have more than the required minimum observations. Is that OK?**

ANSWER: That is great! We need the minimum from each category, so two extra moon observations will not forgive us two double stars. The minimum is 55.

**QUESTION: As aids to my observing sessions I not only use the BOG but also a planisphere and a star atlas. Are these acceptable aids?**

ANSWER: By all means. Any aid that you can use except a "goto" telescope is encouraged. The more ways we can locate what we seek is good practice. Eventually we have to use catalogues and atlases as we start to try for things that cannot be seen naked eye.

**QUESTION: How detailed does the log for each object have to be?**

ANSWER: Not very, just enough that someone looking at it can see that you found the correct object.

**QUESTION: When I eventually fill out the Application and Observation Report Form what do I need to include in the "description" section of the form? Most of the details will be in the log.**

ANSWER: There are many ways to describe it either by appearance or location, but a diagram is the best way. For you personally your log is the most important because later on you will read it again and see how your observations and descriptions change over time.

## Winter and the Herschel 400's

*by Gail Wise*

I started doing astronomy as a child in the year I won't say which because I have reached the point where I not only lie about my age, I forget what I've said it is. When I joined the Winnipeg Centre of the RASC I found a very encouraging group who have inspired me to complete my Messier list, Explore the Universe and Finest NGC's. I am currently working my way through the Herschel 400's and I am often amazed at the beauty of the night sky and the challenge of finding some of the objects.

When the temperature drops below  $-20^{\circ}$  the number of observing partners dwindles significantly. I often find myself alone on my excursions but now is when the sky is at its best.

The Perseus Double Cluster is an easy naked-eye target. In binoculars I can resolve some stars but through the telescope there is nothing to compare it with. At the centre of each cluster are dozens of tiny specks of stars against such a black background I look at it for minutes. A meteor goes through my eyepiece, waking me up and bringing me back to the realization that I am all alone out here.

Winter has a large number of open clusters for me and Auriga has its share of the beauties. NGC1907 is bright and extremely easy to find right beside M38. Some of the clusters are quite spread out, such as NGC1664 and NGC1857. NGC2126 is difficult to see because of a bright star right beside it. By far the nicest one is NGC2281. Its stars are bright and the background sky is very dark. Contrasts are much greater when you're facing away from the Milky Way!

As I turn toward Monoceros I see the Rosette Nebula with its naked-eye cluster NGC2244. Nothing else here is bright enough to hold my attention so I move further south to Canis Major. NGC2360 is spectacular, a full 12' in diameter with a little trail of stars leading to it and a bright blue-white star in the field. I can't keep my eyes off this one and I keep coming back to it after observing other objects. After a while I'm starting to feel very alone out here. I hope the Big Dog will protect me from whatever may come my way.

Time for a cup of hot tea. I'm wishing I had my hot water bottle to warm my toes. Very low in the sky is Puppis. NGC2422, which we know as M47, is huge and bright. Right next to it is NGC2423 and only  $1\frac{1}{2}^{\circ}$  east is M46 with planetary nebula NGC2438 looking like a fuzzy star just off the centre. No challenge to finding this one!

With all my solitary observing expeditions and my tendency to imagine terrors in the dark I again manage to reach my home unmurdered. More in the spring!

## *The Okanagan Centre of the RASC is preparing to host you!*

RASC members from across the country are warmly invited to join us in Kelowna, British Columbia, next May for General Assembly 2005. This springtime GA, on the Victoria Day long weekend, has a lot to offer. The four-day event includes a variety of tours, displays, contests, and lectures, plus plenty of great food and a sip (or two!) of Okanagan wine.

The Okanagan GA's roster of guest speakers is shaping up well. Confirmed presenters include Jack Newton, Andreas Gada, Tyler Foster, Rajiv Gupta, and Jaymie Matthews.

Saturday evening, the 2005 GA offers a dinner cruise aboard the S.S. Fintry Queen -- Kelowna's popular paddlewheeler. There's always a chance that the legendary lake monster Ogopogo will make an appearance, so keep a camera handy.

On Sunday afternoon, the Ruth Northcott Lecture will be presented by Jaymie Matthews, Mission Scientist for the MOST (Microvariability and Oscillation of STars) satellite. Dr. Matthews will bring us up to date on the latest results from Canada's own "Humble Space Telescope". Among MOST's scientific goals is direct detection of light from exo-solar planets -- a very exciting and competitive area of research.

Astrophotographer Jack Newton is our banquet speaker Sunday evening at Gray Monk Estate Winery just north of Kelowna. Gray Monk boasts a first-class reputation for its wines and cuisine, all in a spectacular setting among vineyards overlooking Lake Okanagan. Jack's talk -- planned to follow an optional tour of the winery -- will feature many of his finest, and most interesting astrophotos. Crisp focus is required, so go easy on the wine!

On Monday, you can choose to journey south for a special insider's tour of the Dominion Radio Astrophysical Observatory near Penticton. Then, if you like, continue down the valley for an open-house at Jack and Alice Newton's Observatory Bed & Breakfast in Osoyoos.

Of course, you can expect a variety of presentations, activities, and displays throughout the General Assembly at the event's home base among the pines at the North Kelowna Campus of Okanagan University College. Accommodation is available on site in the student residences. OUC is co-sponsoring the GA.

All in all, we think we have the makings of a very memorable and most enjoyable national convention. As more information becomes available, you can keep track by visiting the GA's web site, [www.ocrasc.ca/ga.html](http://www.ocrasc.ca/ga.html)