# PeGASus

Newsletter of the

Royal Astronomical Society of Canada: Prince George Centre

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# February 2010

*Our pursuits are out of this world.*
*Our activities are astronomical.*
*Our aim is the sky.*

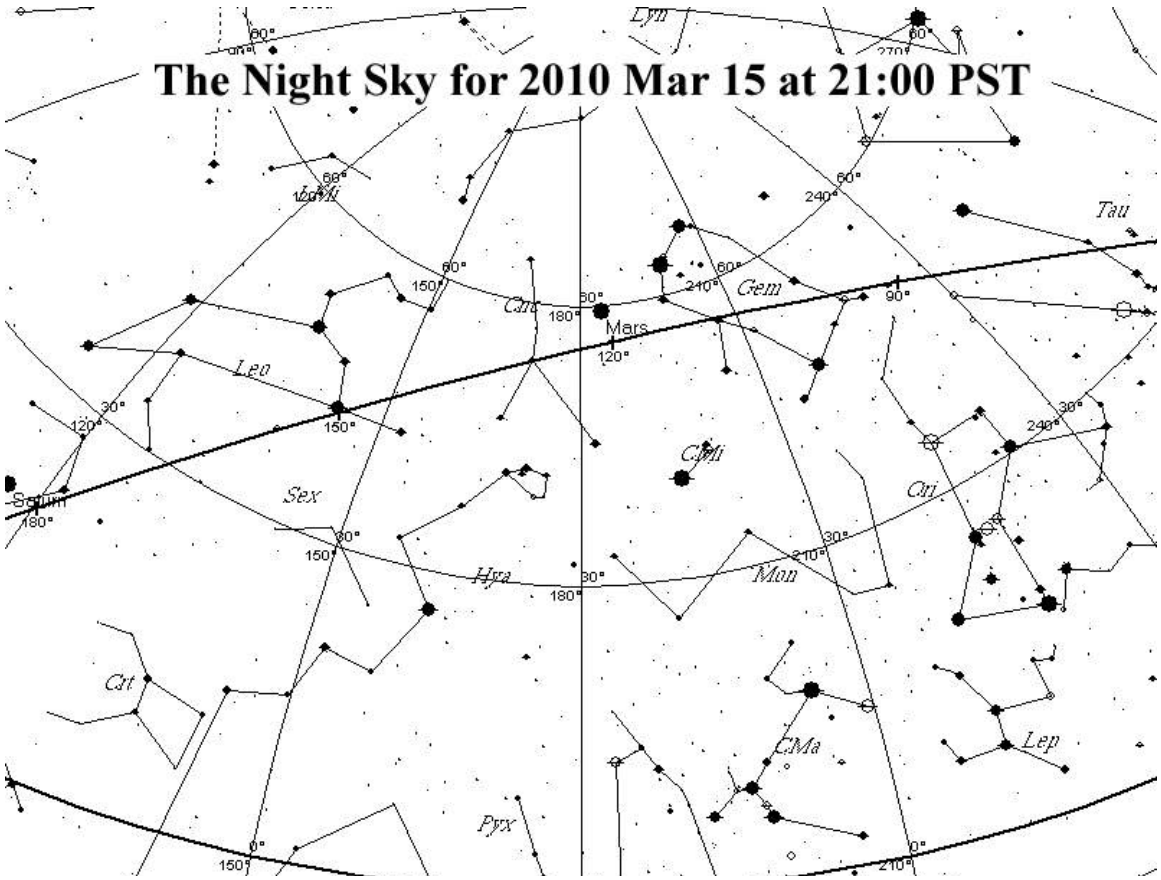
PeGASus

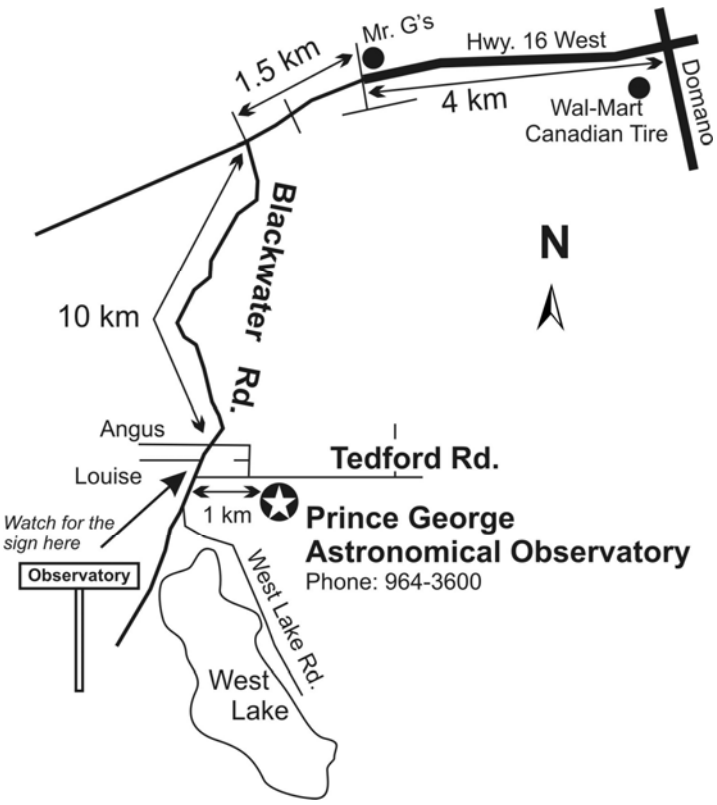
Newsletter of the
The Prince George Astronomical Society

## In Issue # 175



The RASC: Prince George Centre meets next,
Saturday, March 13 (time, check website)
at the Observatory



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## *RASCPG*
## *Executive, 2009/ 2010*

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Rusty Hoff

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Gil Self

Contributions to the newsletter are welcome.

***Deadline for the next issue is***
***March 19,2010***

***PeGASus Editor***
***Gil Self***
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# Coming Events

***To Volunteer to help run an event please contact Brian Battersby.***
**brianbattersby73@yahoo.ca**
***Phone: 614-3316 (cel) 612-4623 (home)***

| *Date* | *Event* | *Time* | *Place* | *Volunteers* |
|---|---|---|---|---|
| March 6,7 | Spring Recreation Mart | Business hours | Pine Centre | All members welcome |
| March 12 | Open House | 7:00pm | Observatory | Everyone welcome |
| March 13 | Business meeting and Messier Marathon | See website for details | | All members welcome |
| March 19 | Sidewalk Viewing at the Mall | Until 9:30 pm | Pine Centre | Everyone welcome |
| March 20 and 26 | Lunar Marathon | 5:30 pm | Observatory | Everyone welcome |

Additionally there will be 2 Nova classes in February ( February , 6 and 20 th both at 7:00 pm) if your not signed up and you would like to take part just drop by the next class at the observatory.

***For an up to date list of the Volunteer Schedule / meetings / classes visit our website in the MEMBERS AREA***

**www.rasc.ca/princegeorge**

Tired of viewing the same objects, we are adding a little wrinkle to the “Members Night” viewing on Saturday nights. Each month we will be targeting three constellations that will be in “prime” position during “reasonable” viewing hours.

