

1995

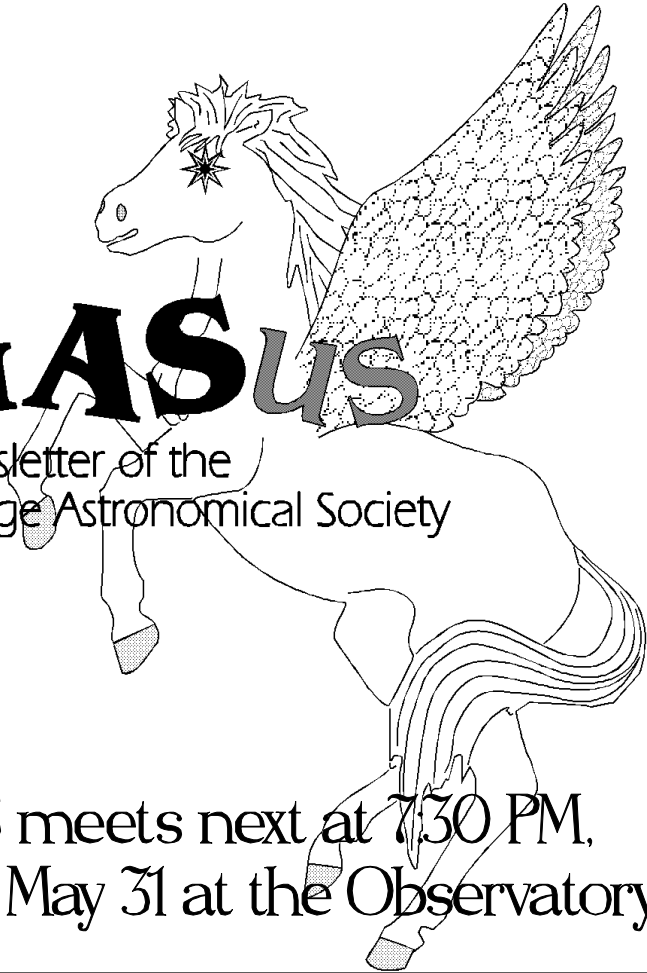
May

Issue #57

*the*

# PeGASus

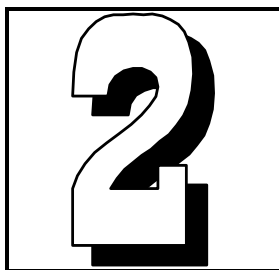
Newsletter of the  
The Prince George Astronomical Society



The PGAS meets next at 7:30 PM,  
Wednesday, May 31 at the Observatory

## INSIDE :

Editorial	3
Coming Events	4
The Night Sky	5
Diffraction Focussing	7
AstroSurfing	10
Rise/Set Times	14
PGAS Contributors	15



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

Contributions to the newsletter  
are welcome.

**Deadline for the next issue  
is June 16**

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Prince George, BC, V2N 1P8  
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Members at Large  
**Gil Self** 964-7279  
**Eric Hansen** 962-7477

### **Nominated Positions**

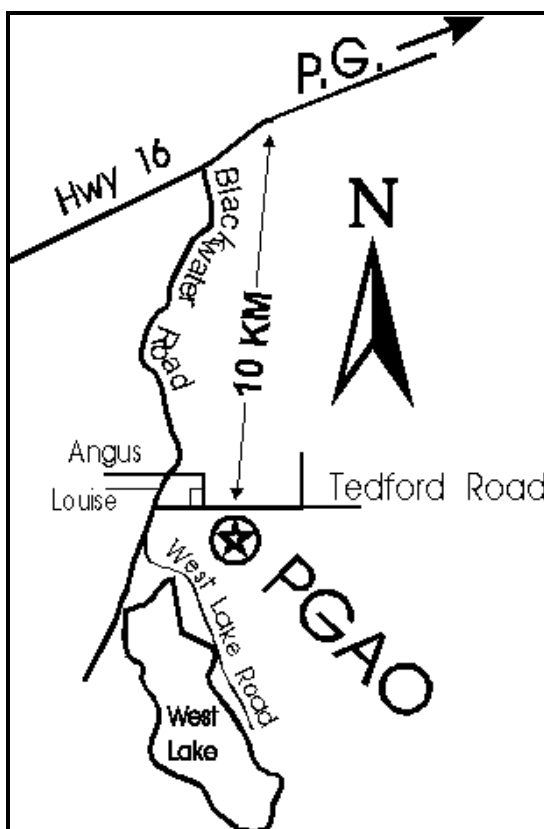
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Orla Aaquist

