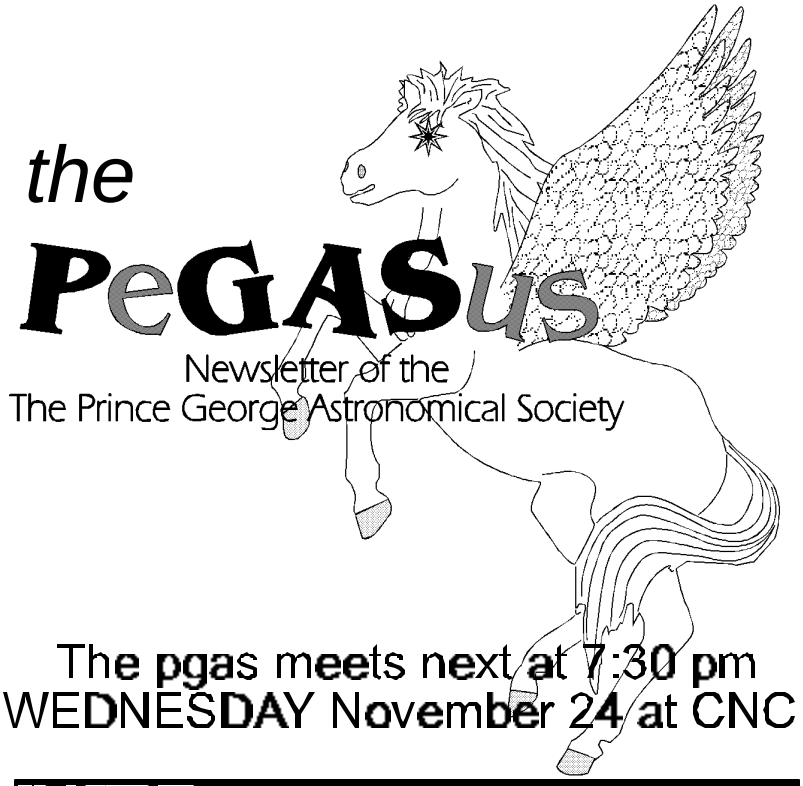
1999 NOVEMBER ISSUE #98

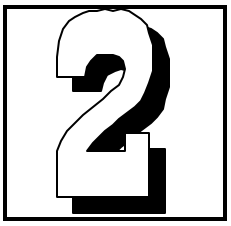


the PeGASus

Newsletter of the
The Prince George Astronomical Society

The pgas meets next at 7:30 pm
WEDNESDAY November 24 at CNC

INSIDE :



the PeGASus is published monthly by the *Prince George Astronomical Society*.

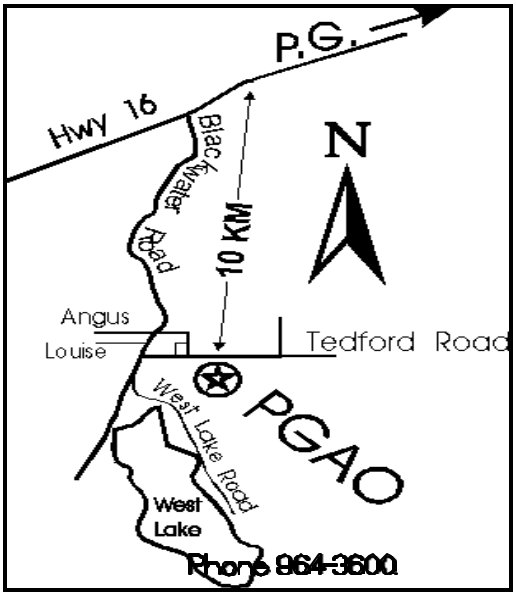
Our pursuits are out of this world.
Our activities are astronomical.
Our aim is the sky.

Contributions to the newsletter are welcome.

Deadline for the next issue is

January 14

Send correspondence to
The PGAS
3330 - 22nd Avenue
Prince George, BC, V2N 1P8
or
selfs@attcanada.net



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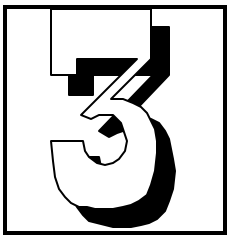
Editorial



By Gil Self

Brian B. sent me an article for this issue in which he very generously thanked all the participants of H-3.The article however missed one name, Brian Battersby. Brian spent a good deal of time preparing for this event, and I think the success we enjoyed was to a large part due to his efforts. Thank you Brian.