The objects will range from naked eye to binoculars to small scopes to larger scopes and a couple of challenge objects for the hard core enthusiasts.

# Editorial

By Gil Self

To the well trained eye or to a PeGASus scholar it may be obvious. To most of us it is probably similar to watching figure skating, when the commentator goes oh that's too bad , and you think I didn't see anything wrong, looks ok to me. To most folks either the skating or the newsletter look normal. But the difference is in the details. This newsletter is two pages skinny ( and the Canadian ice dancing was perfect ). There, did I get an Olympic tie-in. Writing an article for our newsletter will add to our newfound national pride? Maybe a stretch I guess but I think our newsletter is something to be proud of. Have you noticed? The material in the newsletter is ours. With few exceptions everything include is written by one of our members. I think I decided to stick to our material about the same time Google came along. I was quite surprised how often if I did a search for most anything astronomical how many results came back from our website and primarily from our newsletter archive. Many times we were referenced first. There are so many astronomical resources on the net now I doubt that we are often even on the first page but you can't hide anymore. If you put material out publicly it is just that — public. Which also adds to pride of ownership we should feel. We are not just sending this out to fifty or a hundred people where it likely ends up in the bathroom, no if we archive our issues on our website the material could be read by any number of people. I have not heard what our web access is for quite a while but it was always quite high, it's a good website and the newsletters are indexed (read) by whatever mechanisms they use. Hits that I have had were lines right out of articles contained inside the PDF's. As far as I know people see our relevant material when they do a search.

