

1996

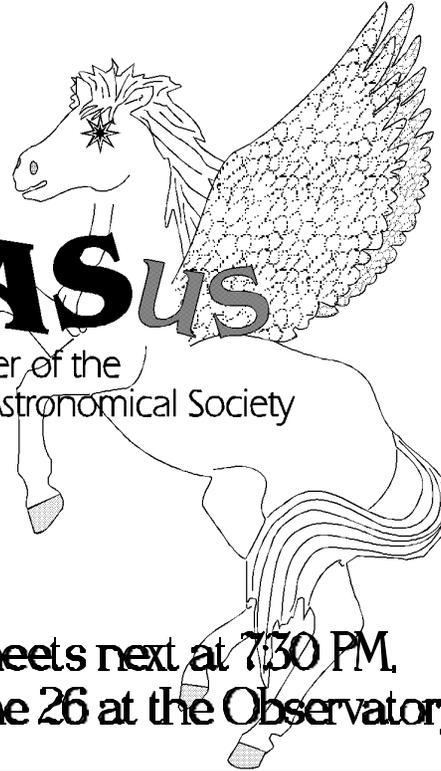
JUNE

Issue #67

the

PeGASus

Newsletter of the
The Prince George Astronomical Society



The PGAS meets next at 7:30 PM,
Wednesday, June 26 at the Observatory.

INSIDE :

<i>PGAS Executive</i>	2
<i>Editorial</i>	3
<i>Coming Events</i>	4
<i>Announcements</i>	5
<i>The Night Sky</i>	6
<i>Summer Sky</i>	8
<i>Help Wanted: editor & db manager</i>	10
<i>AstroSurfing</i>	12
<i>PGAS Contributors</i>	15



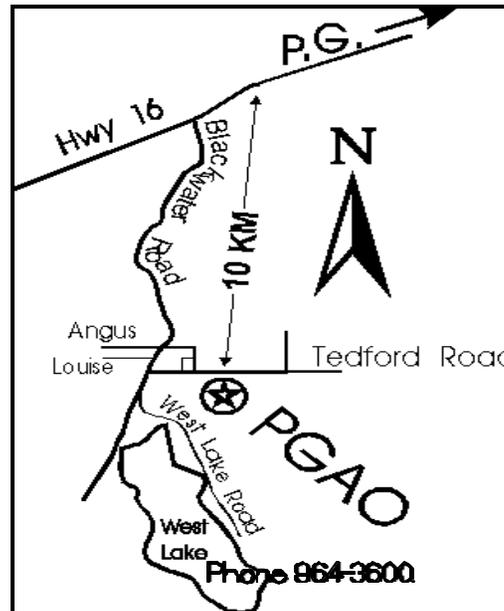
the PeGASus
is published
monthly by the
*Prince George
Astronomical
Society.*

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 Sept 6

Send correspondence to
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**Prince George
Astronomical Society
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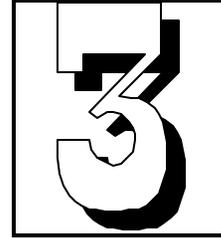
Promotional
Jennifer Whitman

Building
Mike Hansen

PeGASus Editor
???? ????????

Editorial

by Orla Aaquist



I took over this newsletter from Bob Nelson in October, 1992 starting with newsletter #30. Shannon noticed that if you insert the letters *e*, *u* and *s* in our society's acronym, PGAS, you get a winged horse, *PeGASus*, which flies upside down through the northern autumn sky. Since that time, her rendition of this graceful creature has appeared on the front cover of this newsletter, and I hope that it will continue to do so for all future newsletters. In future issues, I hope to continue making contributions to this fine journal, but not as its editor. My contributions will arrive via e-mail from Fort McMurray, Alberta.

