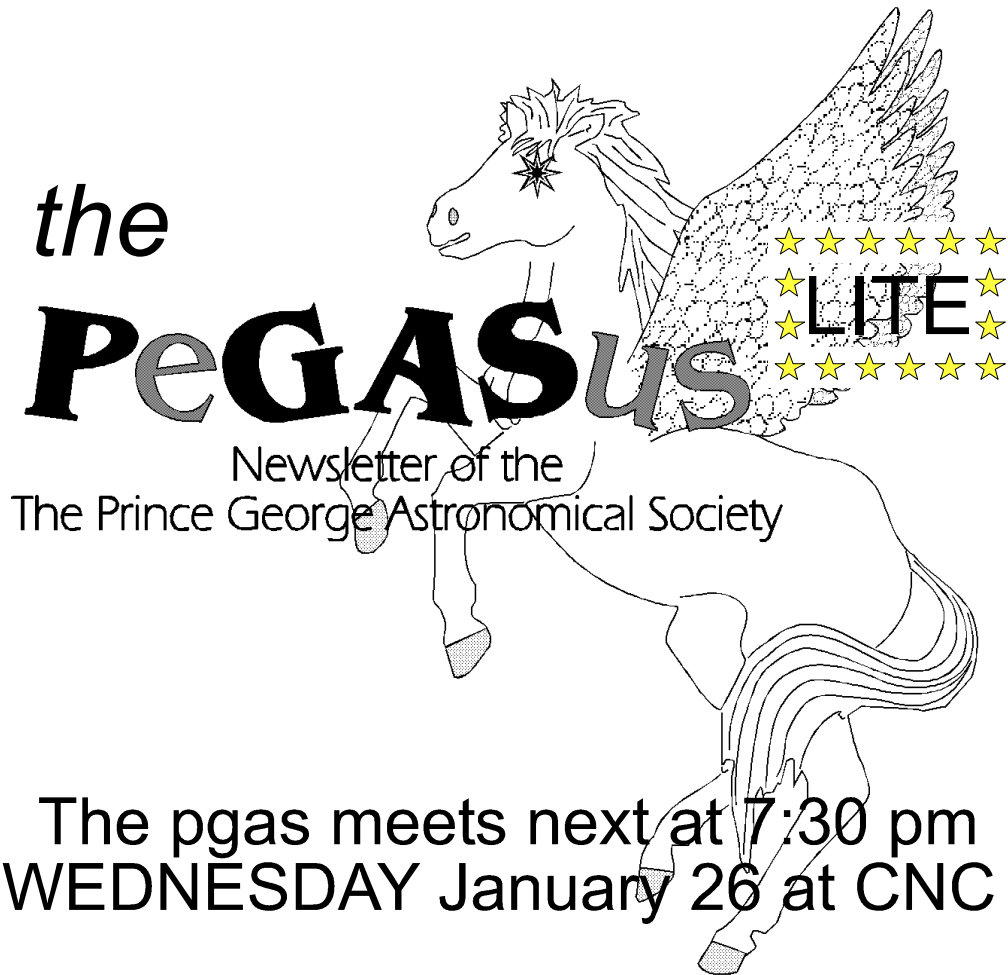


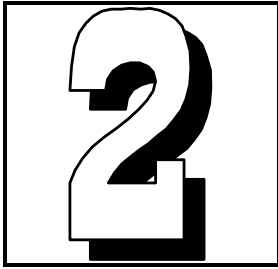
# 1999 DECEMBER ISSUE #99



The pgas meets next at 7:30 pm  
WEDNESDAY January 26 at CNC

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*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  
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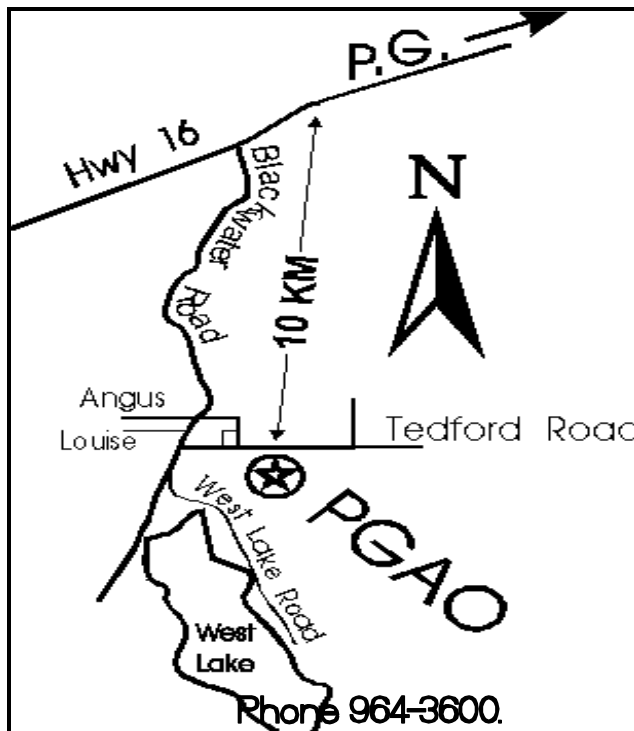
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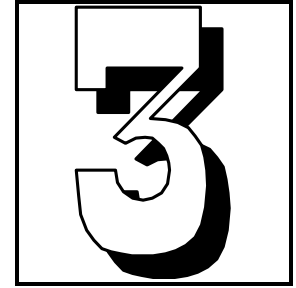
**PeGASus Editor**  
*Gil Self*



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

# Editorial

by Gil Self



Likely, by the time you read this, that wonderful Christmas dinner will be leftovers, the wrapping paper will be cleaned up and you will be sitting back wondering how soon you can take the tree down and get the house back to normal. However, this year there is still one more really big event, all the rest pale by comparison.

'Twas the night before New Year's and all thru the land,  
the coneheads are dreading Bill's bomb, so unplanned  
you tuck yourself in all safe in your bed  
while four digits dates dance in your head  
But into the load sequence there arose such a racket!!  
you run to your server - No!! Not a crashed packet!

Only dreaming! thank goodness - but now you must know  
just flip the switch and watch the screen glow  
Up config system, up auto exec bat  
on! win ini ! I cursed and I pleaded  