This has been a notable year for us. Many of the projects that we have been talking about for some time are either under way or have been completed. It is the first year that we have been able to spend some money and effort on more than maintaining the building. The equipment is working better than it has ever worked, and we are on the verge of a quantum leap in our abilities with Bob's new device to switch secondary mirrors. This coupled with the ST-9 will dramatically change what we can do with the telescope, stay tuned.

As we approach the year 2000, we have another choice to make. Are we going to become a member of the RASC? We have been kicking this idea around for a long time, and I think it is time we got on with it. About the only serious concern I had with this was whether or not joining would affect our standing with the provincial gaming people. I believe this has been answered.

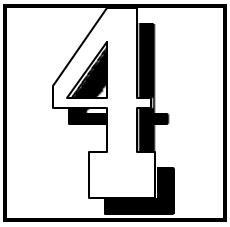
There have been many concerns expressed, all of them worthy of consideration. And if you turn and twist and consider from every angle, you can almost always come up with a reason why to and why not to. I think decisions made by a group take longer in direct proportion to the cube of the number people making a decision. That's why we elect an executive, so we can get things done.

One of the concerns expressed that we shouldn't ignore, is what about the added expense and what about new members. (or is that two concerns?)

"**We are probably the best value for a club anyone could find. The newsletter alone is worth the membership fee. :-) We welcome everyone, and I don't think we have ever "kicked" anyone out for not paying fees. Why don't we simply offer a first year associate membership for ten dollars. At the end of that year if that person was still interested, they would become a full member. If we start offering two levels (opt in or opt out) it will turn into real mess. Let's get on with this if for nothing else than to find out how it works out, we can always back out can't we?**

We will be a significant member."

That's my opinion. **Gil Self**



Coming Events

If you are involved with any astronomical or otherwise scientific activity on behalf of the PGAS, please list the activity here.

PGAS Meets next Wednesday November 24
7:30 pm at CNC

The Night Sky for December '99

by Bob Nelson, PhD
Hi Folks,

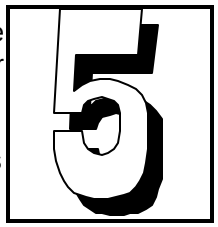
As I write this, it's snowed or rained all day, winter is just around the corner and the cloudy season appears to be upon us (but stay alert for the odd clear spell!). For me, it's been exhilarating having all these clear nights for observing. So far this year, I've been out 63 times observing and have 24 accurate times of minimum which are going into the paper I've spent a good part of the day writing.

I thought I'd add a note about my listening habits. As you can imagine, when one is working for hours in the dome, it's nice to have the radio on. My choice is CBC radio. For some time now (week nights between 11 PM and 1 AM), I've enjoyed listening to "That Time of the Night", a classical music program from St. John's Newfoundland, hosted by Marjorie Doyle. So a couple of weeks ago, I clicked into their web site and sent along a note by e-mail. As it happened, I was observing the very next evening (it was a Friday) and was thrilled to hear her read my note over the air! I think it was some of my words that caught her attention: "... I do astronomy here in Prince George, B.C. when it's clear. So far in September and October, I've had close to 20 nights working at our observatory, recording star images into the wee hours. ... Normally I hear the soft whine of the telescope tracking motors, the not-so-seldom bark of neighbourhood dogs, the occasional howl of a pack of coyotes, and sometimes, the honk of Canada Geese flying over. With the stars glowing brightly through the opening in the dome and our radio tuned to Marjorie's program from St. John's on CBC Radio, the atmosphere is perfect. ..."

As it happened also, the honk of Canada Geese that night was so loud, I was afraid that they might fly right into the dome! Fortunately, that didn't happen.

Back to reality. There are a number of issues affecting our little club. The most important is that we are trying to nail down the details as to affiliating with the RASC. You are being asked to vote by a mail-in ballot, as approved

by your executive. Please read the articles appearing elsewhere by Jon and myself. I would ask that you vote according to your own wishes, not as to how you think it will affect others.



