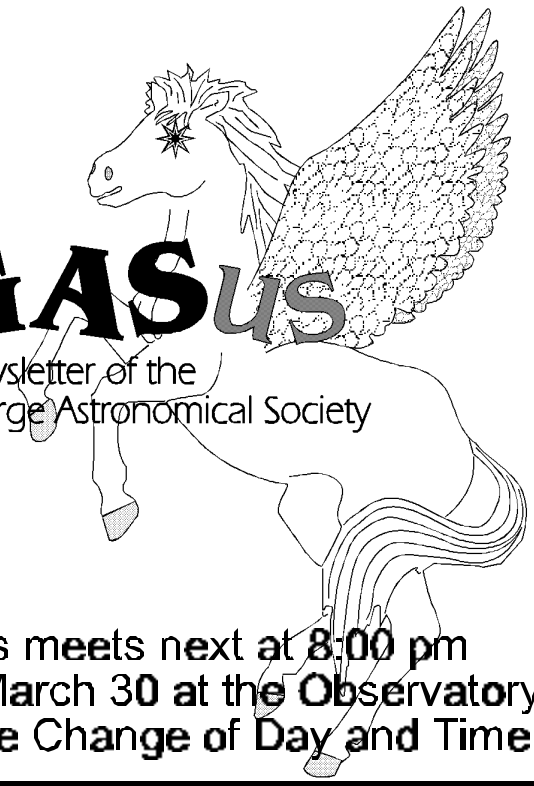
1999 MARCH ISSUE #92

the PeGASus

Newsletter of the
The Prince George Astronomical Society



The pgas meets next at 8:00 pm
TUESDAY March 30 at the Observatory
Please Note Change of Day and Time

INSIDE :

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

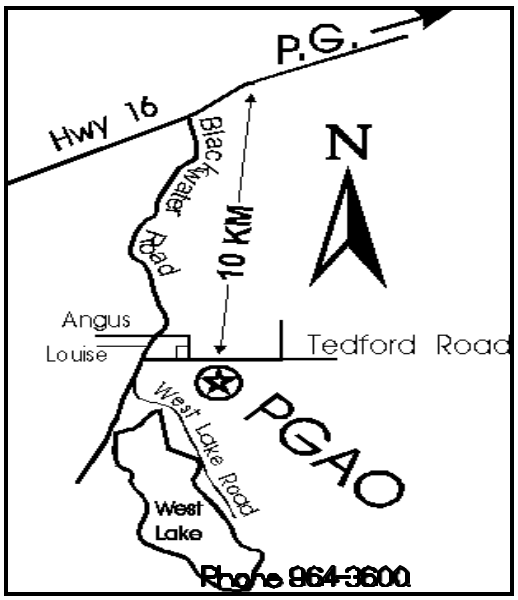
Our pursuits are out of this world.
Our activities are astronomical.
Our aim is the sky.

Contributions to the newsletter are welcome.

Deadline for the next issue is

APRIL 16

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



Prince George Astronomical Society Executive, 1998/99

President
Bob Nelson
562-2131/563-6928

Vice President
Jon Bowen
563-9869

Secretary
Brian Potts
562-8113

Treasurer
Steve Senger
964-1202

Members at Large
Gil Self 964-7279
Owen Salava 964-3289

Appointed Directors

Technical
Bob Nelson

Program
Gil Self

Observing
Brian Potts

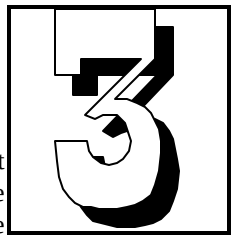
Promotional
Brian Battersby

Building
Owen Salava

PeGASus Editor

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

Editorial



By Gil Self

I might be "jumping the gun" just a tiny bit, but I wanted to let you know about the initial results we are getting after all the work on the telescope. I should really be letting Bob N. tell you about all the improvements, since he is mostly responsible, I really just handed him tools and a few ideas. But come to the meeting on March 30 and Bob will fill us in on the details.

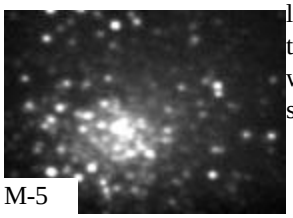
Meanwhile— at the bottom of this page you can see some examples of what we could do before. The images are good but not what you would expect of a 24 inch telescope. On page 7 you will find 6 new images, I think the improvements are easy to see, first and most important much improved resolution . The globular clusters are clear and defined - compare old and new M-13 or M-5. If you look at the old image of M-42 you will see very little nebulosity, at the point that you begin collecting enough light to see the fine detail the bright stars are over-saturated. In contrast, the new image of M-51 is as good as any I have ever seen. The image is a much wider field taking in almost the entire galaxy, not just the core. But look at the detail, the knots and whorls in the star cloud are clear, the improved focal ratio means much better contrast. This is not the place to analyze these photos, nor am I up to the task..