The first four issues of the *PeGASus* were written using *WordPerfect*. Issue #34 was written using *Microsoft Publisher*. Shannon created the initial *Publisher* layout and edited the first few newsletters. After just two issues in this new format, my fingers got very itchy, and I sort of just took over the editor's job. *Shannon was much too busy scrubbing the kitchen floor, anyway.*

I hope that the next editor will like the job as much as I did. My only suggestion to anyone wishing the job is, **"Make the newsletter your own, but keep the horse."**

Here is some more parting advice:

1. To do anything well, you have to make it your own -- whether it is yours or not.
2. If you want something so much that you are not willing to walk away from it, hope that you are not dealing by a salesman.
3. Never turn your back on the devil; always look him in the eye.
4. You should not feel small, insignificant and unimportant since your consciousness can imagine the entire universe -- past, present and future; however, neither are you more important than any other self-conscious entity.
5. If you prefer hurting yourself rather than someone else, then you are human -- humans find it is easier to live with pain than to live with guilt.
6. In an organization like ours there is no shortage of good advice, just good people to act on it.

Bye!



Coming Events

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

June 26 -PGAS monthly meeting at the observatory. This is the last meeting of the season.

June 27 -RASC General Assembly in Edmonton

June 29/30 -PGAS participation with Canada Day?

August 11 -Perseid Meteor Shower Party. Perseids peak at 5AM on the morning of August 12.

August 14 -Mount Kobau Star Party, is held a mile above hot Osooyoos. Ends August 18.

August 23 -Club BBQ at the observatory. Starts at 5:00.

Sept 25 -PGAS monthly meeting. Location TBA.

Sept 26 -total lunar eclipse (not very visible from Prince George)

Oct 30 - Annual General Meeting at CNC. Election of officers.

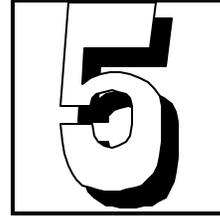
Nov 27 - PGAS monthly meeting.

On **July 12**, there will occur a spectacular dark limb reappearance of Venus from behind the moon. Bermuda is the best place to observe this event. If you are planning your summer vacation to that area, keep an eye open for it. Time of occurrence is 4:29 AM local Bermuda time.

Comet Hale-Bopp reaches perihelion on **April 1, 1997**. See article in previous PeGASus (Issue 66) for details.

The closest total solar eclipse to North America visible from land until the year 2017 will occur on **February 26, 1998**. Start planning your 1998 vacation to Palm Beach, Florida now. The eclipse will last 3.5 minutes. Jupiter will be 2 degrees and Mercury 4 degrees away from the eclipse, and should be visible within the sun's corona. I understand that Alan Whitman is going.

Announcements



New Members: Please welcome Roberta Procyshyn (964-3343) and Dr. Helen Ruddy (964-4169) to the PGAS. If you are going observing, why not invite them along.

Alberta Star Party: The RASC Calgary and Edmonton Centres have announced the 10th annual Alberta star party to be held on **September 13 to 15** at Eccles Ranch, Caroline, Alberta. Caroline is located near Red Deer, about half way between Edmonton and Calgary. The Caroline site has wonderful dark skies. A general information brochure is available at the observatory (or call Orla at 964-9626).

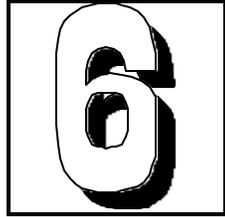
PGAS Joins the WWW: Mathew Burke and Dave Kubert have set up a *World Wide Web* home page for the PGAS at UNBC. Mathew has done most (or all) of the work creating the web page, and Dave is responsible for installing it on the English Department's computer Adreaeas. Thanks to Dr. Stan Beeler (professor of English, UNBC), for giving us access to this computer. Our web address is

http://andreae.unbc.edu/kubert_html/PGAS/

Mathew can be reached at *Avro100@Netbistro.com*

Telescope for Sale

4.25" Mead reflector on an equatorial mount. Comes with view finder, wooden carrying case, and three eyepieces. Price is negotiable. Call Doris Hoff at 563-2229 after 5pm.