Run that system ini and startup group too  
you hold your breath hoping you're not in doo-doo

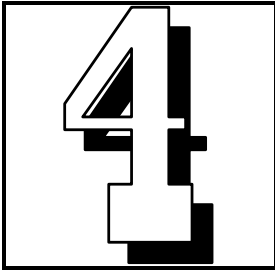
Then, up on the screen, the windows splash appears  
complete with the Ta Da! wav - just for your ears  
How could you have doubted? the patch worked just fine  
Now.. will it still work on Feb 29??

You might recall my comments a few months ago regarding the majority of the population considering December 31 1999 the last day of this century / millenium. You might also remember my suggestion ' lets go along with the majority this year, the purists next year and enjoy both celebrations". Well recently I received an E-mail from an unimpeachable source. This highly respected individual said and I quote .....

“ If you look into astronomical data sets calculated way back in the past, there IS a year 0. Astronomer, being people knowledgeable in mathematics, know about the real number line. In integers, it goes ... -2, -1, 0, 1, 2, 3, ... Therefore the 0th century (as it should be called) started at 0 and ended at 99, the 19th century (as it should be called) started at 1900 and ended in this year. Logical? I think so. “

That's good enough for me , I am opening my bottle of Champagne this year, how about you? I will come up with another good reason for next year. This is a significant , notable time in history. Savor it, enjoy it, — remember.

