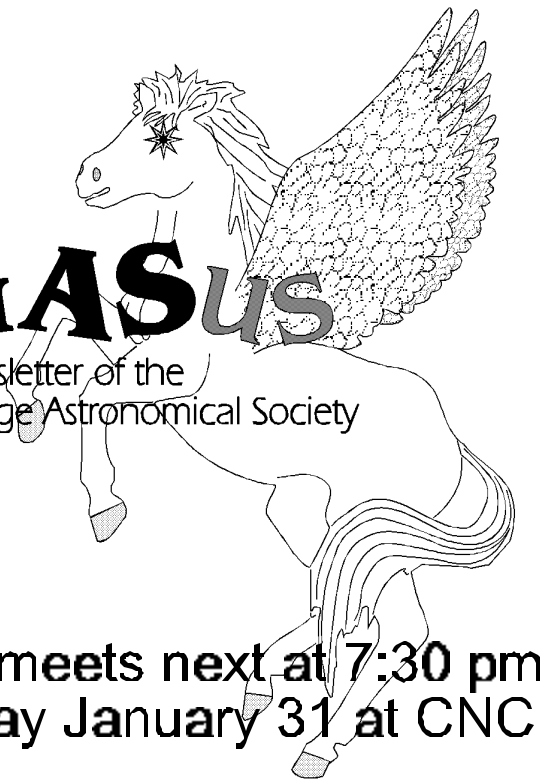
JANUARY 2001 ISSUE #108

the PeGASus

Newsletter of the
The Prince George Astronomical Society



The pgas meets next at 7:30 pm
Wednesday January 31 at CNC

INSIDE :

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

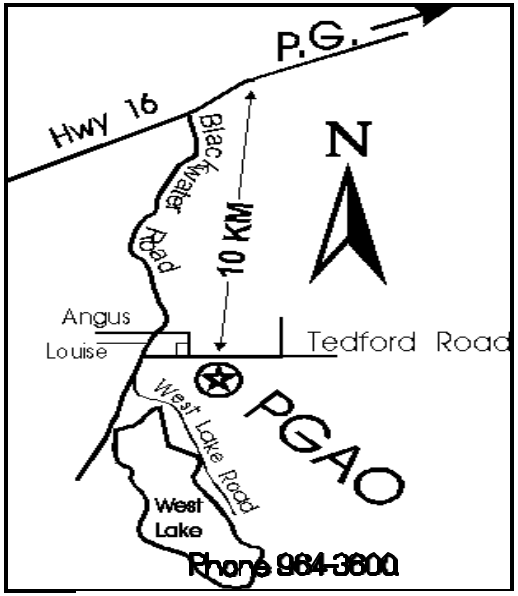
Our pursuits are out of this world.
Our activities are astronomical.
Our aim is the sky.

Contributions to the newsletter are welcome.

Deadline for the next issue is

February 16

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



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

EDITORIAL

By Gil Self

I hope everyone had a pleasant Christmas and a Happy New year! As happens each year at this time, while we drag ourselves through the hind end of winter- the spring season sneaks up on us. Two evenings after our February meeting we will be back to the open house schedule. We know already that we will be short handed for people to staff the observatory.

This would be a good point to wish Owen Salava all the best at his new job in Edmonton and especially congratulations on his up-coming wedding. Boy! did that come out of the blue! Over the three years Owen has been with the club, he has regularly contributed photos to the newsletter, been one of the primary hosts for tours and open house, pitched in on many a construction project and just been an all around super member. Maybe Owen and Orla can form the Edmonton chapter of the PGAS. Best of luck Owen and we will miss you.

While we sometimes lose members to other cites , we also gain new members every year. Two members I would like to mention have both been with the club for less than a year. They have both taken on jobs that help the PGAS function.

Bob Klick is a welcome addition to our group. Bob is a relatively new astronomer who has participated in many events and projects already and has taken on the position of building manager- the big plus here is unlike some of us- Bob knows what he's doing. All future modifications or renovations will go through Bob for approval. Bob will also be the person to talk to about work bees to make sure we get things done.

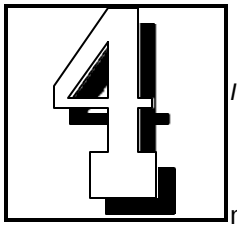
Paul Roberts, a man of many skills, has consented to being our club treasurer. He has extensive experience with computer systems and will help us fine tune our growing collection of high tech equipment. Paul has also taken on the challenge of our Dark Sky committee. We need to get behind Paul and offer our help since this is a very important project, if we don't do something soon it may be too late.