The Night Sky

The Summer of 96's Night Sky

by Alan Whitman

As there won't be another issue of the newsletter until late September, I will briefly preview this summer's events. Use Orla's chart in the last issue to follow Comet Hale-Bopp. When night returns in August, it should have brightened to magnitude 6. The comet will then be a difficult naked eye challenge under dark skies, such as the observatory enjoys.

July 12th: Venus is occulted by the slim crescent moon in Bermuda. When they rise here they will be about one moon diameter apart, still close enough to be quite striking. To add to the scene, Aldebaran will be only 3 deg. upper right of Venus.

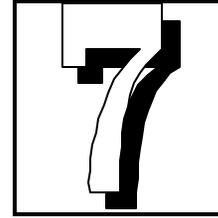
August 11th-12th: The Perseid meteor shower is at maximum during Monday morning's twilight at our longitude, ideal timing for a good display as it will be in phase with the normal dawn enhancement caused by head-on collisions. (At dawn, we are at the leading edge of the earth as it speeds around its orbit).

August 14th-18th: Western Canada's foremost observer's event, the cold Mount Kobau Star Party, is held a mile above hot Osooyoos. (So, bring your winter jacket, toque, and bathing suit!)

Sept 8th: Venus, adjacent Mars, and the lunar crescent entrance in the pre-dawn. Procyon, Castor, and Pollux enhance the view.

September 26th: There is a total lunar eclipse on the same

evening that Saturn reaches opposition with its rings tilted at 5 deg. Here are the eclipse events:



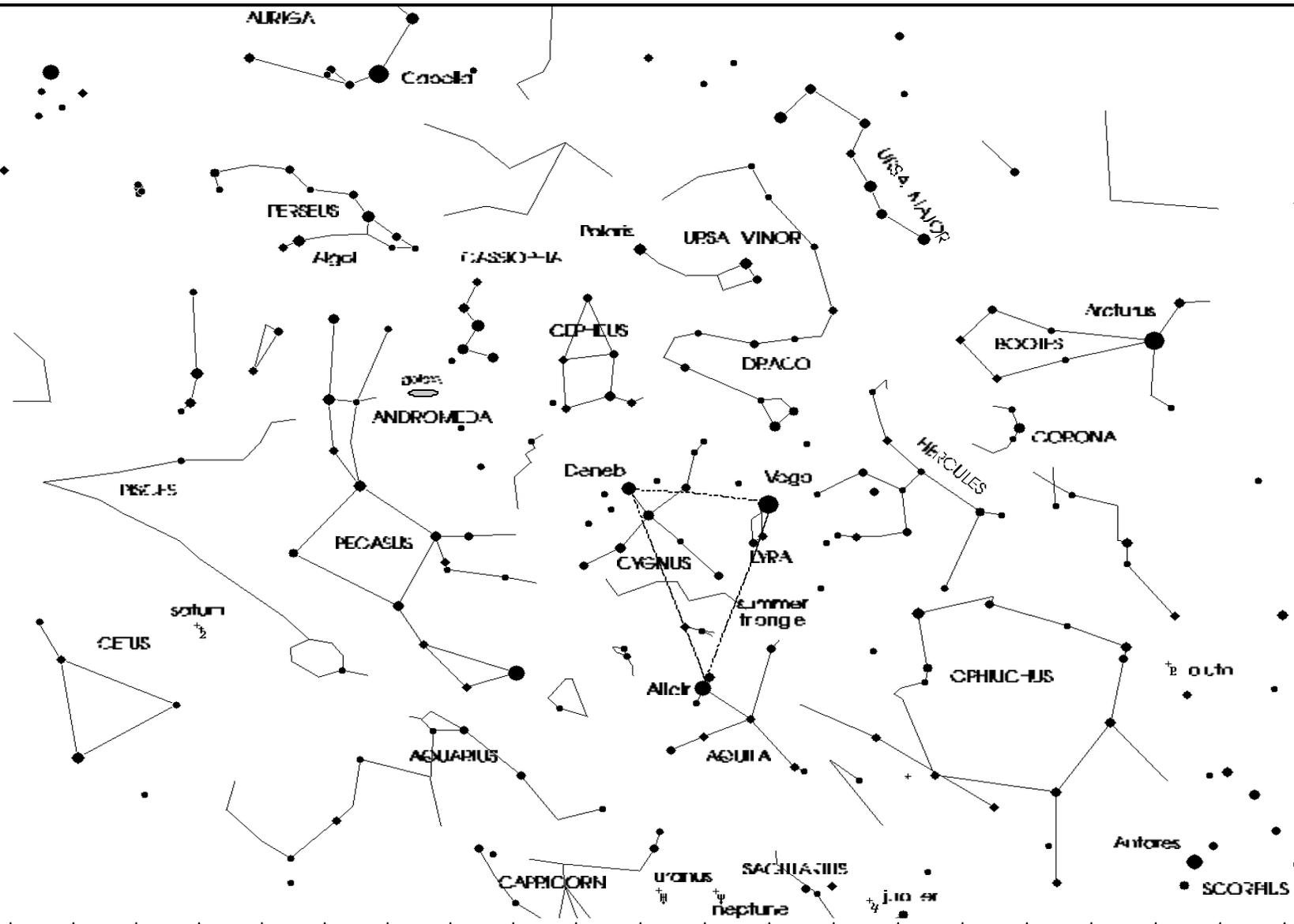
Moonrise 6:50 PM PDT (already in partial eclipse)
Total Eclipse begins 7:19
Mid-eclipse 7:54 (convenient, but really too early)
Total Eclipse ends 8:29
Astron. Twilight ends 8:59
Partial Eclipse ends 9:36 (penumbral shading should be visible for another 35 minutes or so)