Anyway, this article is supposed to be about the sky, so here's what is predicted to happen in PG Skies December:

(Unless otherwise noted, all events are for the 15th of the month.)

PLANET ROUNDUP

MERCURY, in Libra at the start of the month, (then Scorpio then Ophiuchus, then Sagittarius), is a morning object this month. On the first, it rises about 2 hours before sunrise but by the 23rd it is lost in the glare of the Sun. It starts as a 7" disk but ends at 5", magnitude about -0.5.

VENUS is about 22 degrees above the southeastern horizon at dawn on the 15th. On the first, it rises about 4 hours before the Sun and is a 18" gibbous disk of magnitude -4.2; by the end of the month, it has dropped back to 3 hours and is a 15" gibbous disk of magnitude 4.1. It will disappear behind the Sun sometime in June next year. It's still a magnificent object for early risers.

MARS, in Capricornus until the end of the month (when it passes into Aquarius), is low in the southwest at sunset and sets about 4 hours after the Sun. On the 15th, it's a 5" disk of magnitude
+1.0. Not much to look at.

JUPITER, in Pisces, is near the meridian at mid-evening and sets on the 15th at about 3 AM (PST). It's a 15" disk of magnitude -2.7 and is a fine object to look at. See the bands in colour through the big telescope!

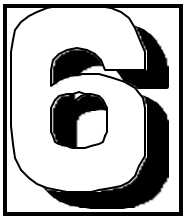
SATURN, in Aries all month, still trails Jupiter and is somewhat dimmer, but still easy to find. On the 15th it's a 20" disk of magnitude 0.0 and sets at around 4:30 AM (PST). Once again, a fine target for viewing and for moons. How many can you see (or image with the CCD camera)?

URANUS, in Capricornus all year, sets on the 15th at about 8 PM (and therefore 4 hours after the Sun). It's a 3" disk of magnitude 5.9. Again, how many moons can you spot (or take a CCD image of)?

NEPTUNE, in Capricornus all year, sets on the 15th about 3 hours after the Sun. As usual, it's a 2.3" disk at about magnitude 8.0.

PLUTO, in Ophiuchus all year, is lost in the glare of the Sun.

Winter Solstice occurs on December 21 at 11:34 PM PST. Winter has



officially begun (but has been in Prince George for several weeks).

CONSTELLATIONS to look for in December (at 9:00 PM, PST) are Fornax, Eastern Cetus, Western Eridanus, Aries, Triangulum and Western Perseus.

Fornax (For, "The Furnace"), is another southern constellation with a number of faint galaxies.

Eastern Cetus (Cet, "The Sea Monster"). Western Ceti was discussed last month, but in eastern Cetus, we see Omicron Ceti, or Mira ("The Wonderful"). Mira was the first of the long period variables discovered, and was discussed last year. Six or seven degrees northeast of Mira lies M77, a bright and compact spiral galaxy of 10th magnitude. According to Burnham, it's unusual in that it has three spiral arms. Also, this galaxy (together with the "Sombrero" Galaxy in Virgo) was the first to reveal a large recessional velocity. In November 1913, V.M. Slipher obtained spectra with exposures over 6.5 hours (!) using the 24" refractor at Lowell Observatory (the one I showed pictures of at a previous meeting).

Western Eridanus (Eri, "The River") is a large constellation out of the Milky Way; the southern part (which we cannot see from Prince George) zigzags its way south to -60 degrees. It contains the triple star system Omicron 2. The outer pair, AB is separated by some 83" (corresponding to 400 AU) and has an orbital period of some 7000 to 9000 years. The "B" star is comprised of a close pair BC which is a white dwarf (B) and a red dwarf (C) with a separation of about 7.6" (1961) and having an orbital period of 248 years. It's at 4h 15m, -7° 36' (2000). What about a CCD image?

Aries (Ari, "The Ram"), is the first entry in the Zodiac and is a northern constellation out of the Milky Way. The brightest star, Alpha Ari (a.k.a. Hamal) is a red giant (sp. K2 III) and lies about 75 light years distant.

