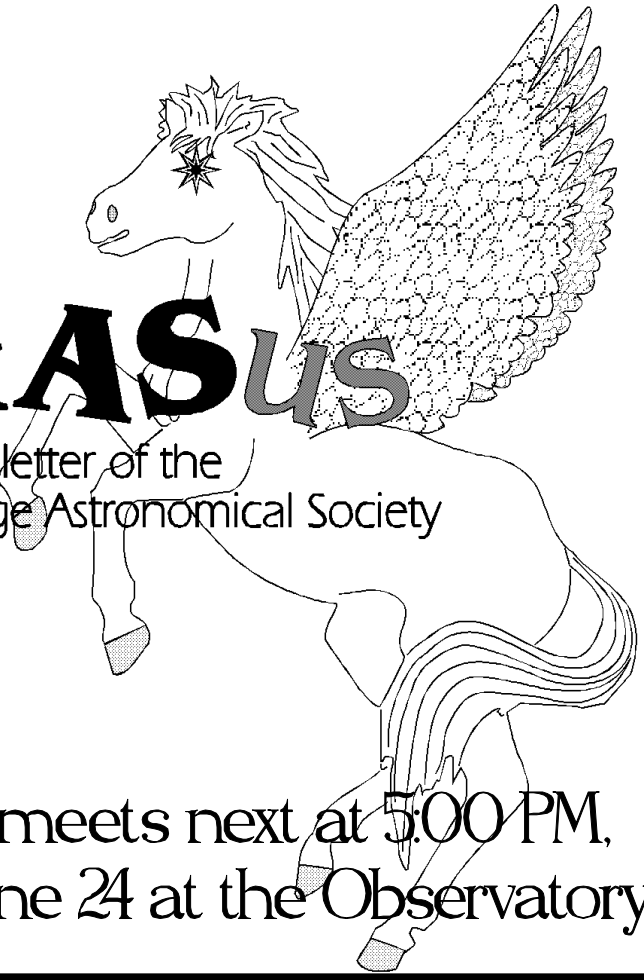
1995 JUNE Issue #58



the

PeGASus

Newsletter of the
The Prince George Astronomical Society

The PGAS meets next at 5:00 PM,
Saturday, June 24 at the Observatory

INSIDE :

the PeGASus is published monthly by the *Prince George Astronomical Society*.
Contributions to the newsletter are welcome.

Deadline for the next issue is Sept. 15

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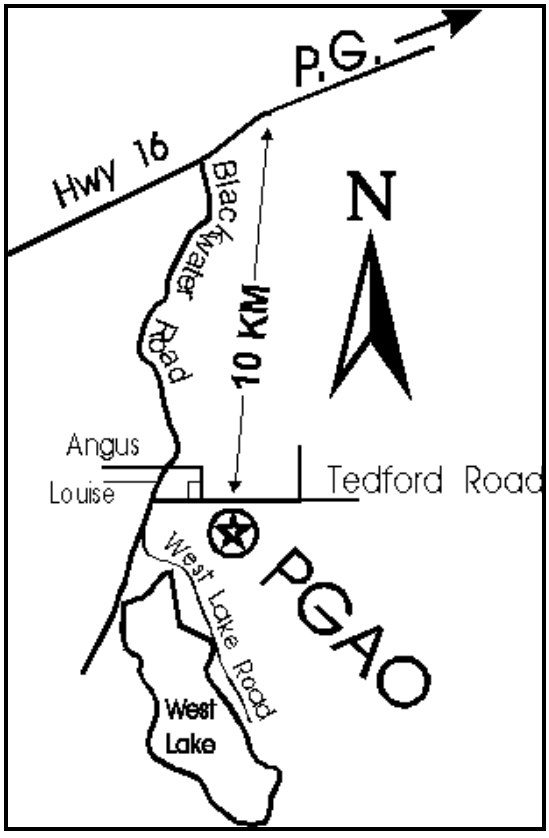

Prince George
Astronomical Society
Executive, 1994/5

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*

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Jon Bowen
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Orla Aaquist
*

PeGASus Editor
Orla Aaquist
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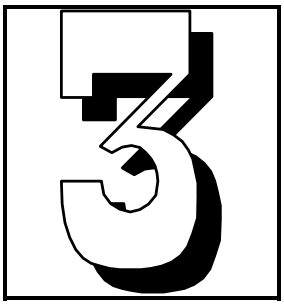
Librarian
Donovan Unruh

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

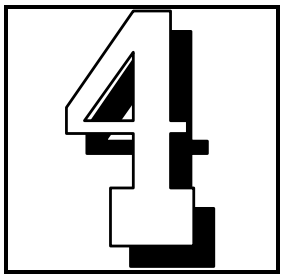


Once again it is summer and time for northern astronomers to go on vacation or otherwise worship the Sun. Because I am the high priest of the Prince George Sun Worshipers Society, my duties will not enable me to publish this newsletter for the months of July and August. The next newsletter is scheduled to be printed in mid-September. Please note the submission deadline on page 2.

You may notice that I have moved the *Image Gallery* from the last page to page 14 in preparation for making room for a few advertisements. This has been done without executive approval, and I am expecting a call from the PeGASus Police sometime this summer regarding this unauthorized action. My hope is to attract a few businesses who are willing to sponsor our newsletter in exchange for a little advertising.