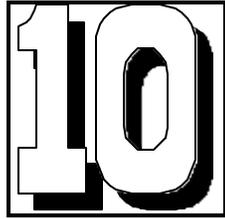
It is unfortunate that the total eclipse ends well before the end of twilight. The rather low eclipsed moon will be very difficult to see against the bright twilight sky. **The general public will probably be unable to find the moon at all**, until it starts to leave earth's shadow. Consequently, it is unwise to advise the public to try to view the eclipse from their backyards. It would be best to invite them to the observatory. Pick the moon up telescopically while still partially eclipsed or use Saturn to find the totally eclipsed moon. The moon will be just 3 deg. north of Saturn. On the plus side, it may be a fairly bright eclipse. Apparently April's lunar eclipse was one of the brightest in many years since the stratosphere is finally purged of volcanic ash.

Editor's note: A chart of the summer sky is printed on pages 8 and 9. The chart was generated for midnight on July 31, but it should be reasonably accurate for all of July and August. South is at the lower centre of the map.

Summer of 1996 Sky

Here is a map of the summer sky for those who just can't go to sleep before the sky is dark.
HAVE A GOOD SUMMER!





Help Wanted

by Orla Aaquist

For the last few years I have acted as the editor of the PeGASus and managed the PGAS database. Because I am changing jobs, I can no longer carry out these functions on behalf of the PGAS. Here is a brief description of what these two activities entail. If you have access to a computer and you have the desire to become involved with the society, here are two really vital and interesting functions which the PGAS needs to fill before September. I will be willing to help anyone learn these two jobs before August. Give me a call at 964-9626 if you are interested.

Editor's Job

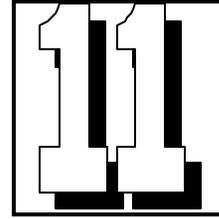
The roll of the PeGASus Editor is to create, print and mail the monthly newsletter of the Prince George Astronomical Society. It is the editor's job to solicit, write and/or find articles for the newsletter and to fit these articles into the framework of the newsletter's layout.

