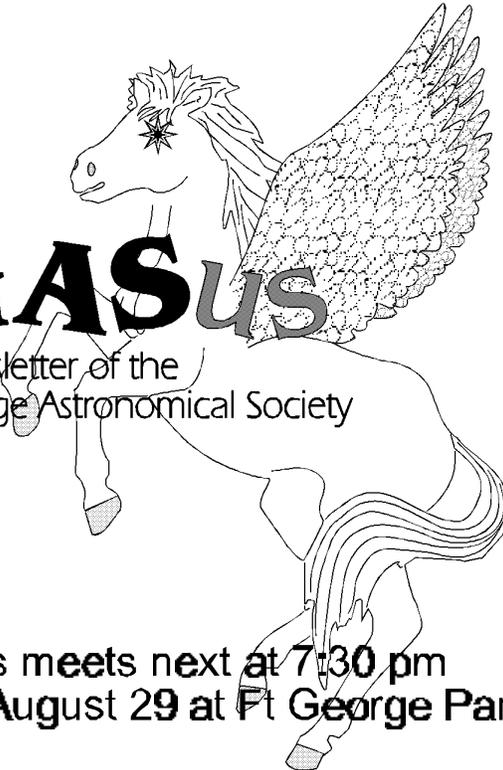


August 2001 ISSUE #113

the

PeGASus

Newsletter of the
The Prince George Astronomical Society



The **pgas** meets next at 7:30 pm
Wednesday August 29 at Ft George Park

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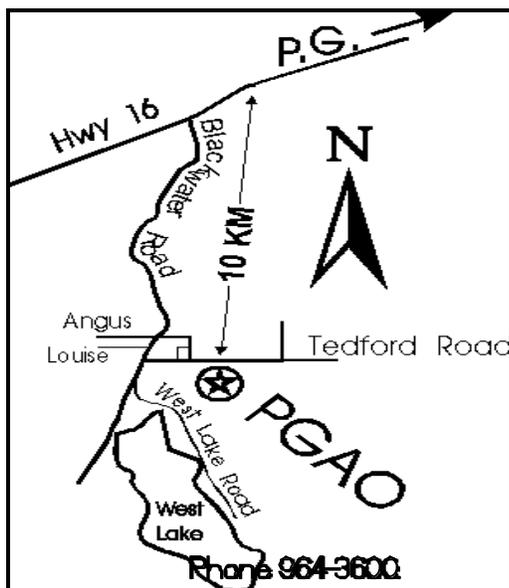
Our pursuits are out of this world.
Our activities are astronomical.
Our aim is the sky.

Contributions to the newsletter are
welcome.

Deadline for the next issue is

September 15

Send correspondence to
The PGAS
3330 - 22nd Avenue
Prince George, BC, V2N 1P8
or



<http://www.pgweb.com/astronomical/>

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Astronomical Society
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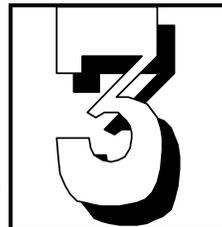
Building

Bob Klick

PeGASus Editor

EDITORIAL

By Gil Self



I have a real problem, and I can't think of any cleaver way to put it , except,

We need more volunteers!!!

No one has signed up for open house in September yet. Don't think for a moment that we don't appreciate all the hours of time everyone has put in. But we are kind of stuck for September, October. If you have a preference for a Friday night please phone (964-7279) or e-mail gil-pg@home.com . We have always maintained our Friday night open house schedule and it can be a lot of fun. If nobody shows up , you've got the entire observatory to yourself. A chance to get some observing done, or relax and read a book, or maybe just sit out back and enjoy the peace and quiet. Sounds pretty good, where do I sign up — like I said , gil-pg@home.com or call 964-7279.

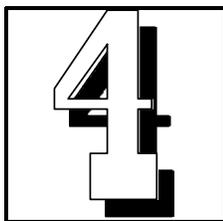
We have also booked a booth at the Leisure Services Fall Recreation Market.. It will take several volunteers to man / (person) our booth. On September 7th from 9:30 am until 9:00 pm and on Saturday September 8th from 9:30am until 6:00pm. It ought to be a fun time. (As those of you who helped out at the HHH show a few years ago will remember) We'll set up some scopes and maybe the computer to show movies and software. As well we could have some photos & articles showing the history of the club and a members photo gallery. Hopefully we will gain some new members from it as well as increase our exposure to the community. If you are interested in helping out please contact Brian Battersby <blbattersby@home.com > or phone 123-4567.