Important upcoming events!

Rob Frith is holding the NOVA workshops this spring. As in the past, we will offer this program to the public. Rob is a very able astronomer, and it's likely any club member will learn something from these sessions.

Brian Battersby has been working many evenings this last year on the regular Saturday "members" night. He will continue this year and I can't think of a better opportunity to brush-up your skills or simply have a nice evening out with your friends.

Gil



Coming Events

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

The **PGAS.**
meets next January 31, 7:30pm at CNC

The Night Sky for February 2001

by Bob Nelson, PhD
Hi Folks,

As I write this, I am hunched over my laptop in the classroom at the observatory typing, while the 24" telescope and CCD camera are gathering images (one after the other) of NS Monoceros, a 10th magnitude contact binary. All seems to be well; the tracking is stable (you have to tweak the fine knob on the control 'paddle'); it's a gorgeous clear moonless night and it's a pity that I have to get up for work tomorrow.

I appear to have a 'live' one. I observe the images as they come in automatically on the classroom computer, as fed over the network from the 'dome' computer. The images files are then downloaded to my laptop (also over the network) and analyzed semi-automatically by the advanced software package MIRA. I see now that the light intensity is dropping nicely and appears to have reached minimum, as seen on my spreadsheet graph on my laptop. (Isn't modern technology wonderful?)

This observing effort is for studying eclipsing binary (EB) stars. These systems consist of two stars orbiting about their common centre of mass. Just by chance, the orbital inclination is such that we are looking at the orbit edge-on. The stars, however, are so far away that we see them only as one. We detect their binary nature by the fact that the light intensity dips during the eclipse (and therefore would not detect EBs if the inclination were not in the neighbourhood of 90 degrees). Now binary star systems usually do not remain constant over time. It may happen that one star transfers mass to the other and in doing so, alters the orbital period. Other effects can also change the period. By studying accurately times of minima, astronomers can deduce fundamental changes in the properties about the system, as well as the evolutionary fate.

I publish the results I obtain and, over the last two years, have observed over a hundred eclipsing systems.

Anyway, here is what is happening in the sky next month.

PLANET ROUNDUP

MERCURY is not really observable this month. At the start of February, it is low in the southwest at sunset as it rushes toward its date with the Sun at inferior conjunction on Feb 15.

VENUS is an evening object all month. At 7:00 PM on the 15th, it's about 15 degrees above the horizon and therefore very visible at magnitude -4.6 (corresponding to an aircraft with its landing lights on). On the 15th, it's a 36" crescent 32% illuminated. It reaches greatest brilliancy on the 22nd.

MARS, in Libra, until Feb 19 when it passes into Scorpius, rises at about 3:15 on the 15th and is a 7" gibbous disk, 89% illuminated and magnitude +0.27

JUPITER, in Taurus until July, sets on the 15th at 3:32 AM and is a gorgeous 40" disk of magnitude -2.3. It's well placed for convenient evening viewing of it and its satellites!

SATURN, in Taurus all year, sets on the 15th at 1:43 AM and is a 18" disk of magnitude 0.2. This means it is bright and conveniently placed for viewing.

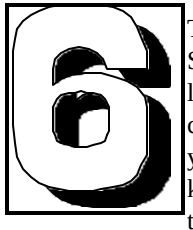
URANUS, in Capricornus all year, is lost in the glare of the Sun this month. A month or two hence, it will be an early morning object as the Earth catches up to it.

NEPTUNE, in Capricornus all year, is low in the southeast at sunrise and is not well placed for observations this month. As usual, it's a 2.3" disk at about magnitude 8.0.

PLUTO, in Ophiuchus all year, rises on the 15th at 2:25 AM. Good for the late types. As usual, it's a 0.1" disk at magnitude 13.8

CONSTELLATIONS to look for in February (at 9:00 PM, PST) are Eastern Eridanus, Canis Major, Lepus, Monoceros, Orion, Taurus, and Gemini. However, since I talked about the first
five last month, I'll restrict this section to Taurus and Gemini.