Creating the Newsletter: The newsletter is currently written using *Microsoft Publisher* on a PC. To create a new newsletter, the previous newsletter is read into *Publisher*. The date, issue number, notice of monthly meeting, and deadline for next publication are changed. Old articles are deleted. The editor then solicits articles from PGAS members (including him/herself) and checks other sources of astronomical information for articles of local interest. No official policy exists as to the contents or format of the newsletter, so as editor you are generally free to shape the newsletter into any form you want; however, the newsletter must suit the needs of the PGAS.

Printing the Newsletter: If there is not a laser or inkjet printer attached to the computer, use the print-to-file option. Set the printer type to be a *HP LaserJet III*. This creates a file which must be copied to a diskette and taken to CNC (see Bob Nelson) for printing. Insert the diskette into a computer with a LaserJet III of IV and send the file to the printer using the following DOS command: **copy/b name_of_file prn**. Take the output to *Spee-Dee Printers* and ask them to make 100 copies (this usually takes a few days). Spee-Dee has agreed to print the newsletters free-of-charge for the club. If there are any problems, talk to David George at Spee-Dee.

Mailing the Newsletter: Pick up the newsletters from Spee-Dee

Printers. Fold the newsletters. From Wilma in the Print Room at CNC, get about 80 envelopes which have a CNC logo and return address. A purchase form must be filled out since CNC charges us (a very small fee) for these envelopes. Above the CNC logo, print the letters PGAS so that in case of a return the college knows to put the letter into our mailbox. Ask the *PGAS Database Manager* to create mailing labels using the PGAS database. Paste the labels on the envelopes. Stuff the newsletters into the envelopes (no need to seal the envelopes unless you like the taste of glue). Take the envelopes to the CNC Print Room and put them into the appropriate box. The envelopes should be bound together with an elastic, and the number of envelopes should be written on a tag attached to the pile. Out-of-town letters must be in a separate pile and put into a separate box.



That's all there is to it!

PGAS Database Manager

The PGAS maintains a database of all its members (active and past), possible members, friends, contributors, promotional relationships, and some schools. This database is currently managed on *Works 3.0 for Windows*. The database manager makes sure that the database is kept up-to-date: enters new members, changes the status of members, and call's members from time to time to check on the accuracy of database content. It is up to the database manager to periodically contact the PGAS executive to obtain all information on new members, contributors, and promotional contacts.

Every month, the database manager creates mailing labels for the PeGASus editor. This is done by using the query option with the **PeGASus field** set to **yes**. The Works word-processing document **labels.wps** is then opened, the label sheets are inserted into the printer and the document is printed.

From time-to-time, or upon request from the PGAS executive, the database manager will create a new membership list and distribute it to all active PGAS members. The membership list is generated using the *Report* option (General List report) on Works.

At the same time that an updated membership list is created, a copy of the updated database should be put on the computer at the observatory and the physics computer at CNC (see Bob Nelson).



AstroSurfing

Details of the Science News posted here are available on the astronomy forum on the Prince George Free-Net.

A new supersonic Gas-Liquid Cleaning System that does not abrade the surface of the hardware being cleaned has been developed by engineers at NASA's Kennedy Space Center, FL, and may soon be used to remove contaminants from Space Shuttle hardware and other sensitive structures. It requires much lower levels of pressure while using very little water. These features allow the system to be used for cleaning anything from small electronic circuit boards to much larger historic monuments and buildings.