We had a great summer, several work-bees. We have reached substantial completion on our bathroom. This one seemingly insignificant item is really very important because we can now invite organizations to use our facility (for a fee) for their meeting or social gatherings. This has been a real team effort, it is amazing how much work it takes to retro-fit a bathroom in an existing building. Great work and thanks to everyone who pitched in.

I think the highlight of every summer is the Perseids meteor shower, and this year was certainly one of the best ever. A warm summer evening, dark, clear skies, good music. But probably the very best part was , a lot of members came out and enjoyed the evening. Don't worry if you missed it – we will do it again next year!!

Your in for a special treat. We have a new member, Fae Mooney. Fae is an avid writer. Writing is not all that hard, anyone can do it (I am proof of that). But writing and conveying ideas or feelings (and all spelled correctly) is a talent. And as you can see on page twelve, Fae is a talented writer, we can look forward to enjoying her writing in future issues.

“I faintly hear, echoing softly, Aurora's serenade”



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 August 29
7:30 pm at Ft George Park**

The Night Sky for September 2001
by Brian Battersby

Hello everyone, Bob is away this month so it has fallen on my shoulders to inform you of what's happening in the night sky. Hopefully I don't mess it up too badly!

PLANET ROUNDUP

MERCURY sets close to the Sun in September. On the 1st it sets 30 minutes after the Sun but by the 30th it is right on the Sun's heels and sets a mere 10 minutes after the Sun. On the first it is only about 3.5 degrees off the horizon at Sunset.

VENUS is a nice morning object this month although it appears near its minimum size. On the 1st its illumination is 82.6% and rises at 3:10 am. At the months end it rises at 4:38 am and is 89.7% illuminated.

MARS slides into Sagittarius this month and is low in the western sky at sunset. On the 15th, it sets about 4 hours after the Sun. At a diameter of 11.9" (on the 15th) it is a little less than half its maximum size.

JUPITER is in Gemini this year visiting the twins. On the 15th, it rises at about midnight when it's a 36.6" disk of magnitude -2.1. Although it's near its minimum size it still well worth a look.

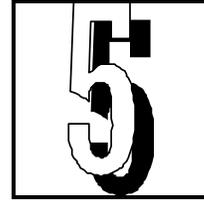
SATURN, in Taurus, rises at 10:21 pm on the 15th and is visible all night long. Smaller and less bright than Jupiter it's about halfway to its maximum size as a 17.7" disk of magnitude +0.1.

URANUS, in Capricornus, sets at about 3:50 AM PDT on the 15th when it's a 3.6" disk of magnitude +6.1 It can be viewed binoculars.

NEPTUNE, also in Capricornus, sets on the 15th at about 2:25 AM PDT. It's a 2.5" disk at about magnitude 7.7.

PLUTO is still in Ophiuchus this year. On the 15th it sets at about 11:20 PM PDT. As usual, it's a 0.1" disk at magnitude 13.8. This is a "challenge"

CONSTELLATIONS to look for in September (based on September 15th, 10 PM, PDT) are Andromeda, Pegasus, Cygnus, Vulpecula, Sagitta, Lyra and Hercules.



Andromeda: The Princess, the Chained Maiden (An-DROM-eh-duh) This popular constellation is home to the famous Great Andromeda Galaxy or M31. Standing on either side of Andromeda are the much smaller galaxies M110 and M32.

Pegasus: The Winged Horse (PEG-a-sus) Within its boundaries you will find one of the brighter globular clusters visible from Earth, M15. As well the spiral galaxy NGC7331 is worth a look. Scientists feel that this galaxy is very similar to the Milky Way and is a good indication of what the Milky Way might appear from a distance of 50 million light-years.