Currently there are about five people who write articles for this newsletter. I compliment them all, the material I have available is all excellent. Olympic quality ( another lame attempt ). Some is simply informative, what we did, what we are going to do. Some are a little off the wall or a bit off centre, makes you think about something from a different angle. Some are development of knowledge or knowhow, what we are trying , what we found out, what we learned. And some are just good science, well thought out good research good detail.

The good news is, you don't need any writing credentials to participate. This is a friendly newsletter, nobody gets turned away. Spelling and grammar are good but hey nobody's perfeect ( did I get that contraction right?) . The idea is to get things right but this isn't National Geographic so give it your best and I'm sure it will as good as any.

What to write about? That's what makes this so easy, write about what you like ,hopefully science related, what your interested in, what you are learning, what you did last week last year

. We have all met those kind of people that make you feel welcome, are interesting to visit with, why is that? Because they ask you about you, what do you think, what you do, what you like. We all have stories to tell and I'm asking you what's your story. What are you interested in. Where have you been. Any projects you've worked on / want to work on. Or maybe even an odd perspective of something others may or may not agree with.

Read Fae's article on page seven, that's national magazine level writing, but the article on page eight wasn't even written really I just put it together from a couple of e-mails.

Point is, there is room for you. If you can't seem to find time to participate in tours or open house this fits your schedule. Do it whenever it suits you. If you would like to write a substantial detailed article, there is room for that too. Let me know and I can spread it out over several issues.

This is an open forum for us all. Some people blog some people tweet I guess that's ok. The part I don't understand is the people that read them. They are giving up their time just to read about other peoples days —huh!

I think that people interested enough in science and astronomy to join this group of like minded people have ideas of their own. Have something to share something to teach. Thoughts or ideas worth sharing.

If you would like to submit something for the next issue the deadline ( loose-line ) is always printed on page two, for next month the date is March 19. It is best if what you send in is not too tightly formatted. It may look good in word but by the time you try and squeeze it into Publisher it goes all helter skelter. Even as simple as an e-mail would be fine. If it needs a certain form let me know and we can work it out. But generally five hundred to one thousand words in a simple txt or .doc document would be fine. Thank you G.S.

# The Night Sky for March 2010

by Bob Nelson, PhD

Hi Folks,

Well, Lois and I got back from Maui at mid-February after 4 weeks in the Sun We enjoyed some great walks, drives around the island, times on the beach, and -- for me -- many great SCUBA dives. (I know, life is tough!) However, towards the end of our stay, I hopped on a plane and attended a conference on Oahu for three days. This was concerning the 'Alt-Az Initiative', started by Russ Genet, of Fairborn Observatory fame back in the 1980s. The purpose of this movement (started several years ago -- I have been in on it since the start) is to build telescopes in the 1.5 to 3 metre range cheaply. (Cheap means somewhere between $10K and $50K or so.) How could this ever be contemplated? Well, there are a few key points:

1) Use lightweight mirrors. New materials, such as foam glass, machined and coated with a thin (5 mm?) piece plate glass slumped onto it (and then ground, polished and figured in the usual way) can produce a 1-metre diameter mirror weighing about 30 kg. (For comparison, a solid glass slab, 1 metre in diameter and the usual thickness 1/6 of this = 16 cm would weigh 320 kg!) Needless to say, weight savings of this magnitude produce huge savings for the telescope mount, both in weight and cost. [A 0.5 m mirror weighing 10 kg has been promised to me: When it comes, I'll be able to put it on my existing Paramount ME making it a super new telescope!]