Measurements returned by NASA's Galileo probe into Jupiter have provided dramatic new evidence about circulation processes within the planet's atmosphere and prompted scientists to propose radical new theories about Jupiter's original formation. Galileo scientists now think that the main driving force of Jupiter's winds is internal heat radiating upward from the planet's deep interior. The strength of the Jovian winds and the fact that they do not subside with depth is very significant. The most difficult probe finding for scientists to explain continues to be the extreme lack of water detected in the Jovian atmosphere. Additional information on the Galileo probe can be found on the Internet at the following URL: http://ccf.arc.nasa.gov/galileo_probe/

Scientists working with NASA's recently launched Polar satellite has released the best images ever made from space of the Earth's aurora. The new spacecraft data show remarkably clear views of the aurora borealis in the daytime.

Numerous space physics and plasma theories are being revised or overturned by data gathered during the Tethered Satellite System Reflight (TSS-1R) experiments on Space Shuttle Columbia's STS-75 mission last March. Models, accepted by scientists for more than 30 years, are incorrect and must be rewritten. This assessment follows analysis by a joint U.S.-Italian Tethered Satellite investigating team of the information gathered during the mission. Perhaps the most significant finding is that tether currents proved to be up to three times greater than existing theoretical models predicted prior to the mission. With the amount of power generated being directly proportional to the current, this bodes well for technological applications.

First produced last year by a NIST-University of Colorado group, Bose-Einstein condensates (BECs) comprise a new state of matter in which gas atoms, cooled to near-absolute-zero temperatures, overlap with each other and collapse into a common quantum state, where they behave essentially as a single "superparticle." It consists of 5 million atoms, 10 times bigger than any previous BEC, and is 150 microns long and 8 microns wide, large enough to be directly observed for the first time.

On May 19th the small asteroid designated 1996 JA1 caused lots of commotion among astronomers when it passed 450,000 km from Earth and

briefly reached magnitude 11. Meanwhile, a second rocky interloper was passing through our neighborhood on May 24th. Roughly a half kilometer across, 1996 JG is twice the size of JA1, but it came no closer than 3 million km and thus never got brighter than 13th magnitude.



Observers report that Hale-Bopp has brightened to magnitude 7.1, making it a snap to pick up in binoculars. Eagle-eyed Steve O'Meara in Hawaii and Terry Lovejoy in Australia even report being able to glimpse it with the naked eye. The comet has a coma about 15' across and a short fan-shaped tail. Hale-Bopp is currently in northernmost Sagittarius, about 15 dg northeast of the Teapot. You can see it low in the south after midnight.

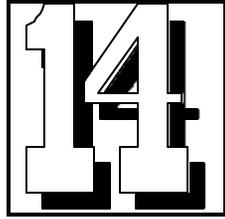
Astronomers have known since 1979 that Jupiter is encircled by a faint, dusty ring. Remarkably, new calculations suggest that many of the tiny dust grains may reside in the ring for less than a day before spiraling into the planet 50,000 km below. The particles are believed to arise from the surfaces of moonlets embedded within the ring, which are constantly bombarded by high-speed micrometeorites.

With the June solstice upon us, solar researcher Patrick McIntosh suggests that we may have reached the precise minimum between sunspot cycles 22 and 23. He notes that the strength of the Sun's radio emission at a wavelength of 10.7 cm has apparently bottomed out, and there's some evidence of an uptick in the number of active regions.

Fascinating new motion picture Entitled "Crab Nebula: The Movie," from NASA's Hubble Space Telescope shows glowing, eerie shifting patterns of light and sharp wisp-like features streaming away from the center of the Crab nebula at half the speed of light. The images reveal waves spreading away from the central pulsar in the Crab Nebula that change in a matter of days.

Take note of the fact that there will be two full Moons this month. The first occurs June 1st at 20:47 Universal Time; the second falls early on July 1st in Universal Time, but that translates to the evening of June 30th for all of North America. Astronomers observing the close approach of Comet Hyakutake to the Earth in March discovered large quantities of the gases ethane and methane in the comet. This is the first time these or other molecules classified as "saturated hydrocarbons" have been found in a comet, strongly suggesting that at least two basic types of comets inhabit the Solar System. Ethane has never before been detected in comets or in interstellar matter, the ultimate source material from which the Solar System was formed. Yet, comet investigators found levels of ethane in Comet Hyakutake that are about 1,000 times greater than can be explained if the molecules were formed by normal physical processes within the gases of the primordial solar nebula, the birth cloud of the Solar System.