Cygnus: The Swan (SIG-nus) Cygnus is brimming with targets. From binary stars to open clusters to diffuse nebulae this constellation has it all. Some of the more famous objects are the open clusters M39 and M29, the North American Nebula, and Beta Cygnus, better known as the beautiful binary star system Albireo where one star is a golden yellow and the other a pale blue. According to the "Field Guide to the Night Sky" there is some question as to whether or not this is a true binary system or an optical double.

Vulpecula: The Fox (vul-PECK-you-lah) This modern constellation has only one object of note, M27, the Dumbbell Nebula.

Sagitta: The Arrow (sa-JIT-ah) This constellation has been around since classical times and has represented almost every famous arrow in mythology. Sagitta is home to the loose globular cluster M71. It is about 11,700 light years away.

Lyra: The Lyre (LYE-rah) The most famous object in the Lyre is M57 the Ring Nebula which is located roughly halfway between Beta and Gamma Lyrae. The distinctive "ring" is a shell of gas that was expelled by the 15th mag. star in the middle of the ring. Lyra also holds the famous "Double-Double" star, Epsilon Lyra. The outer two double stars split easily in all instruments but to split the double-double fully you will need high magnification although not necessarily large aperture.

Hercules: The Strongman (HER-kyu-leez) This popular constellation is graced with the brightest globular cluster in the northern hemisphere M13 which can be just barely seen with the naked eye as a faint smudge on a good, clear night. It also holds M92, several variable stars and even a planetary nebula, NGC6210.

Clear Skies,



Stellar Magnitude

One of the greatest astronomers of ancient times was Hipparchus, who lived in the second century B.C..

"Isn't it funny how we always refer to these ancient people by their last name? In today's society that would be rude unless you were in the military. Since his given name is lost to time, lets just call him Frank, Frank Hipparchus."

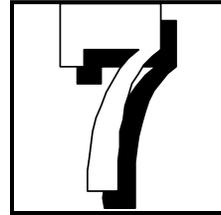
Frank compiled a catalog of some 850 stars. He listed the location of each star and assigned a number to represent its brightness. These numbers endure still today. He divided his list of stars into six levels and assigned magnitude 1 to the brightest stars and magnitude 6 to the dimmest stars he could see. The rest of the stars fell in between the brightest and the dimmest, the difference in magnitudes representing equal differences in brightness. Therefore the difference in brightness between a second and third magnitude star would be the same as the difference between a 4th and 5th magnitude star. As the magnitude number gets larger the star gets dimmer, think of it as 1st class 2nd class etc. A first class star is brighter than a second class star. Other than some slight tweaking to define slightly more or slightly less than a full magnitude, this system survived for 1800 years. Then along comes Galileo Galilei with his new 'telescope'. Upon turning it to the sky, he discovered that in fact there were many more stars than anyone had ever imagined. *"Indeed, with the glass you will detect below stars of the sixth magnitude such a crowd of others that escape natural sight that it is hardly believable," he exalted in his 1610 tract, Sidereus Nuncius. "The largest of these...we may designate as of the seventh magnitude..."* Thus, a new term entered the astronomical language, and the magnitude scale became open-ended.

So far we have been talking about stars that are relatively dim, what about stars that are brighter than 1st magnitude? Simple, the next step brighter than 1st magnitude is 0 followed next by -1, -2, -3 and so on. We now have an unbounded scale for measuring and comparing the brightness of heavenly objects, this is called the *apparent magnitude*. As the system evolved it became necessary to refine the values of the steps in the measurement scale.

When two stars differ by one magnitude, we receive 2.512 times as much light from the brighter one as from the dimmer. If the difference is 2 magnitudes the brightness difference is 2.512×2.512 or the 2nd power of 2.512, which is approximately 6.3 times brighter. A 3 magnitude difference would be the 3rd power of 2.512 and so on. The value 2.512 is the fifth root of 100, so a magnitude difference of 5 represents a brightness difference of 100.

The sun has an apparent magnitude of -27 , while the full moon shines at -12 . The brightest star *Sirius* has a magnitude of -1 and the dimmest stars visible

The 24 inch telescope at the PGAS observatory can easily image 18th to 19th magnitude objects. If you remember the powers of 2.512, that's better than 10,000 times dimmer than the naked eye limit. I seem to recall hearing that at one time we had captured all the way down to mag 20. The highly sophisticated modern telescopes in use today can plumb the depths of the universe down in the range of 25 to 30th magnitude.