2) Use altitude-azimuthal (Alt-Az) configuration (like a Dobby). Inexpensive computers and field rotators at the eyepiece can provide all the guiding necessary. As everyone knows, Alt-Az mounts are much cheaper than equatorial mounts and, properly guided, every bit as good as the latter.

3) Use direct drive motors (disk-like in shape). These are vastly cheaper than worm wheel-worm assemblies and are much more precise (self-aligning as they are).

4) Combine 4 to 6 mirrors (each 1.5 metres in diameter) to make a multiple mirror telescope.

5) Use fibre-optics for the spectrograph feed.

6) Use talented, cutting-edge experts for all phases of construction. Such a team has already been assembled, IMHO. One of these experts is our own RASC member from Vancouver, Craig Brekenridge, who engineers new telescopes for institutions. Another is Andrew Aurigema, who works for NASA and has pioneered the use of foam glass. A third is Dan Gray who owns two companies and is the designer and builder of the telescope drivers that we currently use on our big 'scope. (He does much other R&D.)

It was a good conference (I made a presentation on eclipsing binary stars, which was well received). As far as I can see, the project is coming along nicely. I'll give you updates in this space when they are available.

In the meantime, here is what is going on in our skies this month:

MERCURY. elusive Mercury. For most of the month, it lost in the glare of the Sun. However, by month's end, it lies 22.5-6° above the western horizon and sets almost two hours later! At that time, it is only a tiny 6" disk but is magnitude -0.9 -- a good target for binoculars if you have a good western horizon. Why not have a go, or -- better yet -- get a photo? This should be good, as it is a favourable apparition for us northern observers.

VENUS is an evening object all month. At mid-month, it lies some 11° above the western horizon at sunset and sets over an hour later. (This increases to almost two hours by month's end.) For most of the month, it's a 10" disk of magnitude -3.9 in the gibbous phase.

MARS, in Cancer until May, is visible virtually all night this month. At mid-month, it rises near noon, lies a whopping 50° above the ESE horizon at sunset, transits at 21:53 and sets about an hour before sunrise. It's a 11" disk of magnitude -0.2. (Opposition was last month.)

JUPITER is lost in the glare of the Sun this month.

SATURN, in Virgo until 2012, is visible virtually all night. At mid-month, it rises only 9 minutes after sunset (but only transits at 01:53 the next morning). For the late birds. This month, it's a 19" disk of magnitude 0.5.

URANUS, in Pisces until 2012 (May), is an evening object at the start of this month when it lies almost 12° above the western sky at sunset, setting over an hour later. However, as Earth races away from it, the planet reaches conjunction on March 16, after which it theoretically becomes a morning object (rising on March 31 only 20 minutes before the Sun!!). A difficult object. As usual, it's a 3.6" disk at about magnitude 5.7.

NEPTUNE is lost in the glare of the Sun this month.

March Equinox occurs on 2009 March 20 at 13:32 PDT. Spring will be here!!!

CONSTELLATIONS to look for in March (at 21:00, PST) are Pyxis, Puppis, Western Hydra, Cancer and Lynx.

Pyxis ("the compass on the Argonaut's ship") is visible on the extreme south at 9:30 PM on the 15th. It's just at the edge of the Milky Way but contains little of interest (no open clusters, etc.).

Puppis ("the stern on the Argonaut's ship") is just to the northwest of Pyxis. Straddling the Milky Way, it contains numerous goodies including open clusters M46, M47, M93, NGC 2477 and others. M46 (at 7 deg south, and therefore visible in P.G.) is a rich open cluster, about 1/2 degree in diameter containing around 150 stars between magnitude 8 and 13 lying about 500

The Night Sky , cont from page 4

light years away. It also contains the planetary nebula NGC 2438 about 7' north of the cluster centre.