Clear Skies  
Gil



## 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 January 26 2000  
7:30 pm at CNC*

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### **The Night Sky for January 2000**

**by Bob Nelson, PhD**

Hi Folks,

As I write this, I'm huddled in my little hovel in the basement (my den) over my laptop (my desktop is away being fixed and upgraded). Last night I tried my new SBIG ST9 CCD camera for the first time on the 24" telescope (the smaller telescopes are just too flimsy at the moment). It performed well, but the focal ratio is still a little long at f/12. I did get some nice pictures of Jupiter using blue, green, red and infrared filters which I hope to combine into a nice colour image. We all look forward to the f/4 Newtonian focus which should match the new camera very well.

Anyway, this article is supposed to be about the sky, so here's what is predicted to happen in PG Skies in January (of the new millenium -- there WAS a year 0; check Tuckerman's catalogue of ancient celestial positions!):

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

#### **PLANET ROUNDUP**

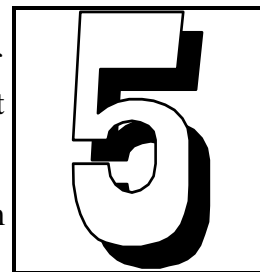
**MERCURY**, is lost in the glare of the Sun this month as it passes from being a morning object to becoming an evening object (watch for it in a month or so). Superior conjunction (when it's directly on the other side of the Sun) is on January 15.

**VENUS** is a morning object all month. On the first, it rises about three hours before the Sun; by the end, that has shrunk to less than two hours. All month, it's a 13-15" gibbous blob of magnitude -4.0 or so.

**MARS**, in Aquarius all month, is an evening object in January and is a 5" disk of magnitude 1.1. It's low in the southwest at sunset and sets about four hours after the Sun. It's just a blob from these latitudes.

**JUPITER**, in Pisces all month, is an evening object setting at about 2:00 AM on the first of the month and at about 12:15 AM by the end of the month. On January 1st, it's a 43" disk of magnitude -2.5; this diminishes somewhat by the end of the month. Still a magnificent sight.

**SATURN**, in Aries all month (and until the end of May), is an evening object setting at about 3:20 AM on the first and 1:20 AM by the end of the month. It's a 19" disk of magnitude +0.2 or so -- also a magnificent sight.



**URANUS**, in Capricornus all month (and until the end of March), is an evening object setting about three hours after the Sun on the first, and less than half an hour by month's end. It's a 3" disk of magnitude 5.9.

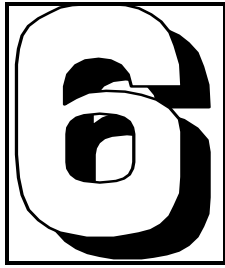
**NEPTUNE**, in Capricornus all year (and for the next few years!), sets on the 15th about 1 hour after the Sun. As usual, it's a 2.3" disk (starlike here!!) at about magnitude 8.0.

**PLUTO**, in Ophiuchus all year (and for the next few years), is a morning object all month as the Earth catches up to it in its orbit. On the 15th, it rises about four hours before the Sun. As usual, it's a starlike object of magnitude +13.9.

**CONSTELLATIONS** to look for in January (at 9:00 PM, PST) are Eridanus (a sparse constellation just south of the celestial equator), Orion, Lepus (which has M79, a magnitude 8.4 globular cluster), Monoceros (which straddles the Milky Way and contains M50, a fine open cluster), and, further south, Canis Major.

**Eridanus** (Eri, "The River"), being out of the Milky Way, contains a few galaxies (NGCs 1308, 1407, 1332, 1395, 1637, 1084, 1281) but little else. Although the start (end) of the "river" lies just to the southwest of Orion, it extends way to the southwest, all the way to Achernar, (Alpha Eridanus) "The Star at the End of the River". Achernar's a main sequence star of visual magnitude 0.53 and spectral type B5 (bluish, surface temperature 14,000 K). At declination -57.5 deg, it can never be seen in Prince George -- you have to go below 32 degrees latitude (southern U.S.). Achernar lies about 120 light years from us.