Triangulum (Tri, "The Triangle"), is a small constellation just south of Andromeda and contains the famous galaxy M33 ("The Pinwheel"), mentioned last month as a member of the Local Group of galaxies. It also contains a number of double stars and variable stars, but little else.

Western Perseus (Per, "The hero that saved Andromeda"), is a northern constellation (appearing overhead at times), is in the Milky Way and contains many wonderful objects familiar to many of us. One object, of interest to the author (although I haven't actually observed it), is Beta Persei or Algol, the most famous of the eclipsing binaries. It was possibly discovered to be variable by the Arabs, but the first definite statement is by G. Montanari of Bologna in about 1667 (almost 60 years after the invention of

the telescope) who observed occasional dimming. The regularity of the period was discovered by J. Goodriche in 1782 who suggested that the dimming might be caused by a "dark companion" revolving about the star. It remained a theory until 1889 when H.C. Vogel proved it to be true by spectral analysis. The star may be seen without optical aid -- it's normally at magnitude 2.1 but at intervals of 2.86739 days fades to magnitude 3.4 then slowly brightens. The whole eclipse takes some 10 hours. At a distance of about 100 light years, Algol has been intensively studied but still has a few mysteries. It's the prototype of the class of fully detached eclipsers but has been found not to be typical of that class. For one thing, the light between eclipses is not perfectly constant but slowly rises to a maximum halfway between eclipses and is thought to be caused by reflection effects. Also, the less massive star is the most evolved (contrary to normal stars). The explanation, by Fred Hoyle, is that the B star was originally more massive but gave up mass to the A star which then became brighter while the B star evolved to the subgiant stage. [Visual binary pairs are named A and B, with A being assigned to the brighter star.] Also in this constellation, look for the Double Cluster, if you haven't seen it before.