Hydra ("the Sea Serpent" - not to be confused with Hydrus, a small boring constellation) extends all the way up to declination +5°. The western part contains M48, another fine open cluster. It does contain the bright eclipsing binary KW Hya. This system, which has a period of 7.75 days and varies between 6.11 and 6.6 magnitudes, is one of the brightest Algols in the sky. While not a classical Algol (which is supposed to have the cooler star filling its Roche lobe), this contains two type A (hot) stars which are detached (completely separate). SIMBAD (the engine that finds all the papers on a given celestial object) tells me that there are 42 publications that at least mention KW Hya, so it appears to have been well studied.

Cancer ("the Crab") is more familiar to us northerners, lying as it does between Gemini and Leo. It contains the famous "Praesepe" or "Beehive" Cluster, M44 and M67, a rich old cluster. It also contains RS Cancri, a RR Lyrae semi-regular variable star that is comprised of a type M6 supergiant star that pulsates pulsates in and out with a period of around 120 days.

Lynx ("the Lynx" -- gee!) lies to the north of Cancer, out of the Milky Way and contains only NGC 2419, the famous "Intergalactic Wanderer", the most distant of the globular clusters. It was discovered in 1788 by William Herschel (and rediscovered by his son John in 1833), observed by Lord Rosse in 1861, and finally classified as a globular in 1922 when photos were taken by the 42" reflector at Lowell Observatory. The distance was determined by observing 31 RR Lyrae stars in the cluster; it's some 182,000 light years (55,800 pc) from us (and 210,000 light years = 64,400 pc) from the galactic centre. This distance is comparable to that of the Megallanic Clouds and suggests that this cluster indeed is intergalactic.

Clear skies,
-Bob

## Mars viewing Feb 17, 2010

Blair and I had a great time observing Mars last night. The atmosphere was very stable so seeing was 5 out of 5. The view of Mars in my C14 was the best I have ever had. Using the William Optics bino-viewer, the view was very relaxing. The image of the planet was at times rock steady. At 300x the north polar cap and the dark area of Utopia or Boreasyrtis, just to the south of it, was plain to see. On the meridian at 8 pm PST was the huge Syrtis Major and on either side, at the south end of it, you could see on the east, the long straight Sinus Sabaeus and on the west, Mare Tyrrhenum. The dark areas of the above mentioned features contrasted well with the orangey red of the rest of the planets surface. Over the approximately 3 hours that I observed the planet, I could see it's rotation as Syrtis Major moved from the west side of the planet to the meridian and beyond. Around 8:30 pm a thin fog began to form and thicken as time went on. At first it actually helped the view of Mars. Normally the planet is almost too bright and the fog acted like a filter, dimming it down, making it easier to see features. We packed it up at around 9 pm when the fog got too thick. This night I had the best view of Mars that I have ever had, even better than what I saw during the much closer encounter of 2003.

Doug Wayland

## Signs You Might Be an Astronomy Guy

What are the signs you might be an Astronomy guy or girl, well here are some thoughts, with nod to Mr Foxworthy.