**Orion** (Ori, "The Hunter"), is well known to every astronomer straddling as it does the celestial equator with its famous three stars in a line -- the belt of Orion. Suspended below the belt is the famous Orion Nebula, M42. This object, lying about 1600-1900 light years away, is illuminated by the four hot stars of "The Trapezium"; the light you see is mostly fluorescence (re-emitted light in the visual -- largely hydrogen alpha at 656 nm). This object is surely one of the most spectacular objects that you can see in our 24" telescope; as you might imagine it has been widely studied by profession and amateur astronomers alike. It has been found that the nebula is quite young -- the Trapezium stars started to radiate around 23,000 years ago; the nebula (consisting as it does of dense gas swirling around) is thought to be creating stars at the present time. The four stars of The Trapezium (Theta Orionis A, B, C, and D) are actually part of a multiple star system consisting of eight stars (A-H). Star C is the true primary star at magnitude 5.1 (spectral type O6 -- 44,000 K, 40 solar masses); separation of the four stars is from 8.7" to 19.2". Star B is a 6.471-day eclipsing binary; star A is also, with a period of 65.432 days and a primary eclipse that lasts 20 hours! (No, I don't want to study this star!! A bouquet to those that had the patience to do so!) According to Burnham, The Trapezium may be part of an expanding association (i.e., a very loose cluster) of stars; extrapolating back, one finds the age of the cluster to be about 300,000 years -- making it one of the youngest clusters known. The Orion Nebula also contains more than 50 other variable stars, many of them of the T Tauri class -- young stars emerging from a dusty cocoon.



**Lepus** (Lep, "The Hare"), lies just to the south of Orion and contains the globular cluster M79 (90,000 solar masses, integrated absolute magnitude -7.6, distance about 50,000 light years) but little else.

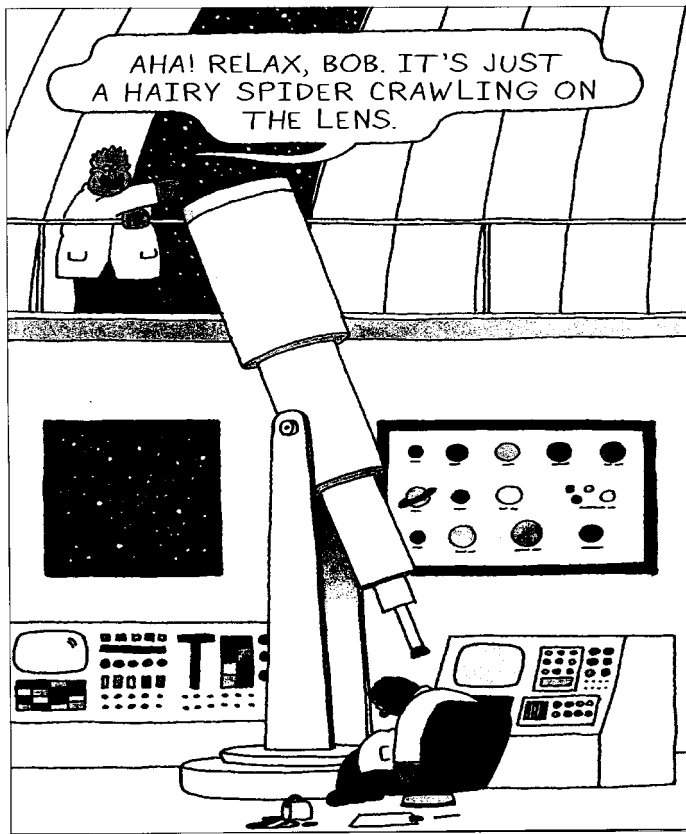
**Monoceros** (Mon, "The Unicorn"), lies in the Milky Way just to the east of Orion and contains many open clusters, too numerous to mention. It contains Plaskett's star, a binary system usually regarded as the most massive pair of stars in the Galaxy; it was studied by Joe Plaskett at the DAO in Victoria in the early part of the last century (that is early 1900s!! -- ha!). The system, which does not eclipse, is of the Beta Lyra type (tidally distorted close stars); the period of revolution is 14.414 days; the stars are O-type likely having 40 and 60 solar masses. There is an apparent violation of the mass-luminosity function in that the brighter star has the lower mass; likely there was mass exchange sometime in the past. The distance is about 2700 light years. Monoceros also contains M50, a fine open cluster, NGC 2237+2244, "The Rosette Nebula", NGC 2261 ("Hubble Variable Nebula"), NGC 2264 ("The Christmas Tree"), and "The Cone Nebula". Read all about it in Burnham's.