The Hubble Deep field is an example of pushing the limits of an instrument, without the constants of an atmosphere. Exposure time not limited by reciprocity inherent in film. The science team at the space telescope science center were able to recover galaxies as faint as 29th magnitude from an area about 1/12 the size of a full moon.

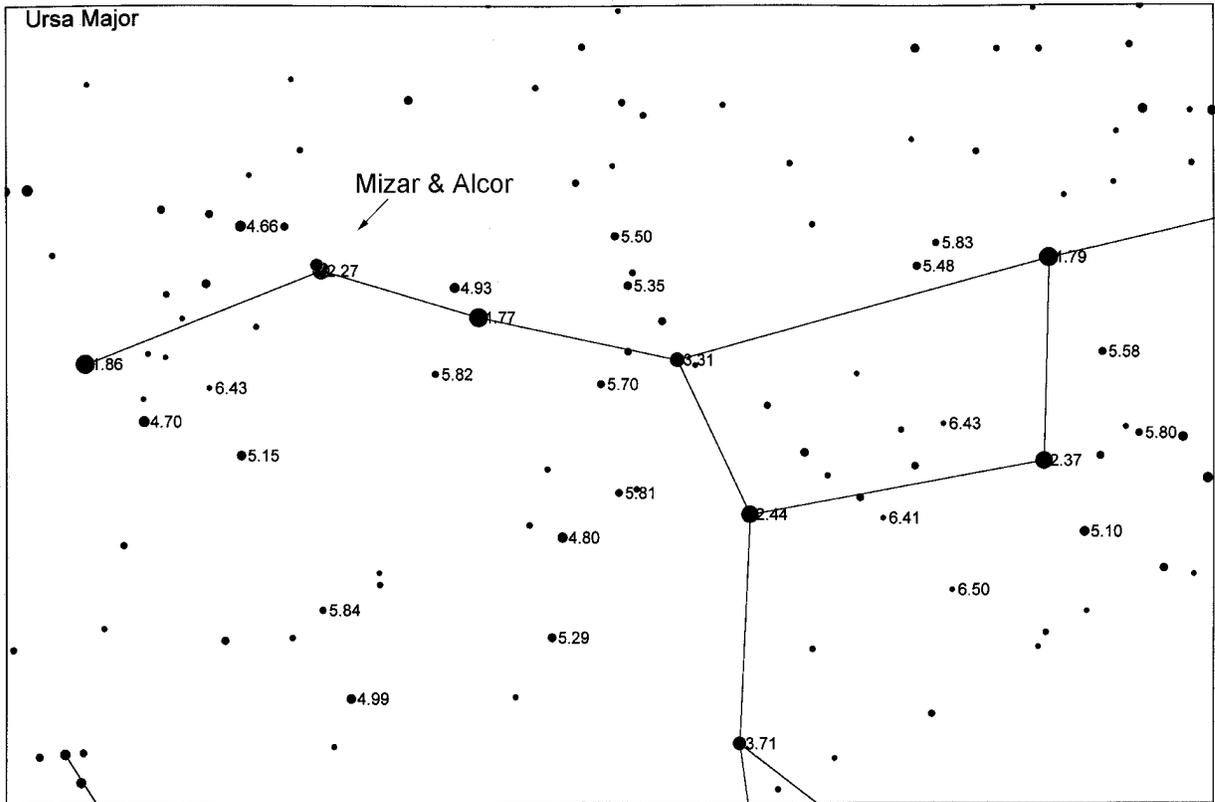
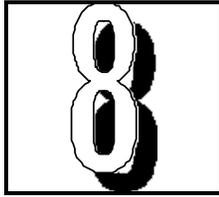
So far we have been “looking at” visual magnitude or apparent magnitude. This is an easy to use tool, visual observers can simply compare an unknown stellar object to a object of a known brightness. With a little practice an observer can estimate fractional magnitudes down to tenths of a magnitude. (Please see charts on page 8 and 9.)