1. You pick up the morning newspaper and the headline reads 'MILK DRINKERS ARE TURNING TO POWDER', and you set aside for later reading and go straight to the Efston Science insert that says 'Astronomy Day-Celestron telescope & eyepiece sale'.
2. You've owned at least one brand of telescope that your local insurance agent and most amateur astronomers have not heard of and you have to spell it twice. Or three times in the case of a 300mm Schiefspiegler f/18.
3. You are tempted to see any movie with Moon, Star or Odessey in the title, regarless of content.
4. You wish you local newspaper would have an 'Astronomy column' to offset the 'Astrology column'.
5. You have a drawer filled with tarnished and worn telescope 'take-off' parts, screws, clamps, diagonal, alen wrenches, cords, eyepeices, all of which you may never use again. Unless you need to get your scope operating on a late Saturday evening with a clear sky.
6. Your neighbours wonder why you are in the back yard with a red light after midnight.
7. You spend a rainy Sunday afternoon reading three different Astronomy magazines, books and a watching a Timothy Ferris documentary, and on Monday morning someone at your office says "How about those Bears?", and you don't know if they're talking about Ursa Major or Minor.
8. You own at least one tripod that is too light and wobbly to use, but still represents good memories.
9. You bring binoculars, a red light and charts on every vacation.
10. The time spent out under stars and seems like an island of enlightenment and perfect sanity in a world gone mad.
11. Opening a eyepiece case creates exactly the same rush of endorphins in as lifting the lid of a plush lined case containing a Stradivarius or a Deering 5 sting banjo.
12. Your pants right knee is warn from kneeling on the ground when swinging your GEM mount around to the deep north sky.
13. Your telescope box is larger than your coffee table, and sometimes is used for a substitute.
14. Your shelves are over flowing with the works of Carl Sagan, David Levy, Sue French, Terrence Dickinson, and books from Cambridge University Press.
15. The only time you use unprintable language is when you pull out your power cord out when rotating beyond 270 degrees or drop you 2" Nagler hand grenade.
16. In just one evening of looking at Astromart, you can entertain notions of buying a 25" Obsession Dob, a Takahashi 400mm mewlon, an Astro-Physics refractor, or a Astrosib RC-250, all in the same brain.
17. You have or are considering a permanent 12"+ concrete pier in you back yard.
18. There is no day so bad that the sight of a copy of Astronomy or Planetary Report magazine in your post office box doesn't dissolve all worldly cares.
19. You are on first name basis at least two telescope supplier like Island Eyepiece or telescope parts supplier like Scopestuff.
20. You own at least one Televue eyepiece.
21. In your electrical parts box in your telescope case contains two spare12-volt power supply transformers, but you can't remember if which one was intermittent.
22. You're starting the think maybe a real astronomy guy should have transformer voltage tester.
23. You go the hardware store to buy two #10 stainless steel allen head screws and walk out with box of 100, because 'its always good to stock up'.
24. You rejoiced when you heard asteroids 4147, 4148, 4149, and 4150 where renamed Lennon, McCartney, Harrison, and Starr. Yes, the Beatles in Outer Space! In the sky like diamonds.
25. You own at least one heavy winter coat that you have 'outgrown' covered with patches such as 'Halley's comet is Back!' and 'I hyper my film', preferably from another century.
26. When house hunting with realtor, you automatically reject any home without a good view for a telescope, or where zoning bylaws are weak and bad lights spill randomly or trespass.
27. Your current neighbours are puzzled by your installation of a retractable 20'-0" high blackout screens with reflective stars and a crescent moon on the back, and you winch up each clear night.
28. Every time the ISS passes overhead, you feel compelled to salute those intrepid astronauts.
29. Half the money you earned in your 20s was given to the local Meade dealer.
30. You have a surprising number of friends whose pets are named after stars and planets (I can think of 4 now).
31. You privately believe that a cheap or insubstantial telescope box reflects a kind of spiritual malaise in the owner.
32. You own a number of screwdrivers, wenches that have been heated to a cherry red and bent to perform a special task on you mount or scope, but now forgotten.
33. You have at least box of spare 'slightly used' circuit boards, cords, and hand pads left over after numerous fixes and repairs, and you bought an extra 'just in case'.
34. Every time you are in Tim Horton's and hear someone order a 'Double Double', you can't help but think of Alcor and Mizar.

You dream star filled skies so vivid that later can't remember if it was a dream or if it was sometime in the past you can't place.

Cheers

Maurice

Write a Book Review for this space next month

Deadline March 19 2010

Send to:

selfpg@telus.net

**WHAT'S OUT THERE**

by

Fae Collins Mooney

It's About Time

It wasn't that long ago, perhaps a century and a bit, that time was believed to be "the great constant of the universe". Prior to Einstein, scientists believed in a "clockwork universe" where clocks ticked everywhere at the same rate. Now scientists wonder if, in the quantum world, clocks tick at all! Does time even exist at the quantum level?