**Canis Major** (CMa, "The Big Dog"), contains a few variable stars and open clusters (including M41). Its chief claim to fame is that it includes Sirius (Alpha Canis Majoris), the brightest star in the night sky, at Johnson visual magnitude -1.44. Sirius is a white main sequence star (Sp: A0 V, size: 2.35 solar masses, 1.8 solar radii, surface temperature 10,000 K, luminosity: 21.8 solar units, distance: 8.60 light years). It is also known to be a visual binary (orbital period 50.09 years, semi-major axis 7.62") having for a secondary a white dwarf, thought to be one of the hottest (and therefore youngest) known. The plot thickens in that it was asserted by a Professor See in 1892 that Sirius was a red star in ancient times (statements were made to this effect by the ancient Greeks Cicero, Ptolemy and others). It seems likely that Sirius was a red giant as recently as 2000 years ago; however this contradicts what we know about stellar evolution -- the transition from red giant to white dwarf should take about 100,000 years, not 2000. Although some astronomers have proposed mechanisms that might explain short transitions, Burnham is of the opinion that human colour sensitivity has changed over the years and cites examples to support this theory.

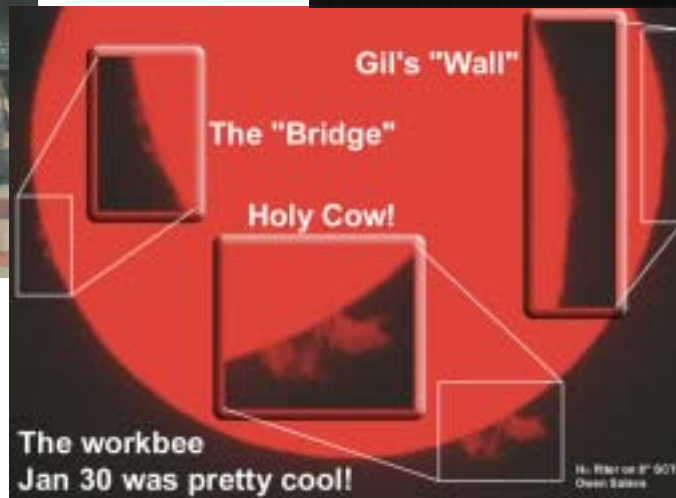
The apparent orbit of Sirius A and B (the white dwarf) is such that they passed periastron (closest approach) in 1994; in 2000, the separation will be around 5.5" -- easy except that Sirius A is so bright that it obscures the secondary (you need to have good seeing and special measures to see Sirius B). It should be relatively easy in 2019 when the separation reaches over 11"!

Clear skies

Bob



A birthday card Bob Nelson  
 received  
**Happy Birthday Bob**



## HOROSCOPE FOR ASTRONOMERS

As we approach the Millenium, society is going through a period of anxiety. Perhaps we should seek reassurance in the stars. Vince Hogan found this horoscope for sceptical astronomers, for December 1999, in one of his obscure astronomy magazines. He found it amazingly accurate. How do they do it?