Bob took these pictures over the last two weeks, and I think they demonstrate the quantum leap we have taken. Now we have a tool we can work with that will produce the high quality results needed for the research projects we have planned (I think I recall hearing Bob say he had already caught a couple of asteroids). And on a more whimsical note I have been wanting to try color imaging some galaxy's. Over the next few weeks as we refine our skills and learn to pull all the detail out of our equipment I think we will see some first-class images

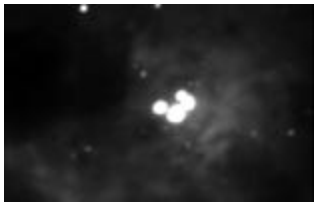
Another one of the objectives of the improvements at the observatory was to demystify the equipment. Most of these changes have been made or are just about complete. when all is in place we will be operating several computers all linked together. You will be able to pick a target from a sky map one one screen while seeing where the telescope is pointing on another screen. You can acquire an image on a much simplified system and then transfer it to another computer for processing, you can even e-mail it to yourself for processing at home. We also should soon have a video system so several people can see what the telescope is looking at, and as a video imaging system. The obstructions to all these improvements were " Time - Equipment - Money". We are whittling away at each of each of them and very shortly should see some great results.

Clear Skies

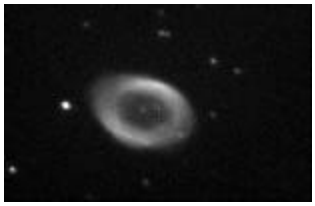
Gil



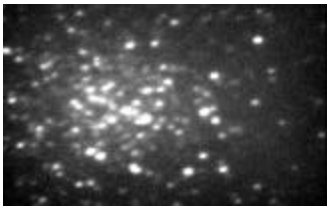
M-5



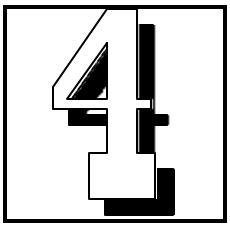
M-42



M-57



M-13



Coming Events

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

March 30 PGAS meeting 8:00pm at the Observatory

March 27 April 24 May 22 —Shoot the Moon, see Brian Potts

The Night Sky for April '99

by Bob Nelson, PhD
Hi Folks,

Well, by the time you read this, spring will have arrived. Hurrah! Now we can look forward to better weather (we hope) but later nightfalls as the Sun rises higher in the sky and Starlight Wasting Time comes again (boo, hiss!). By act of the U.S. Congress, daylight savings begins on the first Sunday in April (at 2:00 AM local time) at which the clocks are set ahead to 3:00. It ends (and not a moment too soon) on the last Sunday in October (at 2:00 AM, at which time, the clocks are set back to 1:00 AM). Read all about it at http://weather.wsmr.army.mil/daylight.htm. Arizona, Hawaii and Indiana do not comply (but of course, we in Canada follow along faithfully except for the Peace district and Saskatchewan). How do we change this?

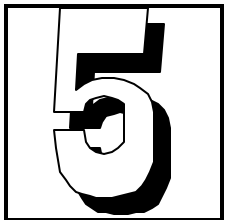
Anyway, here's what's happening in our skies next month:

MERCURY is a morning object this month but is not observable by northern observers. (It rises half an hour before the Sun on the 1st but that falls to 20 minutes by the end of the month. It reaches greatest western elongation (of 28) on the 16th .)

VENUS is still an evening object (and will be until late August). On the 15th , it's a 15" disk of magnitude -4.0. Throughout the month, it's in the gibbous phase but increases slowly in brightness and size. Also throughout the month, it sets 3 1/2 to almost 4 hours after the Sun. On the 11th, look for it near the Pleiades.

MARS, in Libra (until April 16 when it moves into Virgo), rises at 9:20 PM on April 1 and 7:35 PM at the end of the month. It grows from a 14" disk at magnitude -1.1 to 16" at magnitude -1.6. Opposition (when Mars is 180 away from the Sun) occurs on April 24.

JUPITER, in Pisces all month (except when it briefly dips into Cetus), is lost in the glare of the Sun in April.



SATURN, in Aries all month, is a 16" disk of magnitude 0.3 to 0.4. On the beginning of the month, it sets about 2 hours after the Sun but by the end, it sets before sunset. Look for it in the west early in the month just after sunset.

URANUS, in Capricornus all year, is a morning object. On the first of the month, it rises about an hour before sunrise, but by the end, it rises about two hours before sunrise. As usual, it's a 3" disk of magnitude 5.8.