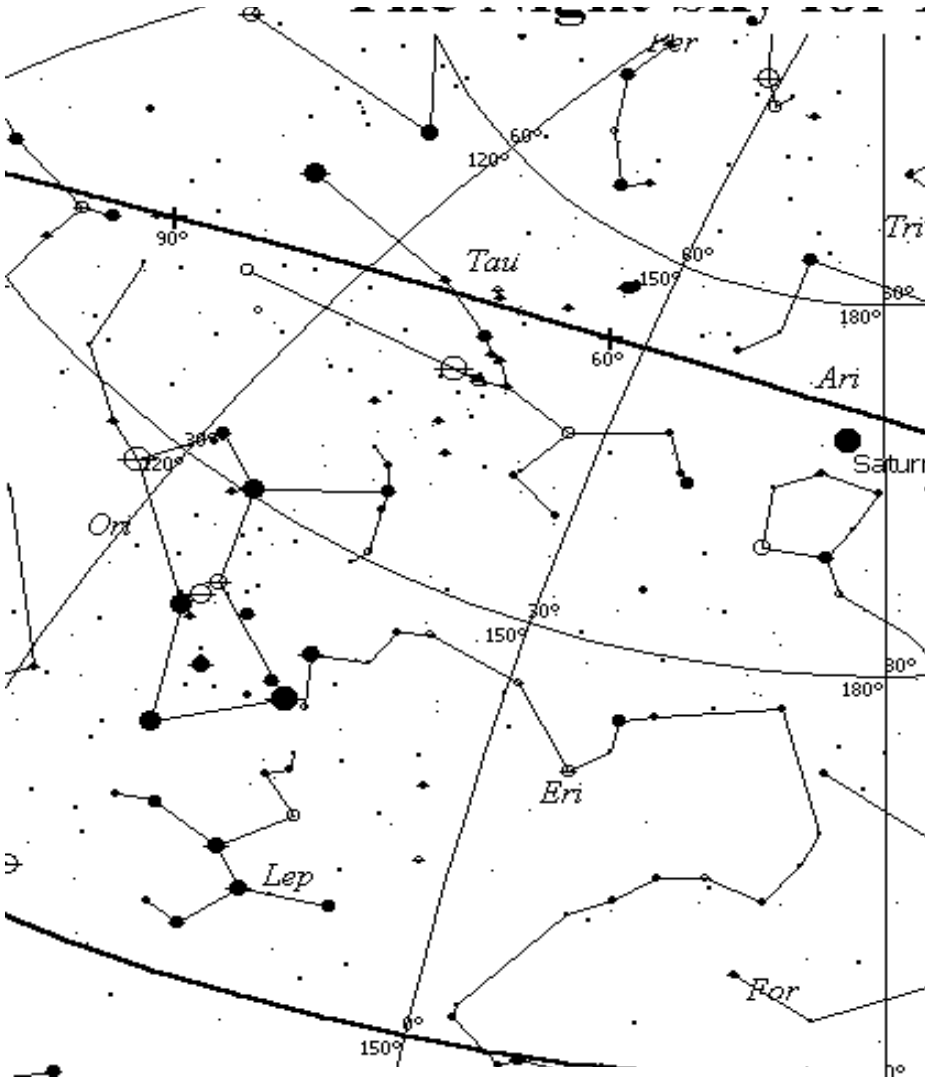
Clear skies,
-Bob

H3 Report

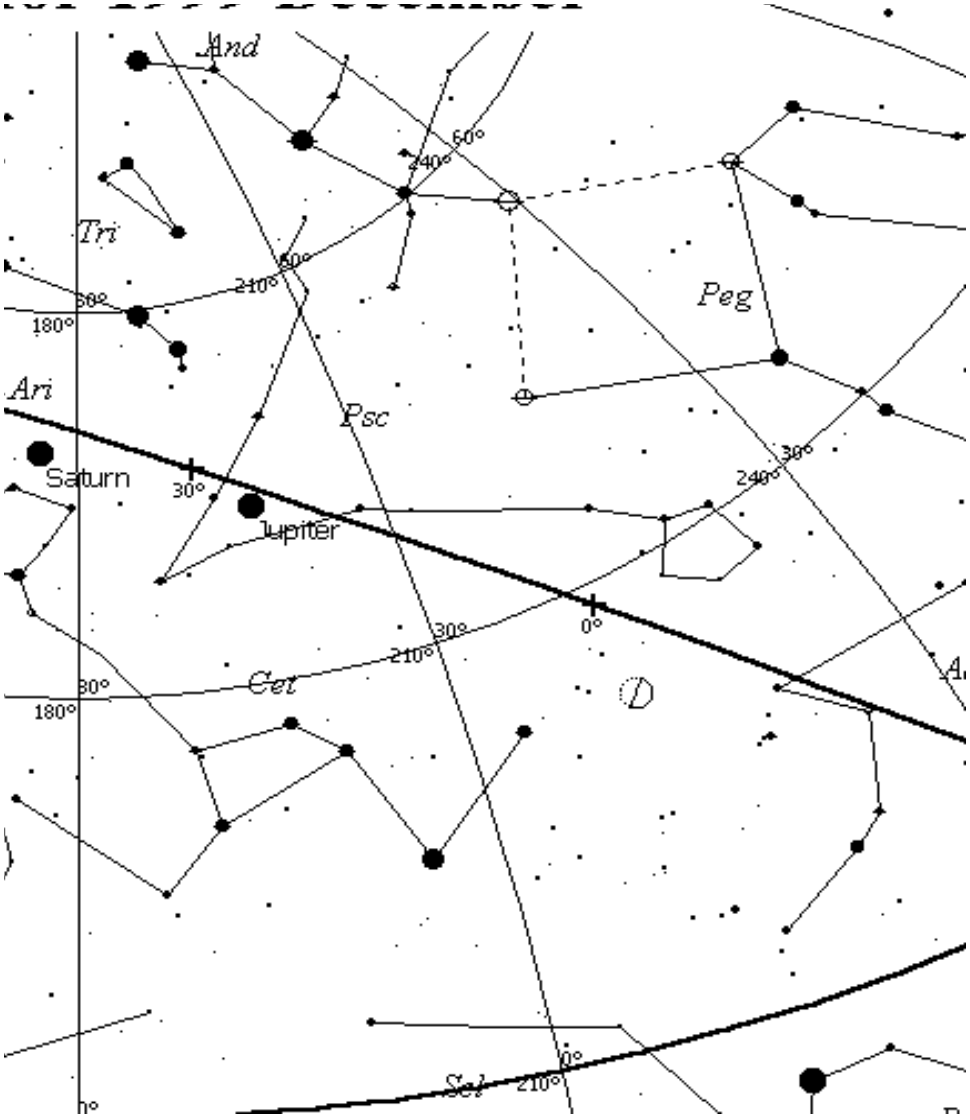
By Brian Battersby

Well here it is the much anticipated Homes, Hobbies and Horsepower report. First of all I would like to thank Don Clapper, Kane Sanders, Doug Wayland, Fred Vogelgesang, Bob Nelson, Steve Senger, Rob Frith, Vince Hogan, Gil Self (and his daughter, Aimee) and Jon Bowen for giving up their free time to man the booth. Thank you very much! If you didn't make it down you missed a great time. I was told on several occasions by other exhibitors how lucky I was that I didn't have to run the booth myself. (Usually the person saying this was sitting at their booth... alone) Also, I couldn't help but notice that of all the booths near us we were the busiest, maybe I should say we looked the busiest because we had half a dozen members standing around. I actually had one person ask me what we were guarding! Anyways... Dam!%t Gil, I'm not a writer! Here are some of the highlights in point form.

1) Steve bought a pink crystal and tried to pass it off as the "Vanderhoof Meteorite"
2) Gil and his flying helicopter computer demonstration.
3) Being asked "What are you guys guarding anyway?"