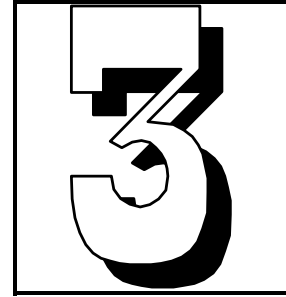
*PeGASus Editor*  
Orla Aaquist

*Librarian*  
Donovan Unruh



The observatory phone number is  
964-3600. This is a party line, so  
if it rings busy, it does not imply  
that someone is at the  
observatory.

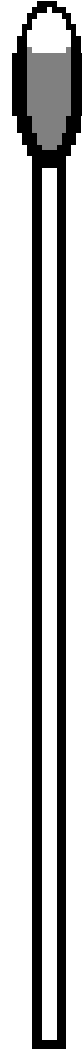
# Editorial

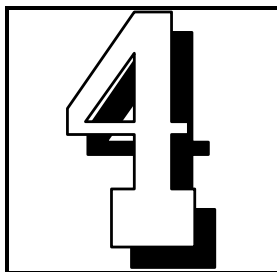


The *Monthly Meetings* article, which in the past has appeared on page 4 of this newsletter, has been replaced by the *Coming Events* calendar. I hope that this will give you an advanced view of upcoming PGAS activities and astronomical events. This change is a direct result of a comment that Brian Thair (CNC biology) made to me after the last newsletter. "Good newsletter this month", Brian exclaimed as he passed me in the hallway. When I asked why he thought that the newsletter was particularly good, he replied that it had lots of 'practical, hands-on, go-out-and-look type stuff' in it. When it comes to 'practical, hands-on, go-out-and-look type stuff', I trust Brian. So in this (and possibly my last) issue, I am going to try to get an even bigger compliment from Dr. Bri. This issue of *the PeGASus* will be a SUPER practical, hands-on, go-out-and-look type issue because it comes supplied with a match. Take this newsletter camping with you, use the newsletter for kindling and use the match to light the campfire. Now, all you have to do is to find the match! It's hidden somewhere in this newsletter. In order to find it you will have to read every word.

Those of you who got excited when you spotted the large match in the right margin should not be attempting to read this newsletter; it could seriously damage your mind. The match I want you to find looks just like the match on the right, but only smaller. If you are getting excited now, stop reading the newsletter immediately and go buy a Waldo book.

On to a more serious issue. Since 1991 we have been receiving donations of money and materials from various sources. To a large extent, we have accepted these contributions without explicitly expressing our thanks. In this issue, and all future issues, a list of contributors will be published as an ongoing reminder of the generosity of these organizations and individuals. As soon as the observatory is completed, our plan is to create a plaque listing all who contributed to its construction. Please examine the list on page 15 of this newsletter. If you find that it is incomplete, please let me know immediately so that the list can be updated for the next issue.





# Coming Events

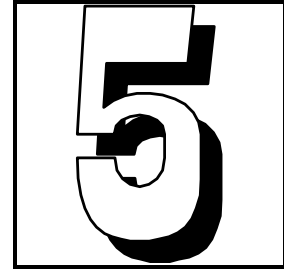
## PLEASE NOTE!

There is no monthly meeting in July and the June meeting is replaced by our annual picnic.