Taurus (Tau, "The Bull"), contains The Hyades, the well-known V-shaped open cluster which represents the head of the bull. For astronomers, it's the closest open cluster (after the Ursa Major Group), lying at about 40 parsecs (=130 light years) distant and probably containing several hundred members. It's important because the distance is too great to be measured by normal stellar parallax, but can be determined by a method known as the "moving cluster method". After that, its Hertzsprung-Russell (HR) or colour-magnitude diagram can then be used to determine the distance to clusters lying further away. This cluster is then an important rung in the cosmic distance scale.



Taurus also contains M45, the Pleiades star cluster (the 'Seven Sisters') which lies about 3 times further away -- 126 pc (= 410 light years). On deep exposures, many of the stars exhibit circumstellar nebulosity which is the tip-off that these are young stars. Another attraction in Taurus is M1, the well-known Crab Nebula. The subject of much study, the Crab is thought to be the result of a star that exploded in 1054 (on July 4th, of all days!). It's not too hard to find -- give it a try -- but the image is just an amorphous blob in the sky. Better images are obtained with a CCD camera (yeah!!).

Gemini (Gem, "The Twins"), is a well-known northern constellation that lies just to the east of Auriga. Just missing the Milky Way as it does, it lacks a lot of deep sky objects. (It does have open clusters M35, and NGCs 2158 and 2392 however.) Some of the stars are quite interesting. Alpha Geminorum, better known as Castor (one of the twins), lies about 45 light years from us and has a total luminosity of about 36 Suns. According to Burnham, it's probably the finest double in the northern sky. There is, however, much more to know. Castor A and B form a visual binary (gravitationally bound -- the first to be discovered) making an orbit of about 6 arcseconds in radius (corresponding to a real distance of about 90 astronomical units) and a period of about 400 years (and hence the system has not yet made a complete orbit since it was first measured likely in 1678). There is a third star, Castor C, which orbits the other two at a distance of about 72". The fascinating thing about Castor is that each of the three stars (A, B, and C) is also a spectroscopic binary.

[Spectroscopic binaries are systems of two stars that almost always cannot be resolved as two but are detected as double by the use of spectroscopic analysis. Spectra taken over a complete orbit reveal spectral lines alternately shifted to the blue at one time, then shifted to the red at other times. Mathematical analysis can solve for certain fundamental quantities like mass and orbital speed, however, the 'fly in the ointment' is that, unless the system also eclipses, you never know the orbital inclination, i. Therefore, all you get are quantities like (v sin i) and (m sin3 i) where (sin i) is the sine of angle i and (sin3 i) is the sine of angle i cubed.]

So there you have it, Castor is a system of six stars! (For further details, read Burnham's Celestial Handbook, page 917 -- available at the observatory.) Castor's twin, Pollux (Beta Geminorum) is, alas, just single.

Another interesting system in Gemini is U Geminorum, a 'dwarf nova'; however, I'll have to talk about it at some other time.