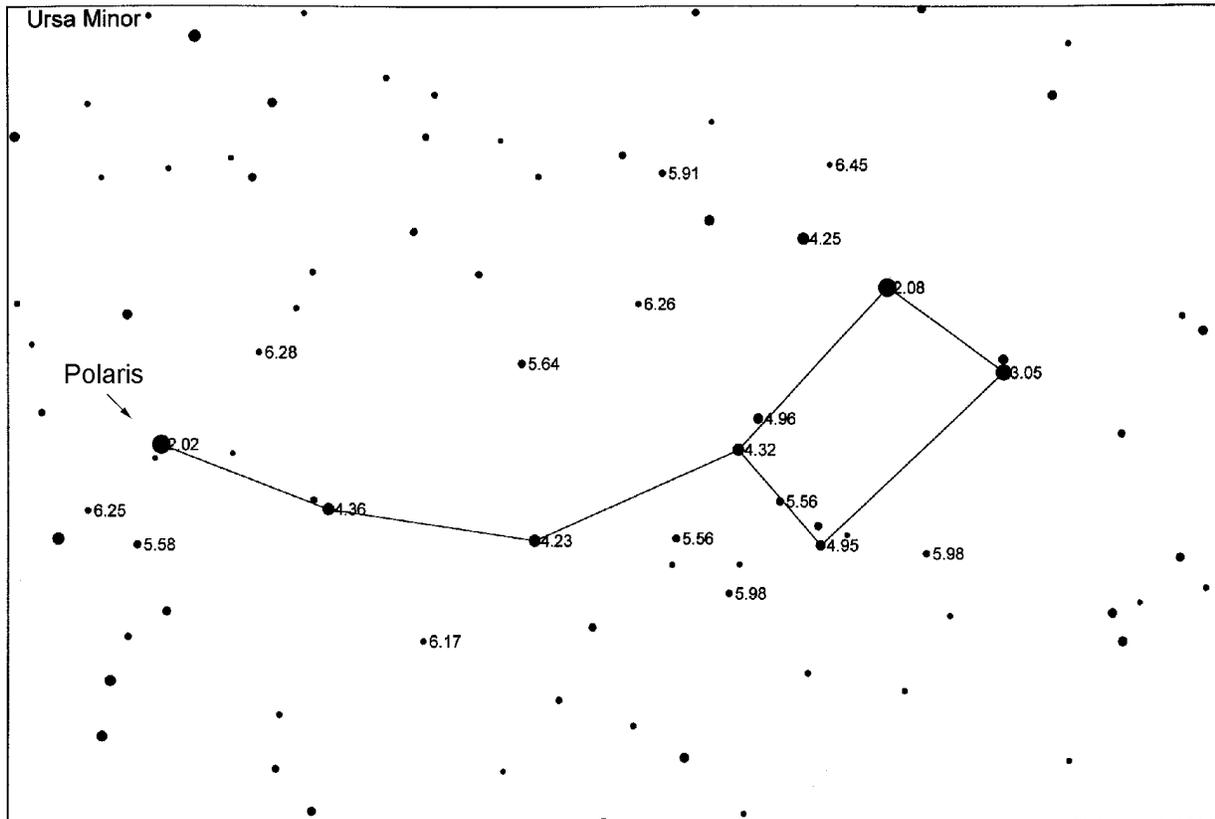
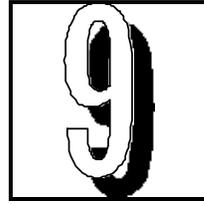
With the addition of a photometer (basically a light meter) or a ccd camera (charge coupled device) , magnitudes can be measured to a fractional accuracy of .001 magnitudes. This level of accuracy allows for mapping eclipses of paired (binary) stars and monitoring the palpitations of variable stars. These kinds of measurements are performed routinely by our members.

As astronomers learned to use visual magnitude, they found that the eye or even the instruments they were using didn't respond to the full spectrum of light evenly. It didn't take long to figure out that by adding filters to the light path and making magnitude measurements at different frequencies they were able to find the true “color” of a star. This is where it gets really interesting, once you know the color of a star , you know it's temperature, that should give you a pretty good idea of how bright a star really is.