NEPTUNE, in Capricornus all year, is also a morning object. (Two cheers for the morning people!) On the first of the month, it rises about two hours before sunrise, but by the end, it rises about three hours before sunrise. As usual, it's a 2.3" disk at about magnitude 8.0.

PLUTO, in Ophiuchus all year, rises on the first at about 11 PM (PST!!) and rises on the 30th at about 10 PM (PDT!!) As usual, it's a 0.1" disk (i.e., starlike) at magnitude 13.8

CONSTELLATIONS to look for in April (at 10 PM, PDT) are Central Hydra, Crater (Crt), Sextans, Leo and Leo Minor.

Central Hydra ("The Sea Serpent", not to be confused with Hydrus, "The Water Snake") is out of the Milky Way and contains two galaxies: NGC 3585 and 3621. The former is a 5.6' ellipse of magnitude 10.8; the latter, a 12' ellipse of magnitude 10.0. Easy pickings for our 24" telescope.

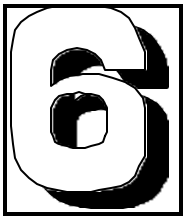
Crater ("The Cup") contains no galaxies, star clusters or nebulae. (My cup is empty! Ooooh, do something with that man!).

Sextans ("The Sextant") contains only the galaxy NGC 3115, a 7.3' ellipse of magnitude 9.8.

Leo ("The Lion") is familiar to most of us. It's a constellation that actually resembles what it's supposed to be. The head of the beast, otherwise known as 'The Sickle' contains at its base the first magnitude star Regulus (spectral type B8, main sequence). It also contains numerous galaxies (almost to many to mention) M65, 66, 95, 96, 105, plus NGC 3628, 3384, 2903. Those from the first group are typically 10th magnitude and 5-10' in size. The latter group are generally fainter, typically 11th magnitude (NGC 2903 is 9.5) and smaller 3-5' (NGC 2903 is 12.5'). Note that M65 and 66 is a famous pair visible in the same field of view.

Leo Minor ("The Little Lion") contains galaxy NGC 3344 (10.4 mag, 7.2' in size).

Anyway, there's a lot to look at, and a lot of new images to take with our new CCD setup..



APRIL 10, 1997

by Vince Hogan

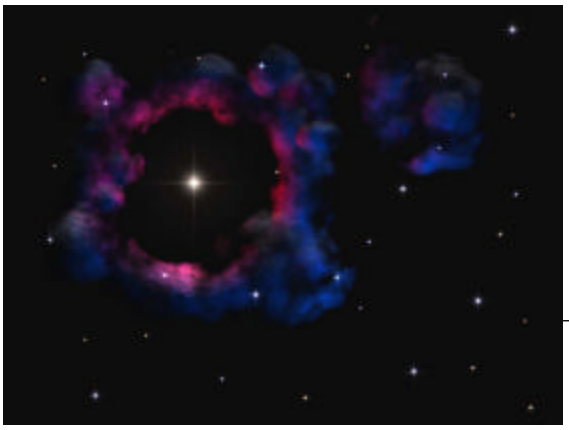
This spring, at open houses, and other evenings when members have been at the observatory, we have had some wonderful conversations recalling the nights of March and April 1997 when Hale-Bopp was present. There were many successive clear nights for observing, and the public was so enthusiastic we had long lineups and crowds during our open houses.

My favourite night was Thursday April 10, 1997 because of the number of events that occurred in one short evening. It was clear, -5C,with some smoke on the horizon from slash burning. Despite haze right on the western horizon, Mercury was visible just at sunset. Mars, which was at perogee the night before, was very bright under Leo, in the eastern sky. Several club members were present, and althought it wasn't a public night, we also had several visitors.

Hale-Bopp was in the north west, near Algo in Persus, and as the evening started it looked like we would be able to see two tails, as the sky got darker. Through the 24" Hale-Bopp was surrounded by waves of gas, much like the bow of a ship. About 9pm we suddenly realize the waxing crescent moon, in the wast, was going to pass in front of Alderbaran, in Taurus. Bob Nelson had his astronomy class from CNC at the observatory for a session, so they all came outside as well. We watched as Alderbaran passed behing the dark lunar limb, and then later as it popped out from behind the sunlit crescent. That really was exciting, as we had all been so busy focussing on Hale-Bopp that no one had bothered to notice that this was scheduled to occur this evening. It, therefore, had the special excitement of an unexpected surprise.