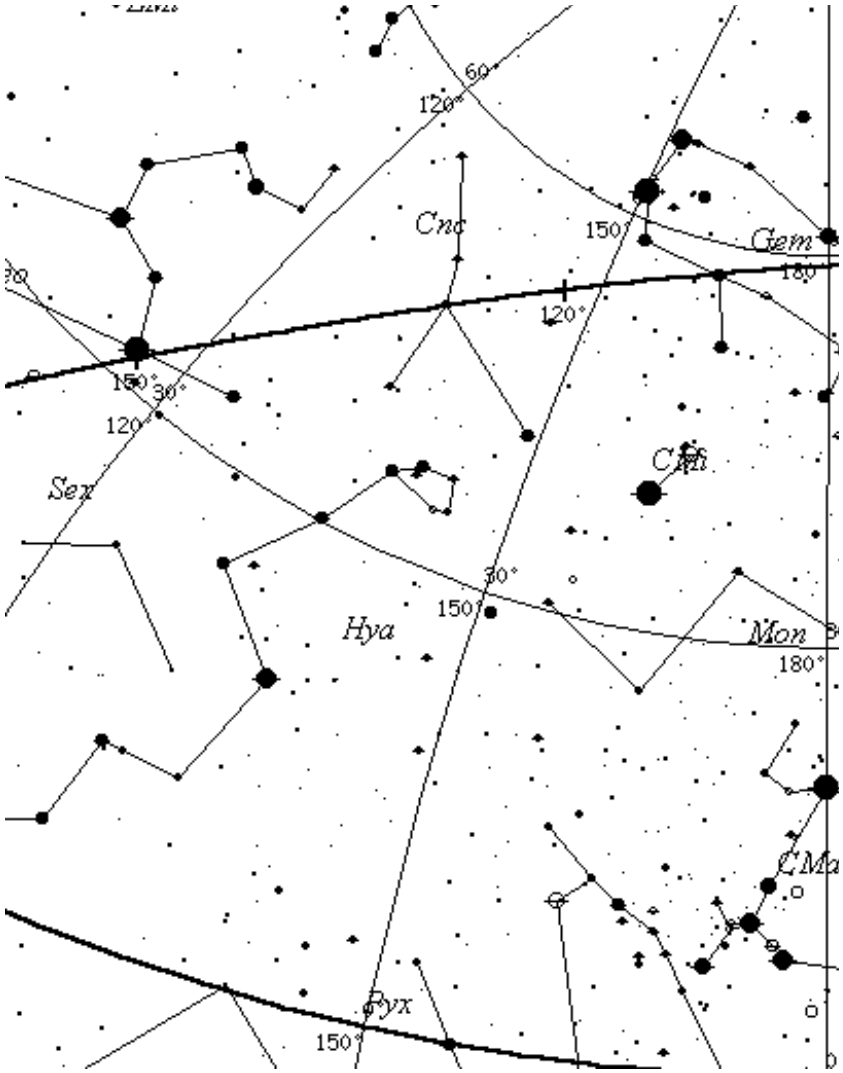
Clear skies,
-Bob

7

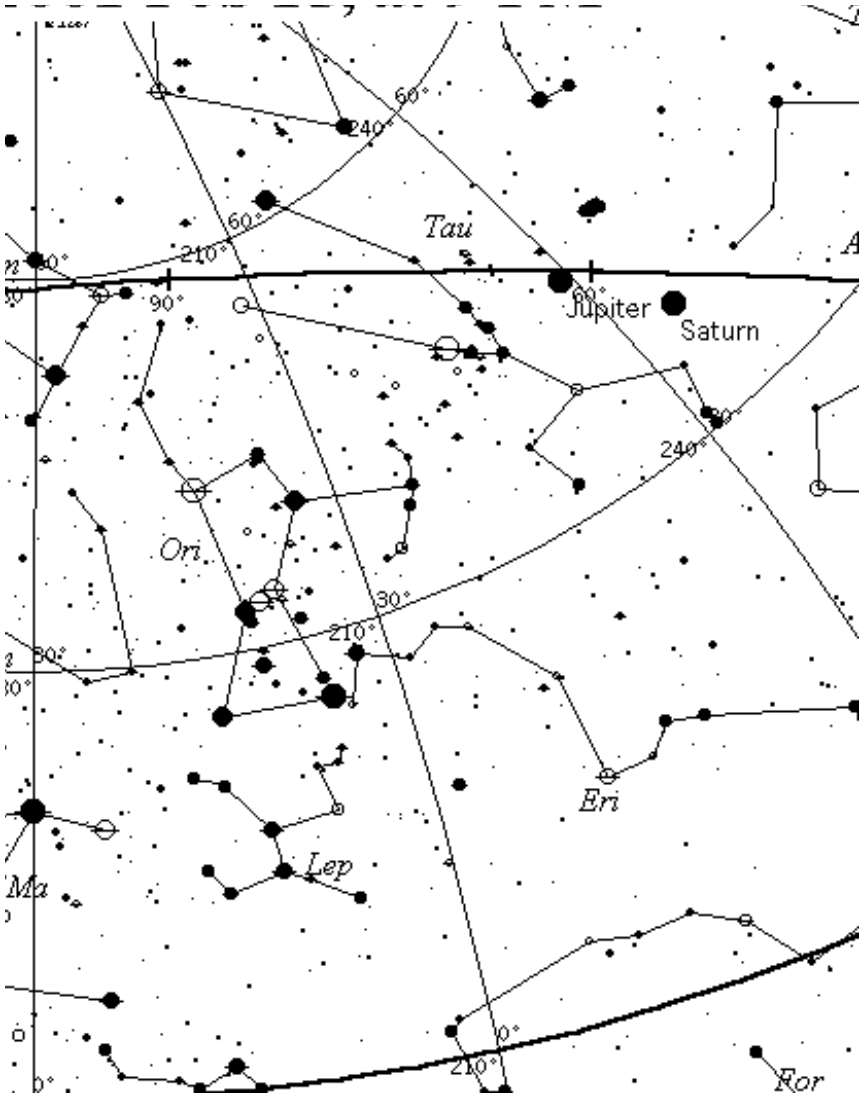
R.A.S.C.
Calendars

Available at the
Next Meeting
$15.00 each

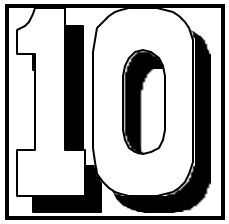
Just a quick note to let you know that **Jacob Mathew Chris Burke** was born today (January 12) at 12:37PM at Prince George Regional Hospital. He weighed 9 pounds 14 ounces (BIG BABY!!). Mom and baby are doing very well..

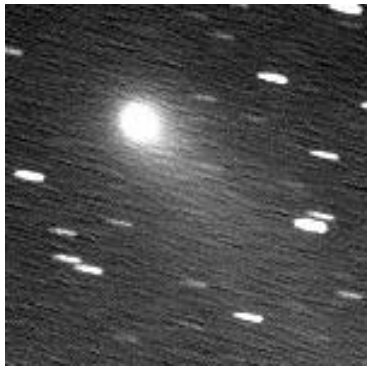


Night Sky for February courtesy Dr. Bob Nelson



Night Sky for February courtesy Dr. Bob Nelson





Comet McNaught-Hartley

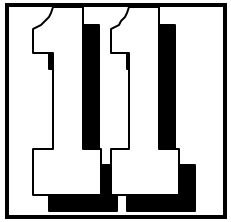
On the morning of October 15, 2000, Cristovao Jacques captured this view of Comet McNaught-Hartley from Wykrota Observatory in Brazil. North is up. The image is actually the sum of 10 exposures of 60 seconds each, taken with his Meade 12-inch Schmidt-Cassegrain telescope at f/6.0 and MX916 CCD camera - under a full Moon!

Comet McNaught-Hartley continues its slow climb in the predawn sky. Skywatchers in North America, Europe, and Asia should have little trouble spotting this object with binoculars and small telescopes.

This comet was discovered by Robert H. McNaught on a plate taken on October 7, 1999, by Malcolm Hartley with the 1.2-meter U.K. Schmidt Telescope, which is located on Siding Spring Mountain in Australia. Then only 15th magnitude, the comet was quickly found to be following a path tipped 80 degrees to the ecliptic. Its orbit is almost indistinguishable from a parabola, meaning this could be its first-ever visit to the inner solar system.

McNaught-Hartley is currently in Hercules.

Speed of Light in Strange Places



Here is a little exercise for our mathematically inclined readers.