AIRES\*\*March 21--April 19

Personal relationships are highlighted now--focus on important people. Call your club's newsletter editor, and volunteer to write articles for the next 6 months. Later, over an intimate dinner, surprise your partner by not talking about astronomy.

TAURUS\*\*April 20--May 20

Act now on those financial impulses. Invest heavily in a proposed Edwin Hubble Psychic Hot Line, where callers, for only a small fee(per minute), can have a channelled conversation with the leading giant of American Astronomy, speaking from a parallel universe, reached through a wormhole.

GEMINI\*\*May 21-June 20

Like your sign, two heads are better than one. This is the perfect time to discuss with your Observing Director that embarrassing incident involving the water jug, the computer and the bats during your last observing session in the dome.

CANCER\*\*June 21--July 22

Money, Money, Money. Watch those credit card balances, don't let those Internet purchases at telescope shops explode like a super nova. The signs are also right to ask if your partner will consider getting a second job. Join your club's annual fund drive, with this year's motto: *"Please give, so that a middle aged man can see the stars!"*

LEO\*\*July 23-August 22

The Planets hover over you. Jupiter, the Giant, is high in the sky--you must start dieting before objects are drawn into your gravitational field and start crashing into you. As well, Pluto remains temporarily inside the orbit of Neptune before it departs for the outer solar system. Beware a job transfer, far far away from head office. You could find yourself facing an icy companion at home.



VIRGO\*\*August 23--September 22

Like Leo, the Planets govern your life. Uranus is on its side and out of view, and you should be too. Spend your days in bed in a darkened room with only a red light for company--your night vision will thank you for it.

LIBRA\*\*September 23--October 22

Meteor showers in your quadrant highlight your brilliance. Witty repartee with friends and tour groups at the observatory, facts, figures, cosmology, all are within your grasp. The only caution--avoid disparaging remarks about religion, UFO's and astrologers, which are danger areas for you.

SCORPIO\*\*October 23--November 21

Emphasize your love aspects. Take advantage of the long evenings for starlit walks with your loved one, ending with steaming cups of hot chocolate and marshmallows, at your backyard telescope. Book a special trip to Hawaii or Arizona, where romantic, secluded Bed and Breakfasts offer uninterrupted access to their 14" Dobsonians, located right outside the bedrooms.

SAGITTARIUS\*\*November 22--December 21

The Pleiades will soon depart the night sky. Watch for a speeding Subaru, possibly leaving the scene of an accident with your car. Other signs are confusing; somewhere something will happen.

CAPRICORN\*\*December 22--January 19

Your bad luck continues. Levy-Schumacher impacts Jupiter--Cloudy. Lunar Eclipse--Cloudy. Solar Eclipse--Cloudy. Meteor showers--Cloudy. 10km asteroid crashes into Tabor Mountain in daylight--perfectly clear.

AQUARIUS\*\*January 20--February 18

Enjoy the holidays. Christmas shopping for a hydrogen-alpha filter for your spouse, astronomy flash cards for the kids, assorted lenses for stocking stuffers, this is *your* season to be jolly.

PISCES\*\*February 19--March 20

The Full Moon--the Huntress--will be your guardian. As she is occulting Alderbaran, celebrate by dressing in black, then accessorize your parka with red and white. In the evenings be sure to sparkle!

V.H.

10

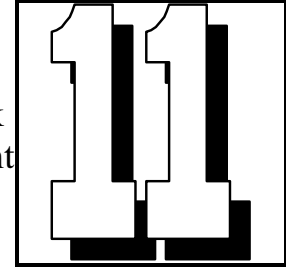


Jack Newtons B&B  
under construction on  
Anarchist mountain.