We never did see Hale-Bopp's long dust trail develop that night — it had stretched from below Algo all the way to the Double Cluster in Persus, by 11pm the night before — because a vigorous display of Northern Lights commenced at 9:30pm. There had been a big storm on the sun during the preceeding 24 hours, and, as a result the Aurora covered three-quarters of the night sky, from the nothern horizon to just south of Leo and the Eclipitic. Normally, an appearance of the Northern Lights, which spoiled the view of a comet's tail, would be poorly received by the club members. Probably because we hd so many spectacular views of Hale-Bopp, and the Nothern Lights that night were so varied, no one voiced any disappointment. Dancing lines, large fiddle head structures, and the bands of faint colour went from west to east until about 10:30pm, when they subsided into a subdued haze.

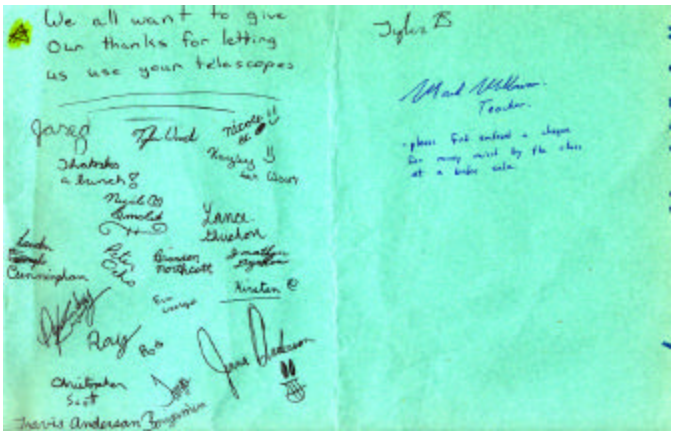
It really was a memorable evening.

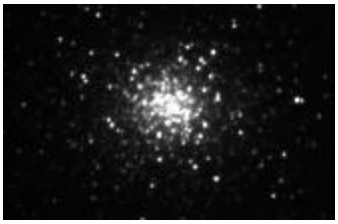


7

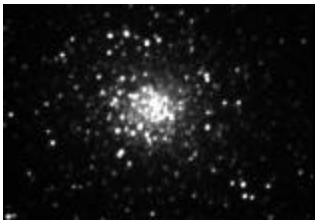
from the P.G.S.T. Science Centre
—— ask Jon

Last fall we had an open house for Mr. Moldowan's grade 7 class from Seymour school. They had a bake sale for us and sent a cheque for $83.00,,,,Thank-you from the PGAS.