The speed of light in vacuum, 299792458 m/s can, apparently, be derived using two verses from the Quran relating this fundamental universal constant with the motion of the Earth-Moon system. A 'relativistic' interpretation of this Quranic relation gives C=299792500 m/s, in surprising agreement with the accepted international value.

The Quran states that the speed of 'affairs' of God in one day is equal to the affairs of man in 1000 years. Now, the Islamic calendar is based on the moon, and there are exactly 12 months in one year (so their year is less than 365 days). The month is based on the first appearance of the crescent moon after the new moon, so their month is the synodic month. Consequently, the speed of God's affairs is given by

GodSpeed x 1 day = 12000 x (distance moved by moon relative to Earth per month)

If you use the circumference of the moon's orbit, 2 pi R, then GodSpeed is almost the speed of light. If you multiply the result by the cosine of the angle that Earth moves in one sidereal month, then you get the speed of light to a surprising number of decimal places. According to the author of this calculation, the cosine term corrects for the effects of the suns influence on the moon's motion, and constitutes a 'relativistic' correction.

Try it and see what you get.

If you want to read the original text, it is located at
http://www.islamiska.org/e/Speed.htm.

Orla Aaquist

Group Tours:

Brian Battersby

January has been a busy month on the group tour scene. As of Jan. 23 two out of the three group tours scheduled for this month are done. So far I have collected $55.00 from the donation jar. I wanted to thank all of the club members that have helped out for their time and effort.

On Jan 12 Owen ran his last group tour for us before moving on to Edmonton. His leaving creates a vacuum in the club, which I hope one of the newer members steps forward and fills. One idea the executive would like to initiate is the creation of "Tour Presenters" and "Tour Helpers".