- |                |  |
|----------------|--|
| Fridays        | -Public Viewing every Friday night at the observatory from 9 PM to midnight until June 30th.<br>-PGAS Rotary Club presentation at noon.  |
| May 16         | -Earth passes through Saturn's ring plane (2 AM)   |
| May 22         | -Monthly meeting <u>at the observatory</u> at 7:30 PM. Alan Whitman speaks on <i>How to Predict the Weather For Your Observing Session</i> . Alan will also show you how to predict transparency and seeing. Come share the evening sky with your fellow members. Invite your friends! |
| May 31         | Lunar occultation of Spica.  |
| June 8         | -The PGAS is participating in <i>Explore Prince George</i> , sponsored by Prince George Tourism. Call Orla for more information (9644-9626).   |
| June 11        | -PGAS executive meeting at 2185 Ogelvie, 7:30  |
| June 14        | -Summer Solstice (2:35 PM)   |
| June 21        | -Annual picnic at the observatory. Picnic starts at 5 PM. PGAS members, family and friends are welcome to come out and look at the sun through the club's H-alpha filter and solar projection system. Bring-your-own-food; if we need your gas barbecue, someone will contact you.     |
| June 24        | - <b>No monthly meeting.</b> Come to the picnic on June 24 instead.  |
| <b>June 28</b> | -RASC General Assembly in Winsor, Ontario.   |
| June 29        | -Solar viewing, Fort-George Park for Canada Day.   |
| July 1         | -PGAS executive meeting at 2185 Ogelvie, 7:30  |
| July 12        | -the <i>Fraser-Fort George Regional Museum</i> astronomy camp (12:30-4:00 pm).   |
| July 27-29     | -PGAS executive meeting at 2185 Ogelvie, 7:30  |
| August 9       | -Earth passes through Saturn's ring plane again!   |
| August 10      | -Perseid meteor shower party at the observatory.   |
| August 12      | The shower peaks after midnight. FULL MOON.  |
|                | -Mt. Kobau Star Party.   |
| Aug 23-27      | -monthly meeting at observatory.   |
| August 26      | -Astronomy sleepover at <i>Museum</i>  |
| Sept 1         | -Matthew Burke's exhibit at the public library.  |
| September      | -Science & Technology Week. Display at Pine Centre   |
| Oct. 23-29     | on October 28 and 29.  |

# The Night Sky

by Alan Whitman



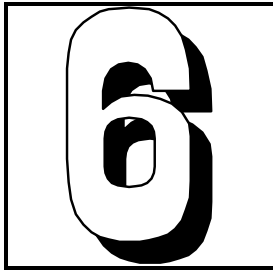
I trust you all saw bright Mercury in early May. It's gone now but you can watch Mars's motion, made very apparent from week to week by its proximity to Regulus which it passed only one degree north of on May 25<sup>th</sup>. Jupiter, at opposition June 1<sup>st</sup>, is bright but low, near Antares. It will be disappointing in a telescope for several years from this latitude--I would hesitate to even show it to observatory visitors as it will be little more than a boiling blur in the eyepiece. And Saturn ringless until late summer! With neither the rings of Saturn nor a good view of the belts of Jupiter to offer, you will have to work harder at making an observatory visit memorable.

But for you this will be a memorable summer, precisely because Saturn is ringless. This gives you a rare opportunity to see faint satellites Enceladus and Mimas near Saturn. *Sky and Telescope* has charts showing the positions of Titan, Rhea, Dione, and Tethys (all easy enough in an 8") plus Enceladus. If you spot an unaccounted for faint object no more than one disk diameter away from Saturn's disk and in the same plane as the other moons, then you have almost certainly spotted Mimas. (Use the Plossel eyepieces and the highest power that the night will allow).

Like Titan, Iapetus is visible in even a 60 mm refractor but its distance from Saturn means that you must know where it is to distinguish it from field stars--see p.156 of *The Observer's Handbook*.

The last year that Saturn was ringless, in 1980, the observing articles written in advance said that all that could be seen would be two thin parallel black lines at Saturn's equator, the ring shadow and the silhouette of the dark side of the rings. But on two evenings in my 8" one of the dark lines had extremely faint extensions on either side of Saturn--an extremely faint line just flashing into view for a fraction of a second every few minutes when the seeing became momentarily steadier. Other observers also noted the visibility of the dark rings in 1980. This year's excellent *Sky and Telescope* article, which begins on page 68 of the May issue, recognizes the visibility of the dark rings, explaining that "what we see is ring material lit partly by reflected Saturnshine and partly by sunlight filtering through the rings' less opaque regions."

Both of my 1980 views of the dark rings were during mid-twilight when the glare of the planet's disk is less. Since the rings