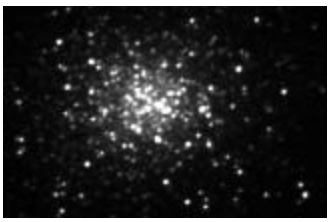




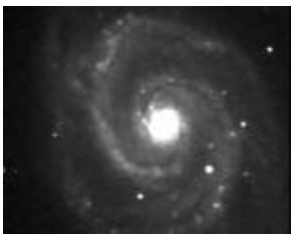
M-3



M-5

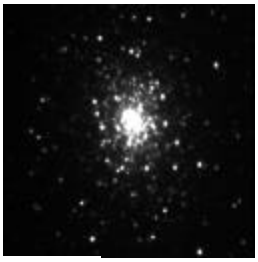


M-13

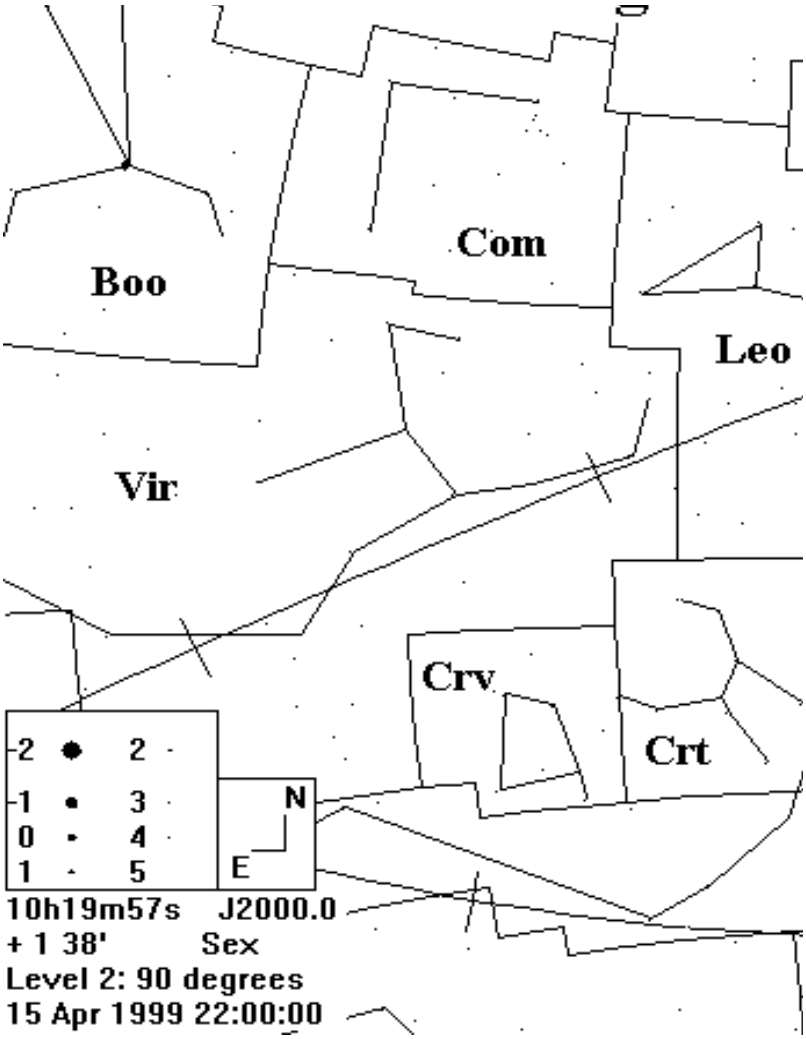


M-51

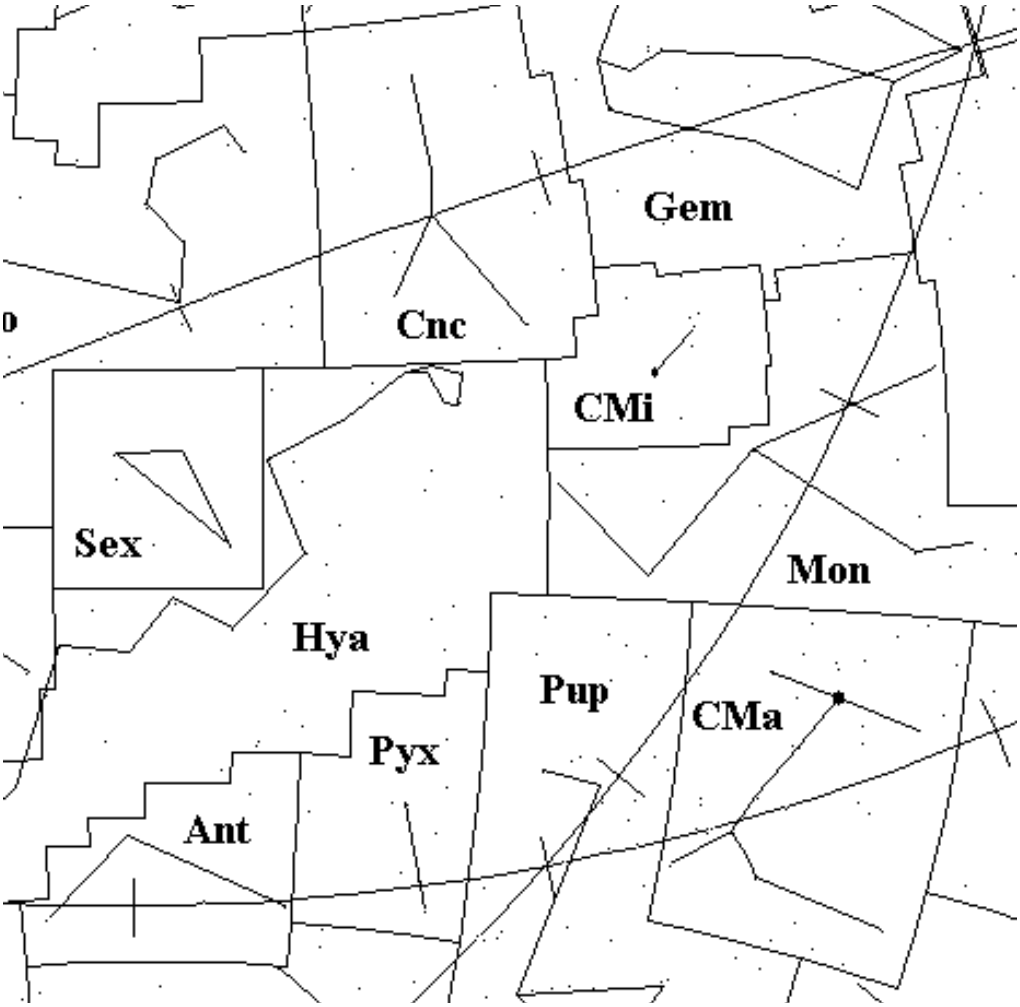
M-57



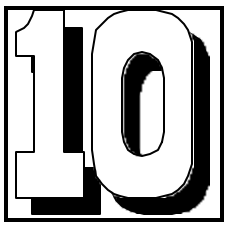
M-92



April 15 Skys for Prince George courtesy Dr Bob Nelson



April 15 Skys for Prince George courtesy Dr Bob Nelson



Childhood Memories of a Not-So-Famous Scientist

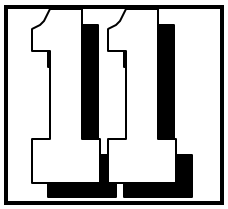
by Orla Aaquist
Keyano College, Fort McMurray
Orla.Aaquist@keyanoc.ab.ca

I am not a famous scientist, although my plan out of high school was to become one. We sometimes read about how famous scientists were first inspired to pursue science as a career. In the quiet of my basement office, while waiting for research to happen, I began to ponder the events that determined my destiny. How different is my background compared to someone more renowned in the field, like Einstein or Feynman? Do famous scientists have a more colourful or interesting childhood than scientists who are not so famous? More to the point, "Why the hell am I not a famous scientist?"

As soon as I posed the question, however, I realized that this was not something I could answer in a few thousand words, nor in the timeframe required for the completion of this column. To answer such a question, I would have to study the childhood memoirs of many famous scientists, and then I would have to interview many *not-so-famous* scientists and summarize their backgrounds. Then I would have to formulate some basis for comparison and write a paper or a book on my findings entitled, "**A Comparison of Childhood Memories of Not-So-Famous Scientists with Those of Famous Scientists**." This project would require me to travel extensively, seek out many not-so-famous scientists, extract their childhood memories, and write them down. God, what a task! But wouldn't it make an interesting project? Wouldn't you want to read such a book?

Perhaps I can start by printing a brief account of my own childhood. Perhaps this will inspire others to summarize their early memoirs and send them to me for analysis. Perhaps I will obtain many responses and I will write a paper wherein I come to understand my own lack of success as a scientist. Perhaps the paper will make me famous, and I will join the ranks of *Famous Scientists*. In doing so, will I have invalidated my own research and lose my fame, thereby … becoming a famous barber who shaves everyone who do not shave themselves?