Tour Presenters would be experienced members who feel confident they can run a tour and Tour Helpers would be less experienced members there to facilitate crowd control and answer general questions, as the Tour Helpers gain knowledge and experience they would become Tour Presenters. In this way the club will always have people who can run tours and give new members a way to help the club and gain knowledge, there is nothing that stimulates learning more about astronomy than an eight year old kid asking you how stars are formed, what is a nebulae and what would happen if a black hole sucked up the Earth, except of
course, an eight year old kid explaining these things to you!
At the next meeting I will be asking for volunteers to sign up to get this program going…
please don't be shy!
BB

BLACK HOLES, WORMHOLES & TIME MACHINES.

By Jim Al-Khalili.

Institute of Physics Publishing, 1999.

This book is a series of explanations of the physics of our universe, some interesting, some quite humorous. A couple of exerpts follow just to give you a taste:

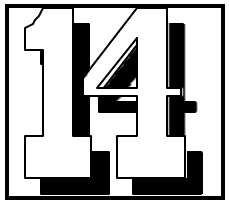
"... the moon is falling towards the Earth in a curve that forms a Circular path around the Earth so that it never manages to get any closer. When Newton calculated this during the plague year of 1666 he thought he had got the wrong answer and, disappointed, refrained from publishing his results.
It was only many years later, when discussing the problem with his friend Edmund Halley (he of comet fame) that he realized the importance of his discovery."

*****

"Imagine that you check into Hotel Infinity, which has an infinite number of rooms - I've stayed in a few hotels that came close to this and I have certainly been lost in a few. You are told at the front desk that they are very busy that night and that there are already an infinite number of guests so all the rooms are occupied. You complain to the management that you had a reservation and insist that they find your a room for the night..."

Well, you'll have to read the book to find out what happens next!

Yvonne Whebel
ywhebell@lib.pg.bc.ca
Prince George Public Library



The Night Sky: An Introduction to Astronomy

Free online Astronomy Course

<Copy url at bottom of page into your web browser>

Syllabus: Your Instructor: Ken Hewitt-White

1. The Starry Sky
   A night-sky primer that explains seasonal motions and easily visible constellations.
2. Planets on the Run
   How to identify and follow the five visible planets as they drift through the sky.
3. Venus and Mars: Opposite Worlds
   Thoughts on one planet that's too hot and another that's too cold.
4. Jupiter and Saturn: Mini Solar Systems
   Yes, the gas giant planets are spectacular, but you should see their moons.
5. The Comet Connection
   The origin of comets and what they tell us about the origin of life.
6. At Home in the Milky Way
   The contents and layout of the immense "galactic city" in which we live.
7. Lives of the Stars
   Tracing the evolution of stars from birth to death and beyond.
8. The Expanding Universe
   The story of how we discovered the large-scale structure and motion of the universe.
9. Cannibal Galaxies and Other Monsters
   The role in cosmology of colliding galaxies, supermassive black holes, and quasars.
10. Whither the Universe?
    Our best clues to the mystery of how the universe will end.

Ken Hewitt-White is freelance astronomy communicator. He writes for television , newspapers, and major astronomical periodicals. A resident of British Columbia, he observes the night sky every chance he gets

URL: Starts February 5,2001

http://www.barnesandnobleuniversity.com/Classroom/Course/1,2631,25015_25697__,00.html

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	

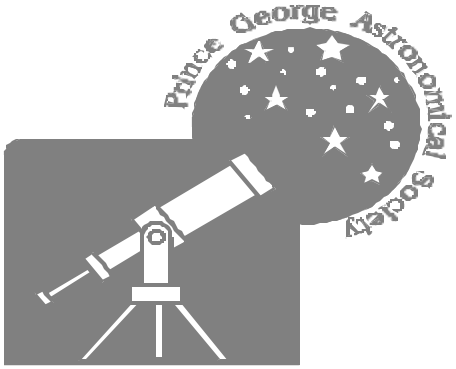
The greatest contributors to the construction and operation of the observatory are from PGAS members who have generously contributed their time to this project. The value of their contribution surpasses all external contributions.

The PGAS is a non-profit organization dedicated to the advancement of astronomy and science in general in Prince George and the neighboring

Support Community Science

Join the PGAS

Prince George Astronomical Society



The P.G.A.S Would like to thank
BISQUE SOFTWARE
for their donation of
THE SKY (Level 4 software)
To The Prince George Observatory

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We thank you for your support.