In our Einsteinian world, time is accepted scientifically as being relative, no longer viewed as being absolute, as Newton believed. In accepting Einstein's view, we acknowledge that our clocks can tick at variable rates - time can vary from observer to observer. As stated in the Observer's Handbook for 2010 by Roy Bishop on page 43, Sir Isaac Newton "perceived time as being separate from and more fundamental than the spinning of changeable planets or oily mechanisms of clocks." Most of us still tend to think of time in the Newtonian way: "absolute, true and mathematical time, of itself, and from its own nature, flows equably, without regard to anything external." This is the common sense or intuitive view, explains Roy Bishop, that most of us have of time - because, to us, that's how it appears to be.

However, contrary to what Newton believed, or what we perceive to be common sense from our personal perspective, "our ordinary clocks do not measure something that is independent of the universe," writes Tim Folger in Discover Presents Einstein (published by Discover magazine, Spring 2009). In fact, "clocks do not really measure time at all." Albert Einstein was the first to understand time in this way - "an abstraction that does not really exist independently of clocks," to quote Roy Bishop again. "Einstein proved that time is part of the fabric of the universe," Folger explains. But when we look at time at the quantum level... it disappears.

"The trouble with time," states Tim Folger, "started a century ago, when Einstein's special and general theories of relativity demolished the idea of time as a universal constant." And to complicate things further, "the rules of general relativity (which describe gravity and the large-scale structures of the cosmos) seem incompatible with those of quantum physics (which govern the realm of the tiny)."

Carlo Rovelli, a physicist at the University of the Mediterranean in Marseille, France, as interviewed by Folger, speculates that "the best way to think about quantum reality is to give up the notion of time - that the fundamental description of the universe must be timeless." If these two theories, that seem to be at odds with each other, can be successfully merged into one grand unified theory, they may describe "a universe in which, ultimately, there is no time."

Time is not itself observable, which prompts the question asked by Rovelli: "Is time a fundamental property of reality or just the macroscopic appearance of things?" He believes that time is something that emerges only for the big things. It may not even exist "at the most fundamental level of our physical reality," adds Tim Folger.

So where does that leave us, in our macroscopic world? Just what is time? "And why is it so obviously and tyrannically omnipresent in our own experience?" asks Folger.

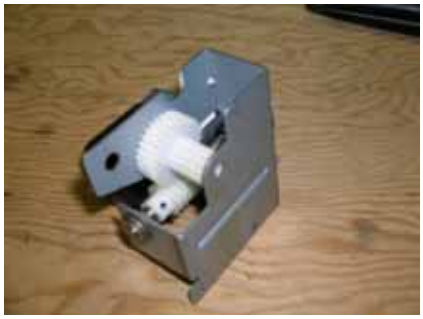
This is what fundamental physics is all about, Rovelli asserts, "finding new ways of thinking about the world and proposing them and seeing if they work..."

Time, whatever physicists may eventually determine it to be, may turn out to be "even stranger and more illusory than even Einstein" could have imagined. And - what if it doesn't actually exist at all? ———————

## R and D on the AllSky Camera

After a week and a half of research and development, the prototype AllSky camera shroud is in service on my garage setup. Because the lens has a manual iris, the shroud is required to prevent possible solar damage to the camera's CCD chip. Once this device proves to be reliable, I'll build one for the observatory. The shroud is operated by the same relay control board used to control the heaters and fan, and is programmed to lower just after sunset and raise just before sunrise. Cost was about $45. The internal parts were obtained from the surplus area at Princess Auto. A plastic coffee container was used to enclose the gears, motor and limit switch apparatus and was painted to minimize UV deterioration. The arm is a modified keyboard shelf runner, and the shroud is peanut butter container lid. The 6 volt DC power supply was in one of my parts bins

Glen



**Well done Glen MacGyver !**

**Want to join the RASC Prince George Centre?**
Fill out the form below and mail it in to the address at the top of the form.
Existing members can use this form to renew as well!