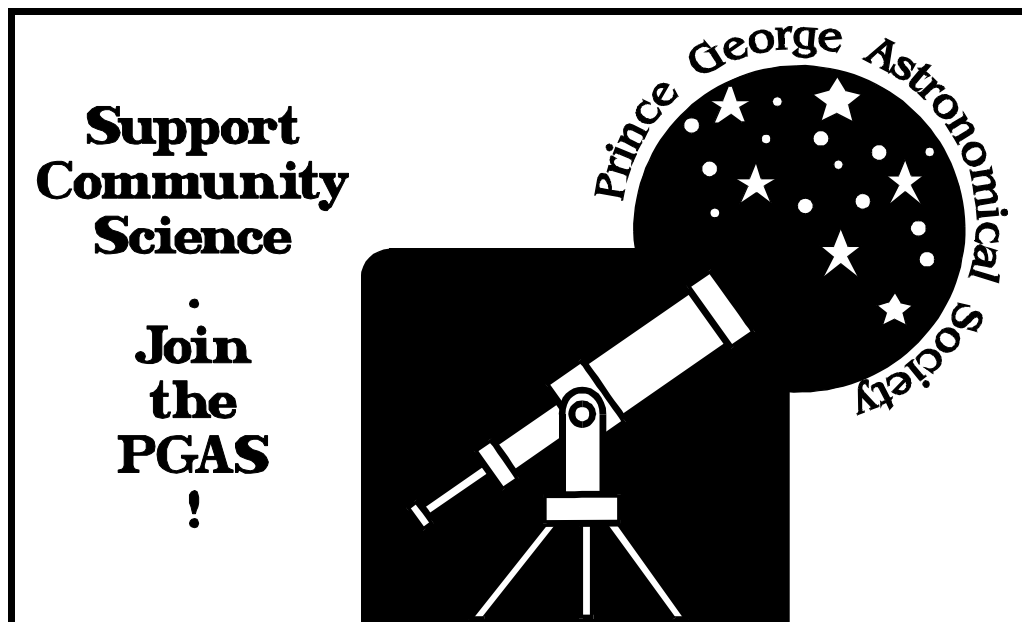


are exactly edge-on May 22<sup>nd</sup> and August 10<sup>th</sup>, your best chance to view the dark side of the rings will be in late June and early July when the dark side is tipped 0.6 degrees towards Earth.

A successful observation of Enceladus, Mimas, or the dark side of the rings will require excellent seeing and clean mirror (dirty optics scatter too much light and make very low contrast features like the dark rings invisible). Let me know how you make out. The observers who win a lifetime memory this summer will be those with enough perseverance to try on many nights until a night of unusually fine seeing allows success.

Spica is occulted on June 8<sup>th</sup> by a waxing gibbous moon, 79% sunlit. This is the third, best, and last occultation of Spica visible from Prince George in 1995. Disappearance at the dark limb is at 11:07 PM PDT; reappearance at the bright limb is at 12:07 AM PDT.

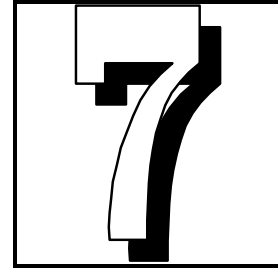
**Messier Corner:** Cancelled by perpetual twilight.



# Diffraction Focussing

by Bill Almond

(copied from the April issue of SKYNEWS,  
newsletter of the RASC Victoria Centre)



Have you met with frustration and difficulty when trying to focus your CCD? Find some comfort in the realization that you are not alone. Focussing is one of the most annoying and time-consuming aspects of imaging -- unless you know a few secrets to help you on your way. More often than not, you will find yourself switching from eyepiece to CCD, and refocussing each time, especially at the beginning of an observing session.

A simple, effective pair of devices I have made make it easy to refocuss my fork-mounted 10 inch Schmidt-Cassegrain. These diffraction focusers can reduce the chore to a few minutes' work, making your evenings more enjoyable, and they can be used effectively by most small telescopes.

First device: cut a light-tight piece of thick cardboard to fit over the corrector plate or the objective end in the case of a Newtonian. Cut two 1.5-inch holes diametrically opposite each other about a half-inch in from the rim of the tube. Schmidt-Cassegrains will need holes that fit between the secondary obstruction and the rim. Find any bright star and image it on your computer screen with a short exposure. Fit your piece of cardboard in place and you will see two bright spots of light on the screen with the next exposure. Adjust the focus in steps, as the exposures are refreshed, until the two spots merge. If your program displays a numerical value for focus, with the highest value for perfect focus, then you now have an additional aid to achieving fine focus. Simply watch the two spots merging and note the numbers climbing. You will quickly get a feel for perfect focus. Remember not to touch your focus when you next use your eyepiece; instead, slide the eyepiece to focus.