Physicists at NIST (Christopher Monroe, 303-497-7415) have experimentally demonstrated the principles of the famous Schrodinger's cat thought experiment with a single beryllium ion. Superconducting Tunnel Junctions (STJ), under development as efficient detectors of x rays, can now also be used as single-photon detectors at visible wavelengths. In this regard they will



be welcomed by astronomers who increasingly record incoming light with charge-coupled device (CCD) arrays. In contrast to the silicon-based CCDs, which are insensitive to a photon's energy (one photon engenders one electron in the detector), the niobium-based STJ's do discriminate as to energy (one photon, depending on its energy, can generate thousands of electrons).

Determining a photon's energy would allow astronomers to forego filters, which lower the detector's overall efficiency. A STJ device developed by an Oxford-Cambridge-European Space Agency (Netherlands) collaboration can detect light in the wavelength range 200-500 nm with a spectral resolution of 45 nm (this should improve to 20 nm or better). The STJ can also determine the photon's time of arrival at the millisecond level, a property that would be handy for studying fast astronomical processes such as pulsars.

A UBC group led by Harvey Richer is getting a very long exposure of a globular cluster which they hope to use to detect many white dwarf stars of great age. The oldest white dwarfs in a globular cluster are just younger than the cluster itself. Globular clusters are thought for other reasons to contain the oldest stars in our galaxy, and they are thought to be just a billion or so years younger than the universe itself. The UBC group's observations can be interpreted to put a new lower limit on the age of the universe. That is an important contribution since the age of the globular clusters and the apparent age of the universe as a whole seem to conflict according to other measurements. It seems that the globular clusters are *older* than the universe, a logical impossibility. This work will go a long way toward clarifying which of these two ages has been determined erroneously.

Space physics suffered a serious setback on June 4th when an Ariane 5 rocket veered off course and broke apart within a minute of its launch. The payload consisted of four identical satellites, collectively called Cluster, that were to study the electromagnetic environment in Earth's vicinity. This "space fleet," which took 10 years and \$400 million to develop, had been built primarily by scientific teams from the European Space Agency with some participation from their colleagues in the U.S. Each craft carried 11 instruments. Since this was the Ariane 5's inaugural flight, neither it -- nor its payload -- was insured against such a catastrophic loss.

By looking for signs of deuterium in very distant gas clouds, backlit by an even more distant quasar (at a redshift of 3.7), astronomers at UC San Diego have determined that the ratio of primordial deuterium to hydrogen is 2.3×10^{-5} , a factor of 10 less than measurements reported by other groups in 1994. Primordial in this case refers to the abundances relatively early after the big bang as opposed to more recent eras by which time much deuterium will have been consumed by fusion burning in stars. The new lower D/H estimates imply that the overall early baryon (protons and neutrons) density was actually higher than previously thought, although still far less than would be required for the universe to eventually close back on itself.

Scientists at the University of Tokyo have achieved the highest peak speed for a computer performing a scientific calculation: 1.08 Tflops (short for trillion floating point operations per second). With their special-purpose GRAPE-4

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
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A.V. Jay Roofing	600
Xerox Canada	500
Russelsteel	465
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Canfor Clear Lake Division	270
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Canfor Netherlands Division	200
Carrier Lumber Ltd.	160
Tom Laing	150
Pine Drilling	150
Cloverdale Paint Inc.	100
Claus Schlueter	

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

The PGAS is a non-profit organization dedicated to the advancement of astronomy and science in general in Prince George and the neighboring northern communities. Donations of money or materials to the society are greatly appreciated and tax deductible.





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