4) People not believing Doug when he told them they could see stars through his scope...in the daytime... inside the Multiplex. (Thanks to the U.S.A. flag)
5) Sounding like a broken record.. "about 10 kms down the Blackwater turn on Tedford
6) Being asked "How much do you want for those photographs!"
7) Trying to explain why you need to counteract the rotation of the Earth when taking photos of the stars. (You would think some people didn't know the Earth rotates.)



December 15 Skys for Prince George courtesy Dr Bob Nelson



December 15 Skys for Prince George courtesy Dr Bob Nelson

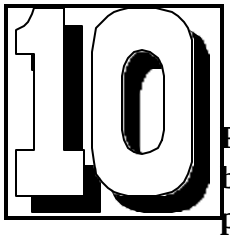
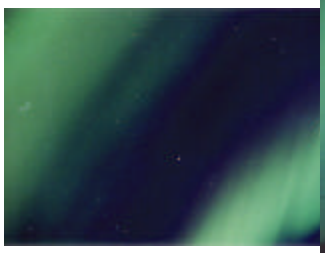
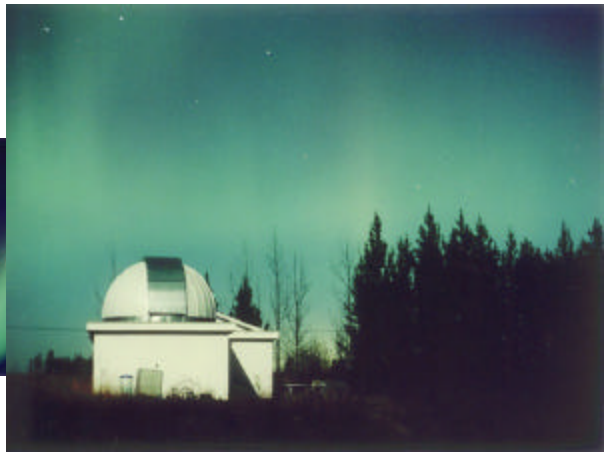


Photo Gallery

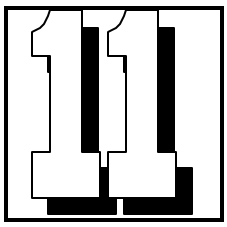
Remember that interesting device Kane and Brian built and demonstrated at the last meeting, well they put it to good use already.





The outhouse by starlight

This is your
RASC
Ballot



The Prince George
Astronomical Society
should become a member
of the
Royal Astronomical Society
of Canada

YES

NO

Please circle your choice, detach this page and mail to: **The PGAS**
3330 - 22nd Avenue
Prince George, BC
V2N 1P8
Ballots may be delivered to any member of the executive. Please respond as soon as possible.