and the “other” view from  
the site  
Brian Battersby



## Cheaper Faster Better



Gil wanted something lite to write about. I couldn't think of anything. Then I remembered! This is old news, but I thought I would just bring it up and get you guys all upset and depressed again. **The Mars Polar Lander. (MPL)** Launched Jan 3 1999, touch down Dec 3<sup>rd</sup> 1999. That's less than a year travelling time. It takes me longer to drive to Vancouver. Earth's orbital velocity around the Sun is 30 km/sec, by going about 3 km sec faster than Earth's sun orbital speed, a space ship will enter a elliptical orbit which will rendezvous with Mars half way through its orbital period. The least energy equation would show the spaceships elliptical orbits period to be 1.41 yrs. At half this period the distance traveled would be about 727 million kilometers at 32.7 km/sec. This window of opportunity occurs just once every 2 years. According to the launch date the spaceship traveled almost a year, so it was a type 2 trajectory that travels more than 180 degrees. So 950 million kilometers is a closer guess. This longer trip allowed the MPL to approach the south pole of Mars Also the Mars Polar Lander had a type 2 trajectory. Which allowed it to travell greater than 180 degrees of the eliptical orbit. So it travelled farther at .92 years not .7 years. This allowed the space craft to approach the south pole of mars. The Mars path finder did a type 1 trajectory and took closer to . 7 years.

The **MPL** had many experiments on board, 2 deep space micro probes, which were surface penetrators, Thermal evolved gas analyzer (TEGA), Mars Volatiles and Climate Surveyor (MVACS) and they even had a modified hearing aid microphone packaged with the Russian experiment. But its main mission was to look for water, therefore its landing spot was targeted near the South Pole of mars. A previous spacecraft perhaps burnt up in the Martian atmosphere due to some of their program being imperial and some in metric. Hey that wouldn't happen in Canada eh, the Americans should have jumped on the bandwagon when we went Star Trek conversion. Any hoo a similar scenario could have happened to the **MPL** assembly although not necessarily a metric/imperial problem , but perhaps not enough communication and testing prior to launch.

The Mars Polar Lander was part of the budget cuts new philosophy **Cheaper Faster Better**. Personally I think the Idea is great. After all we only lost 165 million. If we had a big budget we could have lost billions. So the system works. Look at those big budget programs of the 70's like the Viking Landers. In today's dollars they would have cost several billion dollars. Wait there's more they made 2 of them. Those scientist thought they were pretty hot with all those redundancy systems, exhaustive tests, unlimited budgets. I think they even had the Viking's orbit Mars a few times to check the systems out before landing.

Excuse me ohhh, sorry I've just been informed those missions were both



successful. Okay my history is weak, but still look at the money they spent, and the \$\$\$ we saved.

Oh yeah-important discoveries do occur when missions are successful. But with the much cheaper unsuccessful missions we could replace knowledge with more theories. Theories are way cheaper, in fact most are free.

I'm sure one of the **Fringe Mars societies** has one for the **Mars Polar Lander**. Let me see it would probably go something like 1 of 2 scenarios 1. The mars Polar lander was shot down over the South Pole of mars by Orson wells like creatures. Or 2. The mission was so successful that they had too cover up their **discoveries**. Knowledge of these discoveries would cause all of humanity to go **stark raving mad**. Of course we all know what knowledge could cause instant madness. That would be the knowledge that we are not alone, ahhh I said it ( please erase the last few lines from your data banks).

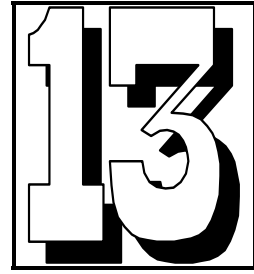
All puns put aside I think NASA would kill for even a microbe of life proven from mars. It would mean NASA would get almost unlimited budgets from the government. If the Fringe theory is right and they discovered Intelligent Life, then one would have to logically deduce they would have to at least let the government know about their discoveries and just keep this knowledge away from us mere mortals.