Until I was 18 years old, I did not know that I wanted to become a physicist, and



it wasn't until I was 33 that I decided to study astronomy. It was pure coincidence that I fell into radio astronomy. I was off to a late start.

At the age of 17 I wanted to be a chemist because I had been playing with chemistry in my parent's basement since the age of 14. The love of science had come to me at the ripe old age of 13 in grade 8 science while dropping paperclips into a beaker that was already full of water, but seemed, somehow, to hold an unreasonable number of paperclips. I thought that the paperclips fit between the molecules of water. You see, I had not yet discovered surface tension, and I didn't notice the build-up of water at the rim of the beaker. At the age of 13, paperclips fitting between molecules of water is a much more appealing theory than surface tension.

Before the age of 13, my only scientific pursuits were in the field of reverse engineering and examining the effects of light refraction through a magnifying glass. When I was 11 years old, I received my first wristwatch, a new Timex. My older brother, Bent, got one too. After only a few days, his watch broke. When he wound it up, the minute and hour hand raced furiously around the face of the watch. I was so jealous! I wanted him to trade, but he worked on the principle that any opportunity to torture and tease a little brother cannot go denied. So I set out to discover how my watch could be made to function in a similar fashion. That very afternoon, I ran up to my mother in great excitement proclaiming, "Look mom, my watch is now just as good as Bent's." She was not nearly as pleased as I was.

As for the episode with the magnifying glass, at an age of 9 or 10 I determined that a magnifying glass could focus the rays of the sun and burn holes in dark, dry things. In particular, carbon paper could be made to burst into flames in just a few seconds of exposure. I spent many happy hours discovering what would burn and what would not. For example, white wet things hanging from a clothesline were not so easily affected by the heat-ray as dark, scurrying things. At one point I wondered just how long it would take for the white wet things to be scorched. I suppose that this was my first real experiment. My mother never did catch me, but I do remember her wondering about several small holes in her new sheets.