Second device: you will need a piece of half-inch mesh wire cloth about two inches wider than your telescope's diameter and three inches longer the other way. This is not chicken wire but thicker, straight-wire cloth. Bind the edges with wide carpet tape to protect your telescope's finish and fold over about two inches of the longer side to make an L shape. Use this to hook your device over the top end of your scope. Place this in position after focussing using the first device, which you will need to remove. If your focus

**...Continued on page 10**

# Announcements

## THANK YOU

TO THE ROYAL BANK FOR DONATING \$1500 TO OUR GENERAL FUNDS.

### Mt. Kobau Star Party

Anyone interested in signing up for this year's Mt. Kobau Star Party (Aug 23-27) should contact

Peter Kuzel, 4100-25th Avenue, Vernon, V1T 1P4

or phone him at 604-545-1226. Peter is the Vice President of the Mt. Kobau Society.

### For Sale

Celestron C8 tripod with 2"-diameter adjustable legs. \$350 or best offer. East Bay (Science and Nature Company) 1889 Oak Bay Avenue, Victoria. 604-595-8338.

### WEB Surfing the CBAT

The International Astronomical Union's Central Bureau for Astronomical Telegrams (CBAT) has inaugurated a homepage on the World Wide Web. The site gives information about the services offered by the Bureaus. The URL is <http://cfa-www.harvard.edu/cfa/ps/cbat.html>.

### Public Viewing

Remember that the observatory is open every Friday evening from 9 PM to midnight until the end of June.

### HUBBLE Anniversary

Monday, April 24th, marked the fifth anniversary of the launch of the Hubble Space Telescope. It's been a struggle at times, but the orbiting observatory now appears to be fulfilling its mission objectives exceedingly well.

### Eclipse Tours

The PGAS has received some information about tours to Asia for the October 24, 1995 solar eclipse. Call Orla at 964-9626 for more information.

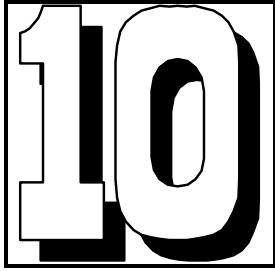
### WELCOME!

We are pleased to welcome **Michael Tkachuk**, to the PGAS. Michael has a C8 in his closet. Lets try to get him to bring it out.

### A SPOTLESS SUN:

Eagle-eyed observers report that the Sun has been virtually spotless since April 22nd. That's great if you're a dishwasher but not so hot if you're a solar observer. Even though we are approaching solar minimum, such a spotless span is unusual. When was the last time you saw any of these dark blips on the Sun?





is good you will see on the screen a single star with four thin, long and bright diffraction spikes, crossed by many dark, diagonal lines: the lines of the mesh. A slight adjustment of the focus knob may be necessary, although I've found I haven't needed to. Turn up the contrast and brightness to brighten the spikes; the higher the better. If used alone increase CCD exposure to three or four seconds.

Use either one, or both. The second device will show four split diffraction spikes when out of focus, slowly merging into four solid ones as focus is achieved. You will quickly settle on a favourite. A bonus: the wire mesh is splendid for finding that perfect focus when using an eyepiece. Split spikes fuse into solid ones and you're there, no hunting!

Next month, a similar device for larger 'scopes.

*EDITOR'S NOTE: Brian Potts (local member) gave similar advice a few months ago at one of our monthly meetings during a discussion about focussing the telescope's image on the frosted plate of a 35-mm camera. It never occurred to me that the method would also work on our CCD camera.*

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## AstroSurfing

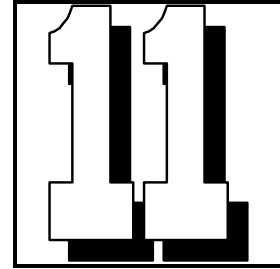
*Astronomy news gathered from surfing through the Internet and other sources. Much of the contents presented here are severely edited for presentation in this Newsletter. For more details, contact the PeGASus editor.*

**MOUNT WILSON INTERFEROMETER:** Mount Wilson will be the site for its new optical interferometer, which will consist of five 1-meter telescopes arranged in a Y shape. Each arm of the Y will be 200 meters long, giving the entire instrument a resolution of 0.0002 arcsecond. That's equivalent to the apparent size of Neil Armstrong's footprint on the Moon!