If you were asked what is the brightest star you may very cleverly say, why the sun of course, the sun is a star and certainly the brightest star we see. That is true but only because it is so much closer to us than any other star. The sun is in fact average. Astronomy needs a measurement to put all stars on equal footing, a level playing field. And it is called *Absolute Magnitude* . Absolute magnitude is the apparent magnitude a star would have if it were 10 parsecs from earth. A parsec is 3.26 light years. (and yes I know they tried to pass off a parsec as a speed measurement in Star Wars, it's not, it's a distance measurement). Since the brightness of a star, or any light for that matter, follows the inverse square law, the apparent brightness drops off dramatically. The sun falls from magnitude -27 apparent to 4.83 absolute.

At this point we know how bright a star appears, how bright it really is. In







Member Profiles

Throughout the summer we have been quite busy at the observatory and around town. We are in this group because we share an interest in astronomy, but it seems to me that it's also a social group. It's always enjoyable to get together with like minded people. With that in mind I thought I would ask a few of the people that come out often if they would mind writing a brief profile, and they did.

Doug Wayland has been a member for over two years, a very capable and knowledgeable observer. Doug has contributed **many** hours helping out at observatory work-bees and often out there fixing things up on his own. If I am hosting an open house I am always glad to see Doug come out, because he really knows his way around the sky, and he brings pretty good music too! Hi Gil,

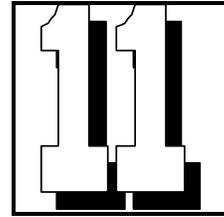
I was born and raised in the Burns Lake area and am now 48 years of age. I have lived in Prince George for the last 17 years.

I am a commercial helicopter pilot and I work for Canfor flying their helicopter in the P.G. and surrounding area.

Astronomy is a subject I have had a casual interest in all my life, I have always enjoyed looking at the night sky, but beyond the big dipper and the north star, I didn't know very many objects up there. That all changed in the winter of '98, '99 when I began to read books on the subject and started going out to the public open houses at the PGAS observatory. My first sight in the big scope at the observatory was the Orion nebula and the trapezium. I was hooked from that time on, I couldn't read enough about astronomy. I became a member of PGAS in March of '99. In May of '99 I bought my own telescope, a Meade LX 10. I like to become involved in helping out around the club and enjoy the camaraderie of people with the same interests. I especially like the group observing sessions. I get great satisfaction out of tracking down objects such as galaxies, nebulae and star clusters, some of them are very hard to find. My scope has no computer go to capability which is just the way I like it, I learn to find my way around the sky with the aid of star atlases. For me the hobby is very relaxing and a great stress reliever. The only problem is time goes by too fast when I am out under the stars.

D.W.

Glen Harris has been a member for a few months , but in that short time he has become one of the most capable and involved members in our group. (just check out his M-57 t-shirt). Glen has taken more ccd images with the 24 inch than anyone except Bob and Bob takes a hundred at a time. Glen is a welcome addition to a group function, but he is also often out at the observatory working on his own, either on his astronomy or on improvements to the facility.



Gil; Here's a mini profile as requested.

I've worked for BCTel and Telus for 33 years, and moved to PG in 1975. It was during the building of my log home out in the countryside in 1976-1978 that I became enthralled with the night sky. There were many nights spent out under the stars with my young children, exploring the more common constellations. That interest way back then affected my eldest daughter more than I realized, because even now at 31, Leanne shows a keen interest in astronomy, and has encouraged me to 'show her the observatory' whenever she visits from Vancouver. She is always lamenting the problems of light pollution down south, and how far she has to travel to get away from it.

It may have been Brian Potts, who works in the same building as me at Telus, that told me about the PGAS. In the fall of 1999, my family and I visited the observatory for the first time, and it was my first glimpse of a galaxy that really got my interest. We visited the observatory several times over the fall and following spring, but it was a solar observing session at Parkwood Place in the summer of 2000 that convinced me that I really wanted to expand my horizons in the area of astronomy. I joined the club in early 2001. What I've found ever since that first visit to the Tedford Road site is that everyone associated with the club has a genuinely enthusiastic interest in the stars, and shares their knowledge happily and willingly. The friendliness and camaraderie is stellar. It has been my pleasure to help out with club functions as often as I can, and I always come away knowing a little bit more about astronomy.