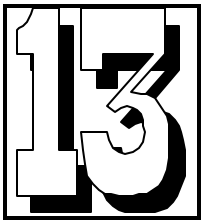
What led me to this process of experimentation? It may have been my study of projectile motion a year earlier at the age of nine. This happened during a warm summer day when I borrowed my brother's new BB gun. It looked just like a Winchester rifle. You cock the lever below the trigger and the gun is loaded. A BB (a round pellet of copper) falls into the base of the barrel and air pressure builds up in a chamber. When you pull the trigger, the pressure is released and the pellet is forced out of the barrel to travel in an arc towards the target. Two things became obvious on that summer day. The first was a basic principle of projectile motion, "In order to hit the target you have to aim above the target". The second

was Murphy's First Law of Motion, "If you aimed at a target that you are not supposed to hit, then you are sure to hit it no matter how bad your aim or how far the target." In addition to the window, I aimed at a robin high up in a tree, way across the yard, on the other side of the bar. To my horror, the robin fell to the ground. I had hit the poor bird right in the eye. I felt terrible. So I gave up shooting at living things. I decided to use my mother's laundry for target practice. This may have had something to do with the fact that I could easily recover and reuse the oily little pellets. I do not recall ever using the BB gun after this.

After learning about surface tension in grade 8, my next big boost into the world of science came with the discovery that I was the only student in my eighth grade science class that could balance chemical reactions. My teacher was so impressed that he let me help clean up the prep room at the back of the science lab. Lucky me. It was there that I was first exposed to real research. I set out to study "The Life Cycle of a Common House Fly" for entry into the local science fair. Unfortunately, the life cycle of my fly was only two days. I found the fly lying, unmoving, at the bottom of its jar. When I reached in with a pencil and poked at it, a white wormy thing squished out of its abdomen. And, my God, the white wormy thing moved! Yuck! Neat! Was this something new? I searched with great excitement for Mr. Harrison, my science teacher, but as is the case with many great scientific discoveries, no one is there to witness the event. I could not find him. When I came back the next day, the white wrmy thing was all shriveled, and Mr. Harrison had no idea what it could have been. After that, I spent weeks, squishing flies, but the white wormy thing never re-emerged. I was very disappointed, and I lost complete interest in biology. What a sad thing to happen so early in life.

However, my interest in chemistry blossomed because my parents gave me a chemistry set for Christmas. So my research shifted from the science prep room at Welling Junior High to my parents' basement. Here I discovered the basics of chemistry: how to mix acids and bases to produce colourful salt solutions, and how to make carbon dioxide, oxygen and hydrogen. I think it was the first little explosive pop from my homemade brew of hydrogen and oxygen that attracted me to the explosives. I obtained a book about explosives from the library and learned that my chemistry set had all the ingredients of gunpowder, except for carbon. But how difficult could it be to find carbon? For some reason, I was never very successful with the mixture. However, my experimentation with the stuff did teach me that it is not a good idea to dry gunpowder in my mother's oven, and my mother learned that it is a good idea to check the oven before turning it on.

After gunpowder became illegal at home, I discovered a great substitute: equal volumes of saltpeter and icing sugar. While my parents were away, I launched several rockets from my back yard using this mixture, but I became a little nervous when one of them



actually traveled more than a few feet to land on our neighbour's house. It lay there, on the rooftop, smoldering. I almost phoned the fire department, but hid in the basement instead. Periodically, I peaked out of the window to see if the situation was 'under control'. Luckily, nothing happened, but it put a sudden end to my exploration into rocketry. Just think, had I not been scared off, today I may have been working for NASA or the Canadian Space Agency.

Coming to think of it, I spend a lot of time in my parents' basement doing things I would never let my own kids do. For example, I remember building a carbon arc from the carbon stems in a couple of old batteries. For power I used household current. Yup, that blew the fuse, but my parents weren't home, so I continued. A step-down transformer was needed, but I didn't have one, and I was in a hurry to 'create light'. I didn't really understand transformers anyway, and I figured that a big resistor would do the trick just as well.

I can hear some of you screaming, "Nooooo!"

Actually, I wanted a big variable resistor so that I could adjust the voltage across the carbon rods until I got the promised *light* without blowing the fuse. Two electrodes in a salt solution did the trick. By varying the distance between the electrodes, I created my variable voltage, and after just a few adjustments (starting with the largest separation, of course) the carbon arc lit up the darkness of the basement. I was absolutely impressed at its brilliance. Although I did see the light, the remembrance of its creation still scares me. So, I keep a close watch on my own children. However, with the advent of 'Nintendo' and 10^3 cable channels, there is very little chance that they are going to burn the house down.