*[NOTE: this does not mean that the telescope will be able to collect enough light to see a footprint on the moon.]*

**DYNAMIC NEPTUNE:** Astronomer Heidi Hammel has been using the Hubble Space Telescope to monitor Neptune, and its

appearance has changed radically since Voyager 2 flew by in 1989. The Great Dark Spot in Neptune's southern hemisphere is no longer, but a new dark spot has appeared in the north. And huge, bright clouds appear, evolve, and disappear from week to week. The cloud systems may be spawned by heat rising from the planet's interior.



**HUBBLE SPIES KUIPER OBJECTS:** The Hubble Telescope may have detected extremely faint objects beyond Neptune in what is called the Kuiper Belt. The objects are roughly magnitude 28, which would make them only 20 km or so across. 59 objects in a field only 4 arcminutes on a side have been found. If these really are members of the Kuiper Belt, there must be about 60,000 such objects per square degree of sky. That would translate to a total of some 100 million comets traveling in low-inclination orbits and shining brighter than the HST's magnitude-28 limit.

**CLEMENTINE REVIVED!:** According to Trevor Sorenson, ground controllers regained full control of the spacecraft on April 10th.

**GAMMA RAYS AND SPF300:** As if we don't have enough to worry about, a Princeton astronomer has posed a new long-term threat to life on Earth. Distant collisions of co-orbiting neutron stars might explain the enigmatic gamma-ray bursts that astronomers have been observing for decades. If a nearby (1,600 light years) binary collided, the resulting gamma-ray burst would shower the Earth with the energy equivalent to 10,000 megatons of TNT. This would destroy all of the planet's ozone, leaving the surface without protection from solar ultraviolet radiation for years. The gamma rays would also create nitric acid, giving the world a few really bad years of acid rain. It is estimated that a gamma-ray burst within 3,200 light- years of Earth may happen every 100 million years or so.

**NEW SUPERLUMINAL SOURCE:** Last year radio astronomers found the first object within the Milky Way appearing to show faster-than-light motion. Now a second such object has been reported at radio, optical, and X-ray wavelengths. Located some 10,000 light-years away in the direction of Scorpius, the source has components with the unprecedented proper motion of 1 arc second every three weeks. The pieces appear to be flying apart faster than the speed of light, but this is really just an illusion created by matter traveling at relativistic speeds. Because this



source is so close and has an optical counterpart, astrophysicists are excited about what might be learned about the violent activity that must be taking place in such exotic objects.

NOT "MACHO" IN THE LMC: A 400-night imaging survey of the Large Magellanic Cloud (LMC) seems to rule out another once-promising candidate for the dark matter thought to comprise the bulk of our galaxy's halo. Supposedly, massive compact halo objects (MACHOs) are giant planets or tiny stars that exist in great profusion around the galaxy's remote margins. But over the past three years Charles Alcock and his colleagues have been looked for them in the center of the Large Magellanic Cloud using an Australian 1.3-meter telescope -- with little success. Indirectly, therefore, the case has been strengthened for some exotic nonnuclear substance to make up the bulk of the dark matter in our cosmic neighborhood.

INTERGALACTIC MAGNETIC FIELDS are probably very weak but may well influence galaxy formation. R. Plaga of the Max Planck Institute in Munich, Germany suggests that the fields between the galaxies can be detected through their influence on gamma ray bursts reaching the Earth. According to Plaga, these weak fields would delay the arrival of some gamma-ray photons by a measurable amount. (Nature, 30 March 1995.)

NEW MEASUREMENTS OF THE GRAVITATIONAL CONSTANT  $G$ , the number that determines the strength of gravity, depart significantly from the accepted value established in the 1980s.  $G$  is the least well known of all the fundamental constants; the accepted value of  $6.6726 \times 10^{-11} \text{ m}^3 / \text{kg-s}^2$  is known with a relatively high uncertainty of  $\pm 0.01\%$ . Three scientists from international labs (the German Bureau of Standards, the Measurement Standards Laboratory of New Zealand, and the University of Wuppertal in Germany) reported at the last APS Meeting new measurements of  $G$  which disagreed widely with one another and with the standard value. The Wuppertal value was 0.7% below the accepted value, the New Zealand measurements were 0.07-0.08% below, and the German Bureau of Standards value was a whopping 0.6% above. Researchers at Los Alamos, the lab which helped set the 1980s standard, are undertaking a new measurement of  $G$  which may be five times as precise as current measurements, and may shed light on these puzzling results. (Number 224 May 1, 1995 American Institute of Physics)



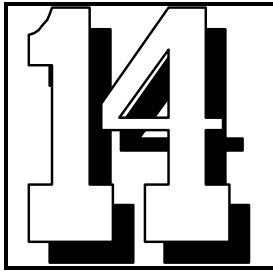
**MAN-MADE LIGHTNING BOLTS:** In a pilot-scale research furnace at MIT, a 10,000-degree plasma, created by passing an electric current between a pair of graphite electrodes in a nitrogen-filled gas chamber, has been used to melt waste material into a lavalike liquid. The liquid solidifies into a stable black glass which can be safely stored or even used as a construction material. The process produces no toxic ash, virtually no dioxin, and less gas emission than traditional incineration techniques.