This would allow a humongus flow of money to pour into **NASA's** pockets . Now **NASA** could proceed with very big ambitious projects. But wait big projects mean larger pay loads, that means bigger rockets. It would be pretty hard to launch any rocket secretly, let alone a Saturn-V class rocket. Perhaps they could launch them at night when everybody is asleep, NASA could sneak up to everybody's home for 1000 square miles put tin foil and cotton batten on their windows.

Oh yeah My theory.. well I just think the computer crashed.....along with the spacecraft.

*Steve Senger* < ssenger@netbistro.com >

## The Saga of Mr. Spot by Bob Nelson



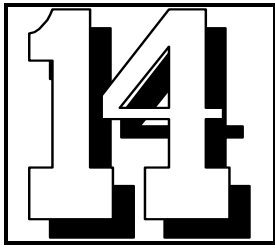
This article is not so much about astronomy as it is about science. Please bear with me.

Last summer, while at the Riverside Telescope Makers' Conference in California, I bought a laser pointer. I've always wanted one, it was fairly cheap, so why not? It would be useful during the occasional public presentation I make now and then.

What I didn't know at the time was the enormous fascination that it would hold for our two cats -- they are completely mesmerized by it!! I can turn their little heads any way I want, I can make them run up and down the hall attempting to snag it (it never happens) and I can make them run around in circles. They never seem to get tired of it. Aside from being a fine toy (for both me and my cats), it occurred to me that it is also a fine probe of cat senses, behaviour and intelligence.

I have learned the following things about cats:

1. Their vision is quite acute (this is well known). But I can also probe their range of vision (it's about 180 degrees, side to side, similar to our vision), the ability they have to follow a moving object (not as good as you might think) and their night vision (superb, as is well known) -- they have no difficulty dashing up and down a darkened hallway after the spot. I had thought that I should be careful not to let them bump into things, but they are quite careful in this regard.
2. They have wonderful memories. The Pavlovian response is very evident in that both of my cats quickly associated the jingle of my spare key set (to which the laser pointer is attached) with "Mr. Spot". They both remember my habits and know when I'm about to bring out the laser pointer (they move their heads about searching alertly for the spot before it appears). However, they cannot distinguish the sound my spare set makes from the one my main set makes (it has a different ring). The fact that cats have good memories makes evolutionary sense in that cats [ 14 ]



(like all predators) have to remember patterns of events, where that prey often appeared, etc. Those that couldn't, wouldn't survive.

3. Their hearing is very acute (which is also well known). If I jingle my keys anywhere in my house, they come running. I'll have to try it down the block next summer.

4. They are very patient. After I put away "Mr. Spot", they often hang around looking for the spot, sniffing the floor, etc. (This ties in with evolution in that cats have evolved to be patient to catch prey.)

5. Their reasoning power is just about zilch. They think the spot is a material object. If it runs up the wall, they expect to see it coming down the wall and are always surprised to see it re-appear somewhere else. They can never understand that if they lunge at it, all they get is air.

This brings me to my last point. The cats, of course, have no idea what the bright red spot is. They cling to what they know (or what is instinctive within them). If it's an object, they should be able to pick up its scent, grab it with their claws, etc. As I mentioned before, if it disappears somewhere, it ought to reappear near there.

Now if there is such a thing as extraterrestrial intelligence, they could really play around with us humans using science and technology that we have no conception of. We'd be like the cats, expecting that the apparitions they show us would be like things we already know. Could it be that flying saucers (if they exist) are really like some kind of laser pointer, in that they are apparitions and not material objects at all? Could the ETs be merely playing around with us (and having a good laugh in the process)?

That is why I call the laser pointer "Mr. Spot" -- it's a takeoff on "Mr. Spok" of "Star Trek" fame.

B.N.

Owen reminded me that RASC provides deep discounts for purchases of 5 and up for their Observers Handbook and calendars. For example the handbook goes from \$23.49 to \$14.45 if you purchase 5 or more. Come to the January meeting ready to order and we will put a bulk order together.



## ***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.*