In grade nine I took shop. In shop I built a metal box, a wooden box and a laminated fruit bowl. My mother still has the laminated fruit bowl. I also discovered radio waves. On one table in the shop, the shop teacher had assembled a crystal radio consisting of an antenna wire strung across the shop's ceiling, a ground wire attached to the plumbing, a diode and earphones. When I put on the earphones I could hear the local radio station. So, for my 15^{th} birthday, my parents gave me an electronics kit that enabled me to build my own crystal radio, one that could be tuned. I spent some time trying to understand amplitude and frequency modulation, and then I was inspired to build a real radio, one with vacuum tubes (now you know how old I am). Building the radio was fun, but trying to improve it was more fun. To a 15-year old, improving consists of '*lets see what happens when we remove this element from the circuit*'. So, by the age of 15, I had discovered that there are several components in a radio that have no apparent function. I also discovered that it is a bad idea to work on an electrical device while it is plugged in. This revelation came one day when I was home alone. I was sitting at the kitchen table *experimenting* with my radio poking at the underside with a screwdriver. I had learned earlier that eliminating a device from the circuit could be achieved by shorting out the device,

and this is what I was trying to do with the screwdriver. Somehow, my free hand came in contact with the metal chassis and my working hand came in contact with the metal shaft of the screwdriver. I clearly remember the thought that raced through my brain. I thought that my brother had come home, sneaked up behind me and grabbed my shoulders. He did that on occasion, and I would like to report to you that the effect is very similar to 120 volts pushing alternating current across you chest. Fortunately, the screwdriver connection was precarious, and I found myself alone in the kitchen. I unplugged the radio, and discontinued my research into radio waves until I was 33 years old, at which time I became a radio astronomer at The University of Calgary.

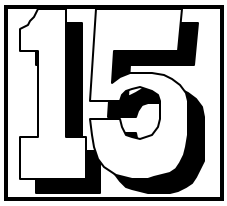
One last thing, as far back as I can remember I have had the desire to push buttons just to see what they do. It just seems to me that if someone put a button onto a device, then it is meant to be pressed. However, I have developed a very loose definition of 'button'. For example, at the start of term I received an order of alnico magnets that my students will use to fish steel bearings out of a glycerin tube after their viscosity experiment. As I was unpacking the magnets, into my head popped a silly idea, "I wonder what will happen if I bring a magnet close a computer monitor?" This temptation is similar to that of putting your wet, warm tongue on a frosty, playground monkey bar. I became aware of the monkey-bar 'button' in grade six when one of the dumber male students, probably on a dare, yielded to the temptation. Of course, the magnet didn't stick permanently to the monitor, but the weird colour pattern did. Now, don't be too hasty to judge me. I have learned something over the years, you know I ruined one of the old lab monitors that I want the college to replace, and not my new 17-inch office monitor.

O.A.

NEW BOOKS AT THE PUBLIC LIBRARY.
by Yvonne Whebell.

EMPIRE OF THE SUN: PLANETS AND MOONS OF THE SOLAR SYSTEM.
By John Gribbin and Simon Goodwin.
New York University Press, 1998.
This book is comprised of a lovely collection of photographs, within and without the visible spectrum, as well as a few artist's renderings, each with its own brief discussion. The authors state in their introduction that their intention is "to focus unashamedly on the visual delights' of solar system exploration.

In the coming year, there are a great number of things to be done around the observatory to both improve it for the use of the members and to present a great face to the community. Donations of time and materials in the coming year will be highly appreciated as we work as a society to improve the capabilities of the equipment, and increase the comfort and usability of the building overall.



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
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
Xerox Canada	500
Canfor Clear Lake	500

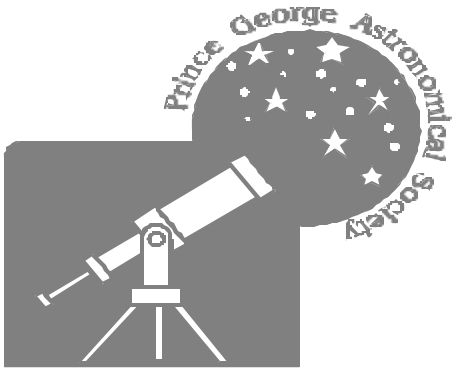
The greatest contributors to the construction and operation of the observatory are from PGAS members who have generously contributed their time to this project. The value of their contribution surpasses all external contributions.

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

Support Community Science

Join the PGAS

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



ALL UNDER ONE ROOF

- *Business Products*
- *Art Supplies*
- *Printing*
- *Office Furniture*
- *Copy Centre*

spee-dee's office plus

490 Brunswick St.
Prince George, B.C.
V2L 2B6

Ph: (250) 562-2414
Fax: (250) 562-9159
Toll Free: 1-800-667-9633

Internet Access Just Got Easier!

Proud to Sponsor www.pgweb.com/astronomical

- Dial-up Internet Access
- Dedicated ISDN
- Fast K56FLEX Connections
- Web Site Development and Hosting
- Locally Owned & Operated

562-0616
www.pgweb.com

BOREALIS INTERNET

This newsletter is printed courtesy of
Spee-dee Printers and XEROX of CANADA
We thank you for your support.