Regards, Glen

I think both these letters bring out a very interesting point, that is , how important our public events are to our survival. To survive and grow we need new members. There are untold numbers of latent astronomers in Prince George. We just need to introduce ourselves to them and encourage that interest.

Another point to consider, I have heard many times the concern that we



FROM "SIMPLE PLEASURES: SPELLBOUND"

December, 1999

Journal of the Royal Astronomical Society of Canada

AURORA'S SERENADE

Nights of icy silence, endless and dark.

It was deep in a Yukon winter that I fell victim of its spell. Phantoms of wispy light frolicked and danced, played hide and seek, and caused this mere mortal to shiver - not just from the cold, but in awe. The stars, in a velvet black sky, flickered and flashed like brilliant sparks throughout the long night.

From early evening through to a late dawn, a black eternity swallowed whole that frozen land. But for this insignificant human (and romancer of her stars) dwelling in that land of ice and night, the naked-eye viewing was exceptional. No need to set the alarm for unearthly hours of the morning to enjoy a celestial performance. Romancing my stars happened each time I stepped outside.

One night, still vivid in my memory, the aurora stole the show: the appearance of a ghostly apparition circling Capella overhead, its outer edge fluted and undulating. This tiny pie in the sky hugged and danced around its glittering captive, mesmerizing and enthralling the lone human looking skyward. Across the sky, shimmering curtains of celestial light waved and fluttered, and as quickly as they appeared they changed, transformed, fanned, and then, like a ribbon, unfurled across the black expanse, stretching off to the east and to the west. Then directly overhead a rayed arc metamorphosed into a brilliant bow - the northern sky thus gift-wrapped for my upturned eyes to behold.

Through a long and dark Yukon winter I beheld a glittering world. Stars, like crystals of ice, sparkled on a flawless velvety veil of pure black where ghostly lights danced to unheard music.

Deep in a Yukon winter the Spell was cast. If you leave the North, as I did, it haunts you, calls and beckons you to return. I could not resist that call. I had to return. And I did, at the beginning of a winter's embrace. Here, in northern B.C., at the fringe of its influence, the Spell holds me captive still. Our sky is equally as black, the star-studded

These countless sparks of light on a clear black night romance me, and I think I faintly hear, echoing softly, Aurora's serenade. And, through the long dark northern nights I remain bound by that spell cast so many years ago, my sight - and my very soul - filled with the images of shimmering, vapourous phantoms and sparkling points of light trembling in icy suspension. I am become as one with them, wrapped in that swaddling black veil of a northern night.



FCM

Brief bio: Fae Collins Mooney has been a member of the RASC for many years and is now a member of Prince George centre. She can sometimes forget what a clear night sky looks like from her home in cloud-shrouded Terrace. But she believes in miracles and occasionally they occur, when the pewter-grey overcast dissipates to reveal the star-studded splendor of a northern night sky.

NEW BOOKS AT THE PUBLIC LIBRARY.

By Yvonne Whebell

THE CHRONOLOGICAL ENCYCLOPEDIA OF DISCOVERIES IN SPACE.

By Robert Zimmerman.

Oryx Press, 2000. A wealth of information about 20th century space exploration. This book will be in our children's department due to interest, but is well worth a look for adults.

An interesting observation from the book: "Although S and C classifications of asteroids make up almost 75 percent of all known asteroids, the spectrum of neither type corresponds very closely to the spectrum of most meteorites found on Earth. In fact, only a handful of asteroids fit precisely the spectral class of 90 percent of all known meteorites." (S and C refer to rocky and rubble type asteroids.) "Even more puzzling, the closer one gets to the earth, the worse the spectral match".

NEAREST STAR: THE SURPRISING SCIENCE OF OUR SUN. By Leon Golub and Jay M.

Pasachoff. Harvard University Press, 2001.

The two authors have put together a book that details various aspects of solar exploration, including the chemistry, physics, history, and human endeavor to understand our sun.