Thank you

Earth Wobble According to Euler

Leonhard Eulrer (1707 - 1783) was a Swiss mathematician who distinguished himself with his contributions to modern analysis. One aspect of this work calculated the earth as a rigid body should wobble with a period of 304 days due to astronomic attractions of the sun and moon.

However, it was not until 1881 that S.C.Chandler of the United States found latitude variations around the earth of a few arc seconds. This variation could only be accounted for by a wobble in the earth's spin, but its period was variable and averaged 430 days. This is now known as the Chandler wobble.

Euler's method of calculation seems to be difficult to find or follow as some references call attention to the large difference between the two periods. Supposedly, Euler's tremendous accomplishments haven been emphasized rather than his failures. Researchers also wonder what keeps the Chandler wobble sustained without dissipation from tidal friction.

I have been unable to locate a copy of Euler's work but have concluded that it was carried out as follows:

The moon's distance varies with a period of 27.55 days. The sun and the moon are in phase every 29.53 days. (It is important to realize that these are averages.)

Bob Nelson showed at a club presentation a few years ago that these two periods will cycle by the differences of their inverses, namely 412 days (with extension of significant figures).

Suppose Euler started out with this period and he would conclude that there will be an additional annual period acted on by the sum of the relative tidal strengths of the sun and moon, namely 3.17 and that it would combine with the 423 day period as follows:

$1/412 + 1/365.24(3.17) = 1/304$ days

Therefore, if one accepts this method, then there may not be any mystery as to how Euler arrived at this period. It appears that these relationships are still accepted today, namely that there is an annual period and tides add 3.17.

It should also be pointed out that responses to tidal forces are not synchronous with the tidal fields. It is know that maximum oceanic tides do not peak at new and full moon but frequently 2 or 3 days afterwards. (they can also peak before lunatons.)

The Ruler period as developed above suggests some basic differences in concept. It is realized that that the earth is not rigid but has a water surface in part and has molten and partially molten interior. The ratio of lunar to solar tide responses probably differs from 3.17 and may not be additive (my suggestion). One reference on the internet states that the Chandler wobble can now be predicted for two years in advance by using astronomic variables.

If readers know of errors or omissions or suggestions for improvements, I would be pleased to hear of them.

Arthur Beaumont
7843 Toombs Dr
Prince George, B.C
V2K 4Z5

The Proposal to Join the RASC -- The Argument In Favour

There has been a proposal that we, as a club, join the Royal Astronomical Society of Canada. It's Canada's national astronomical organization for both amateur and professional astronomers, with 23 centres across Canada from St. John's and Halifax in Atlantic Canada, to Vancouver, Victoria and Okanagan in this province. There is an annual meeting each summer, called the general assembly, to which Owen and I attended last year in Victoria -- they're a lot of fun, and it's great to meet astronomers from all across the country. (In addition, I went to the one in Toronto this summer.)

Why would we want to join? (After all, we've been an autonomous club for 20 years now.) Well, Owen and I got to thinking at last year's meeting that we've been isolated for just too long. You learn SO much from talking to other astronomers, picking up ideas, practical tips, and general enthusiasm. These guys have FUN! In addition, we could expect at least one speaker a year (and maybe two) to address our club, bringing information and good wishes from fellow astronomers. Next year's meeting is in Winnipeg and I would hope that a carload of us could make the trip.

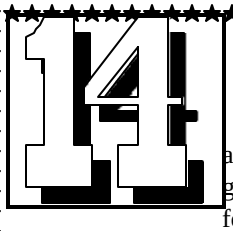
It's true that our fees would double, but for that extra $20/year, each member would receive the Observer's Handbook (chocked full of information and used at probably every observatory in the world; it retails for $18 US if you order from Sky & Telescope), SkyNews (Canada's astronomical magazine) and the RASC Journal (scientific articles at the semi-technical level). I should also mention that a number of our members also belong to the RASC as unattached members, for which they pay $36/year, over and above their PGAS membership.

As a club, we would continue to own our own resources (we'd have the largest observatory in the RASC), would have to submit a modest report each year (your executive would take care of that), and would have input to national RASC policy.

There are a number of issues (like the constitutional amendments, and relations with the Public Gaming Branch and Revenue Canada which must not be harmed) that have yet to be dealt with. (We hope to have these resolved by the December meeting.)