# THE ROYAL ASTRONOMICAL SOCIETY OF CANADA
136 Dupont Street, Toronto, ON M5R 1V2 Canada
Tel: 416-924-7973 Fax: 416-924-2911 Website: http://www.rasc.ca
Join/renew online at: http://www.rasc.ca/join Form Updated: 2008 July 14


## ORDINARY MEMBERSHIP APPLICATION

### PERSONAL INFORMATION

Name (Please print in full)

Address City

Province/State Country Postal Code

Telephone (Days) Telephone (Evenings)

E-mail Address

### YOUR CENTRE AFFILIATION (PLEASE CHOOSE ONE ONLY)

| ✓ | Centre | Base National Fee | Centre Affiliation Discount | Centre Fee | Total Fee |
|---|---|---|---|---|---|
| ☐ | Belleville | 67.00 | (23.00) | 31.00 | **$75.00** |
| ☐ | Calgary | 67.00 | (23.00) | 36.00 | **$80.00** |
| ☐ | Charlottetown | 67.00 | (23.00) | 23.00 | **$67.00** |
| ☐ | Edmonton | 67.00 | (23.00) | 23.00 | **$67.00** |
| ☐ | Halifax | 67.00 | (23.00) | 23.00 | **$67.00** |
| ☐ | Hamilton | 67.00 | (23.00) | 36.00 | **$80.00** |
| ☐ | Kingston | 67.00 | (23.00) | 28.00 | **$72.00** |
| ☐ | Kitchener-Waterloo | 67.00 | (23.00) | 33.00 | **$77.00** |
| ☐ | London | 67.00 | (23.00) | 27.00 | **$71.00** |
| ☐ | Mississauga | 67.00 | (23.00) | 23.00 | **$67.00** |
| ☐ | Centre Francophone de Montréal | 67.00 | (23.00) | 48.00 | **$92.00** |
| ☐ | Montréal | 67.00 | (23.00) | 32.00 | **$76.00** |
| ☐ | New Brunswick | 67.00 | (23.00) | 23.00 | **$67.00** |
| ☐ | Niagara | 67.00 | (23.00) | 27.00 | **$71.00** |
| ☐ | Okanagan | 67.00 | (23.00) | 28.00 | **$72.00** |
| ☐ | Ottawa | 67.00 | (23.00) | 23.00 | **$67.00** |
| ☐ | Prince George | 67.00 | (23.00) | 27.00 | **$71.00** |
| ☐ | Québec | 67.00 | (23.00) | 34.00 | **$78.00** |
| ☐ | Regina | 67.00 | (23.00) | 27.00 | **$71.00** |
| ☐ | St. John's | 67.00 | (23.00) | 27.00 | **$71.00** |
| ☐ | Sarnia | 67.00 | (23.00) | 23.00 | **$67.00** |
| ☐ | Saskatoon | 67.00 | (23.00) | 33.00 | **$77.00** |
| ☐ | Sunshine Coast (BC) | 67.00 | (23.00) | 23.00 | **$67.00** |
| ☐ | Thunder Bay | 67.00 | (23.00) | 23.00 | **$67.00** |
| ☐ | Toronto (see note at upper right) | | | | |
| ☐ | Vancouver | 67.00 | (23.00) | 26.00 | **$70.00** |
| ☐ | Victoria | 67.00 | (23.00) | 25.00 | **$69.00** |
| ☐ | Windsor | 67.00 | (23.00) | 23.00 | **$67.00** |
| ☐ | Winnipeg | 67.00 | (23.00) | 23.00 | **$67.00** |
| | | **OR** | | | |
| ☐ | **Unattached (No Centre Affiliation)** | 67.00 | n/a | n/a | **$67.00** |

*Membership in the RASC includes one issue of the annual **Observer's Handbook**, six issues of the **Journal** of the RASC and six issues of **SkyNews** along with benefits that your Centre may also offer.*

### APPLICATION

I hereby apply for membership in the Royal Astronomical Society of Canada. I understand that personal information is collected and used according to the Society's Privacy Policy available at www.rasc.ca/privacy.shtml

Note that **Toronto Centre** memberships are processed locally. Visit toronto.rasc.ca/content/membership.shtml for details and to download an application form.

### MEMBERSHIP FEE CALCULATION*

Your Total Fee (from table) $ _____

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## Prince George Centre

*AKA the* ***Prince George Astronomical Society***

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