**JET-PROPELLED PULSARS:** Observations made with the Rosat x-ray satellite reveal the presence of a gas jet shooting out of the Vela pulsar, some 1500 light years from Earth. University of Wisconsin astronomers Craig Markwardt and Hakki Ogelman believe the jet (20 light years long) may indicate a new mechanism for pulsar propulsion. (Nature, 4 May 1995.)

**SOLAR NEUTRINOS AND SOLAR WIND:** The neutrinos are a by-product of nuclear fusion reactions at the core of the sun while the solar wind is an outward gust of particles originating in the solar corona. Ralph McNutt of the Johns Hopkins University Applied Physics Lab, comparing neutrino data from the Homestake (SD) detector with solar wind data recorded by the IMP-8 satellite, finds a correlation. Over a 16-year period the neutrino flux and the flux of solar wind particles seem to go up and down together. There is no theoretical explanation of why this should be so. (Eos, 18 April 1995.)

**NEUTRINOS** have mass, recent experiments show.

**CARBON** has been found in gas clouds near the edge of the universe (10 billion light years away) using the 10-metre Keck telescope at Mauna Kea. Finding carbon in these primordial clouds is surprising since heavier elements, such as carbon, are formed in stars, so their presence in these distant (hence very old) clouds means that they cannot date from the origin of the universe. Rather, they must represent the ashes of a generation of stars that formed and disappeared BEFORE the present galaxies came into being. This is in conflict with the prevailing view which is that stars first formed inside the galaxies which we presently observe.



# Rise/Set Times (June)

This calendar was generated using the *Eric Bergmann-Terrell Astronomy Lab v1.13* available on the PGO computer. Show are SR (sunrise), SS (sunset), MR (moonrise), MS (moonset), FQ (first quarter moon), LQ (last quarter moon), FM (full moon), NM (new moon), JSO (summer solstice) for Prince George.

Sunday	Monday	Tues	Wed	Thur	Friday	Saturday
			1	2	3	
			SR:04:47	SR:04:46	SR:04:45	
			SS:21:32	SS:21:33	SS:21:34	
			MR:07:56	MR:08:58	MR:10:03	
			MS:23:43	MS:None	MS:00:12	
4	5	6	7	8	9	10
SR:04:44	SR:04:43	SR:04:43	SR:04:42	SR:04:41	SR:04:41	SR:04:40
SS:21:35	SS:21:36	SS:21:37	SS:21:38	SS:21:39	SS:21:40	SS:21:41
MR:11:10	MR:12:20	MR:13:32	MR:14:46	MR:16:04	MR:17:23	MR:18:44
MS:00:38	MS:01:01	MS:01:23	MS:01:45	MS:02:08	MS:02:35	MS:03:06
		FQ:03:26				
11	12	13	14	15	16	17
SR:04:40	SR:04:40	SR:04:39	SR:04:39	SR:04:39	SR:04:39	SR:04:39
SS:21:42	SS:21:43	SS:21:43	SS:21:44	SS:21:44	SS:21:45	SS:21:45
MR:20:01	MR:21:09	MR:22:07	MR:22:53	MR:23:29	MR:23:58	MR:None
MS:03:46	MS:04:36	MS:05:37	MS:06:49	MS:08:08	MS:09:28	MS:10:46
	FM:21:04					
18	19	20	21	22	23	24
SR:04:39	SR:04:39	SR:04:39	SR:04:39	SR:04:39	SR:04:40	SR:04:40
SS:21:46	SS:21:46	SS:21:46	SS:21:47	SS:21:47	SS:21:47	SS:21:47
MR:00:23	MR:00:46	MR:01:08	MR:01:29	MR:01:53	MR:02:19	MR:02:49
MS:12:02	MS:13:15	MS:14:25	MS:15:33	MS:16:39	MS:17:43	MS:18:43
	LQ:15:02					
		JS:13:35				
25	26	27	28	29	30	
SR:04:40	SR:04:41	SR:04:41	SR:04:42	SR:04:42	SR:04:43	
SS:21:47	SS:21:47	SS:21:47	SS:21:47	SS:21:46	SS:21:46	
MR:03:25	MR:04:06	MR:04:55	MR:05:50	MR:06:50	MR:07:54	
MS:19:38	MS:20:27	MS:21:10	MS:21:46	MS:22:17	MS:22:44	
		NM:17:51				