Well, what about it? Please be sure to vote according to your own wishes.

Bob Nelson,
President



And The Case Against by Jon Bowen

"Why would we want to join? (After all, we've been an autonomous club for 20 years now.) Well, Owen and I (Bob) got to thinking at last year's meeting that we've been isolated for just too long. You learn SO much from talking to other astronomers, pickup up ideas, practical tips, and general enthusiasm. In addition, we could expect at least one speaker a year (and maybe two) to address our club, bringing information and good wishes from fellow astronomers."

I believe that the above paragraph, written by Bob Nelson last month, summarizes the issue rather nicely, with just a couple omissions. First, the increased membership dues; from $20 per year to $40 per year. Second, the extra goodies; the Observer's Handbook, SkyNews and the RASC Journal. And third, we must have a minimum of twenty paid members per year to be a chapter of the RASC.

In fact, last year we had only 23 people who paid their membership dues to the society. It is my personal belief that the only way we can expect our society to function is to ensure a steady supply of "fresh blood" – new members, with new ideas, perspectives and new enthusiasm to keep the attitudes about the club positive, and keep the energy levels high. I don't feel that raising our fees, from $20/year to $40/year, is going to promote the growth of our society. Are the obvious goodies worth the extra $20 to a new member? Rather than worrying about sharing astronomy with other people halfway across the country, let us instead try to share it with more people in our own community.

Two points:

1) Any member may join the RASC individually, for $36/year – still a good bargain for anyone serious about joining the national society.
2) This isn't a one shot deal. We don't have a limited time offer, we're not burning any bridges. If next year your club decides to join, we can do so then.

I feel rather strongly that we need to encourage local support, both in terms of new membership, and in terms financial support for our club, and I don't feel raising the fees is the best way to do it, whatever the benefits may be. Perhaps next year, if our membership has grown, we might consider this again, but I think it's too early to do so now. Please, however, take the time to send in your opinion, yes or no, to tell us what you think. Should we join the Royal Astronomical Society of Canada? After all, it's your club just as much as it is mine. JB.

NOTE from the Promotions front - Min. of Highways is looking into the feasibility of letting us put up a sign at the Tedford turnoff as we speak. (They might even gives us a sign) Also, we had an ad in Nov. 10th citizen for NOVA and our general meeting. We might (or might not) run the ad monthly to have our general meeting dates publicized and allow us to promote other events (like NOVA). BB.

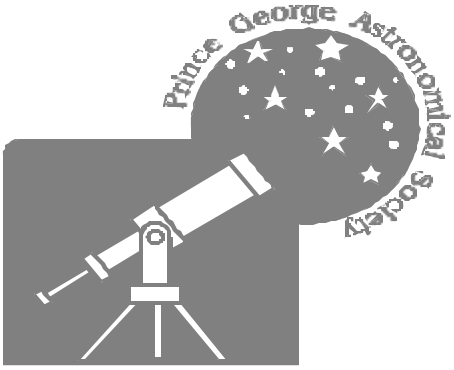
PGAS CONTRIBUTORS

The PGAS would like to thank the following individuals, corporations and government agencies who, since 1991, have donated money, goods or services to the construction and operation of the Prince George Astronomical Observatory.

Ministry of Adv. Ed. Training and Tech.	$25,000
BC Science Council	16,000
BC Lotteries	3,900
Helmar Kotsch (Acme Mas.)	1,932
Northwood Pulp and Timber	1,665
Electrical Services Ltd.	1,583
Royal Bank of Canada	1,500
Xerox Canada	1,300
Regional District of Fraser-Fort George	1,000
Prince George Rotary Club	1,000
The Pas Lumber Co	750
Rustad Broth & Co Ltd	750
Canfor Polar Division	744
Bisque Software	500
Canfor Clear Lake	500

The greatest contributors to the construction and operation of the observatory are from PGAS members who have generously contributed their time to this project. The value of their contribution surpasses all external contributions.

The PGAS is a non-profit organization dedicated to the advancement of astronomy and science in general in Prince George and the neighboring northern communities. Donations of money or materials to the society are greatly



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