Yvonne Whebell,
Acquisitions Coordinator
Prince George Public Library



September Star Hop Through Cygnus

September is my favourite month of the year. The weather is still reasonably warm and the nights are getting longer so you can start viewing at a decent time of the evening. This month we will explore the constellation Cygnus. Cygnus is directly overhead and forms one third of the asterism the Summer Triangle. The star hop starts at M39 and continues on to M29, NGC6888 (The Crescent Nebula) and Alberio. Cygnus is located in the summer part of the Milky Way. After you view the objects listed here cruise around and check out the amazing number of stars. There are many open clusters located in Cygnus for additional star hoping practice look some of them up in your planetarium software and see how many you can find on your own.

HOP #1: M39

We will start our search at the 1.3 magnitude star Deneb. Deneb is the alpha, and brightest, star of Cygnus the Swan. To find M39 move from Deneb to the northeast about 9 degrees, roughly halfway to the constellation Lacerta. M39 is quite noticeable at magnitude 4.6

HOP # 2: M29

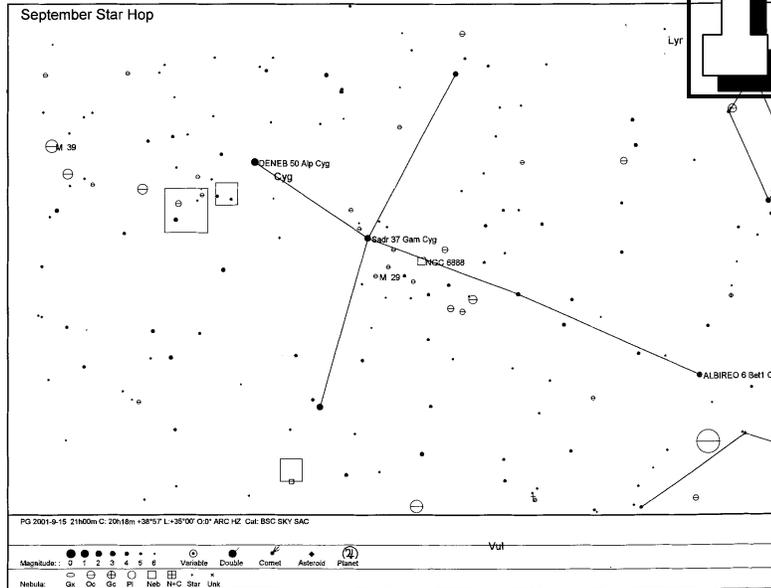
Return to the star Deneb. From Deneb move to the yellow colour star Gamma Cygnus (Sadr) This star is about 6 degrees (a little more than 3 finger widths) to the southwest of Deneb. It forms the centre of the “Northern Cross” asterism in Cygnus. Next, move south about 1.5 deg to M29. M29 is easy to see in 7x50 binoculars. Take your time to properly identify M29 as Cygnus lies within the Milky Way so there are tons of stars in the area. This is why identification of M29 is easier in binoculars than in a telescope. M29’s magnitude is 6.6

HOP #3: NGC6888

This is the challenge object of the evening. It is a diffuse nebula called the Crescent. To locate it go back to Gamma Cygnus (Sadr) and move 2.5 deg. to the southwest, following the imaginary line that connects Gamma Cygnus (Sadr) and Beta Cygnus (Alberio). The magnitude of the nebula is about 10. As a size comparison M29 is about 7’ in diameter while NGC6888 covers an area about 18’ x 12’. The description I am using states that the Crescent is very similar to the Veil Nebula and is being illuminated by a mag. 7 super hot Wolf-Rayet star. A viewing magnification of between 100X to 150X is recommended as well as excellent transparency.

HOP #4: BETA CYGNUS (ALBERIO)

Follow the line created by Deneb and Sadr to the next brightest star, mag 3.2. It will appear to be in roughly the middle of the asterism called the “Summer Triangle” It will appear a yellowish colour to the naked eye. Under magnification of about 60X (maybe as little as 30X) it reveals itself to be a beautiful double star. Alberio itself is a golden yellow colour and its companion Beta 2 Cygnus is blue. They are separated by 34.3”. Mizar and Zeta Ursa Major, by comparison, are separated by 14.4” (arc seconds)



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 appreciated and tax deductible.

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Science

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The P.G.A.S Would like to thank
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for their donation of
THE SKY (Level 4 software)



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