# PGAS CONTRIBUTORS



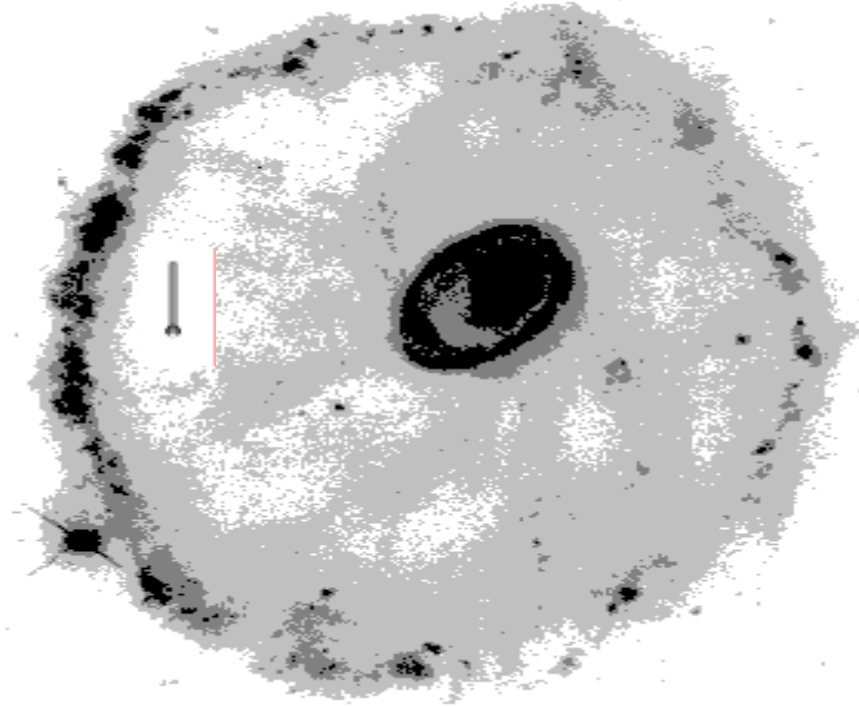
The PGAS would like to thank the following individuals, corporations and government agencies who, since 1991, have donated money, goods or services to the construction and operation of the Prince George Astronomical Observatory.

Ministry of Adv. Ed. Tr. 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
The Pas Lumber Co.	750
Canfor Polar Division	744
Xerox Canada	500
Russelsteel	465
Lakeland Mills Ltd.	460
Canfor Clear Lake Division	270
Canfor Netherlands Division	200
Carrier Lumber Ltd.	160
Claus Schlueter	100

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.*

# The Image Gallery



Hubble: PHOTO RELEASE NO.: STSci-PRC95-02, *Credit: Kirk Borne (ST ScI), and NASA:* A rare and spectacular head-on collision between two galaxies appears in this NASA Hubble Space Telescope image of the **Cartwheel Galaxy**, located 500 million light-years away in the constellation Sculptor. The new details of star birth resolved by Hubble provide an opportunity to study how extremely massive stars are born in large fragmented gas clouds. The striking ring-like feature is a direct result of a smaller intruder galaxy -- not seen here -- that careened through the core of the host galaxy. Like a rock tossed into a lake, the collision sent a ripple of energy into space, plowing gas and dust in front of it. Expanding at 200,000 miles per hour, this cosmic tsunami leaves in its wake a firestorm of new star creation. Hubble resolves bright blue knots that are gigantic clusters of newborn stars and immense loops and bubbles blown into space by exploding stars (supernovae) going off like a string of firecrackers. The Cartwheel Galaxy presumably was a normal spiral galaxy like our Milky Way before the collision. The ring contains at least several billion new stars that would not normally have been created in such a short time span and is so large (150,000 light-years across) our entire Milky Way Galaxy would fit inside.