I would like to thank all the volunteers who helped clean up the observatory. Lets try to keep it clean. This is difficult because there is no cleaning equipment out there; however, this will be rectified within the next few weeks (thanks Barb). The new CLOSEUP CHECKLIST will include an inspection for general tidiness and a requirement to mop or vacuum if dirt is found. If you find a mess when you arrive, then make note of it in the Log Book, check who used it last, and let the PeGASus editor know who the culprits are. The guilty party's names will then be printed in **BOLD AND CAPITAL** letters in the next newsletter. Now comes the tough part. Clean up the mess even if it isn't yours! If everyone cleans up after themselves and a little bit extra, the observatory will stay clean. Those of you who are parents know how well this rule works. Hopefully, the adults among us will set a good example; this includes the few 'real' men (the ones who don't eat quiche) among us.

As to whether or not I will be the editor of this newsletter in September is still uncertain.



Coming Events

PLEASE NOTE!

There is no monthly meeting in July and the June meeting is replaced by our annual summer picnic on Saturday, June 24.

June 14	-executive meeting at 2185 Ogelvie, 7:30
June 21	-Summer Solstice (2:35 PM)
June 24	-Annual picnic at the observatory. Picnic starts at 5:30 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 28	-**No monthly meeting.** Come to the picnic at on June 24, instead.
	-RASC General Assembly in Winsor, Ontario.
June 29	-Solar viewing, Fort-George Park for Canada Day.
July 1	-the *Fraser-Fort George Regional Museum* astronomy camp (12:30-4:00 pm).
July 26-28	-Star Party at Museum. StarLab presentations.
	-Earth passes through Saturn's ring plane again!
July 29	-Prince George Exhibition *Discovery Booth.*
August 10	-Perseid meteor shower party at observatory. The
Aug 11-13	shower peaks after midnight.
August 12	-Mt. Kobau Star Party.
	-monthly meeting at observatory. This is our fall
Aug 23-27	picnic. If you missed the June 24th picnic, be sure
August 26	not to miss this one.
	-Astronomy sleepover at *Museum?*
	-PGAS executive meeting. Location TBA.
Sept 1	-Matthew Burke's exhibit at the public library.
Sept 14	-monthly meeting at CNC.
September	-Science & Technology Week. Display at Pine
Sept 27	Centre on October 28 and 29.
Oct. 23-29	-PGAS executive meeting. Location TBA.
	-Annual General Meeting of the PGAS to be held at
Oct 12	CNC. Election of executive.
Oct 25	

The events listed here are subject to change without notice. For the latest update, call Orla Aaquist or Jon Bowen.

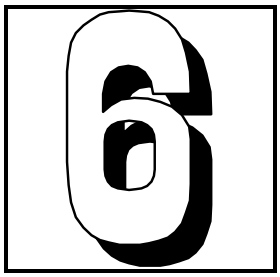
The Night Sky

by Alan Whitman

Jupiter rides low in the south through the summer, bright but too low for a good view. Mars continues to fade as it accelerates eastwards into Virgo. Saturn, ringless until August 10th, is the planet of interest this summer -- see last month's column for the observing challenges that it offers. Saturn won't reach opposition until mid-September, so it will be a late night object this summer.

While our latitude's all-night twilight in June and July is frustrating, we are perfectly positioned for viewing noctilucent clouds (literally, night-shining clouds). These clouds at the edge of space are believed to be ice crystals which have grown on meteoric dust. Noctilucent clouds are only visible for a few weeks around the summer solstice and normally only between about latitudes 50 and 57. At higher latitudes the sky is too bright to allow the gossamer noctilucent clouds to be seen. Noctilucent clouds somewhat resemble ordinary cirrus clouds but are so much higher that they still shine in sunlight when any cirrus clouds in the sky are dark grey silhouettes against the late twilight. Noctilucent clouds are most commonly pale green to whitish but this June's Sky & Telescope magazine features an incredible Finnish photo of iridescent pink and blue ones. One of the best displays that I have seen in recent years was visible while driving home from the club barbecue last June. Look low in the NNW on June and early July evenings in the hour before midnight.

The Perseid meteor shower, the highlight of the summer sky, conveniently occurs on a weekend this year, the night of August 12th to 13th. Since this is only two days after full moon, many observing columns will repeat that hoary old foolishness that this ruins the shower. Don't believe it! Do you watch the Perseids to see the 4th and 5th magnitude meteors that the moonlight will hide or to see fireballs? I thought so -- well, the fireballs will be as strikingly beautiful as ever. I well remember watching the Perseids with my parents one evening with a full moon, in town, many hours before the pre-dawn peak. But the Perseids produce numerous fireballs that year, the normal yellow and green ones but also red and even purple ones! Watch!



A Heavenly Mish-Mash...

by Jon Bowen

There's been quite a bit happening lately with the Astronomical Society, and I felt that this was the easiest way to keep you all up to date, so here goes....

First off, the next time you go out to the observatory, the telescope may look a little different. Bob is in the final stages of building what's become known as the "Four Shooter." In short, for those not familiar with it, the "Four Shooter" is a device to enable us use the telescope for four things at once. Through the use of a rotating mirror, you could just have finished taking a CCD image, and just have to twist a know, and bingo, what you were looking at is right there in the eyepiece on the other side of the device. Anyway, it promises to be a exceptionally useful addition to the telescope, and I'm really looking forward to using it.

This brings up the first point I would like to make. The executive laid down the groundwork for a new "policy" concerning volunteers. As you all know, there is still a lot of work to be done out at the observatory, and not much money to do it with. And so, after hours of carful thought and discussion, we came up with the following: "If you want to do some work to the building, go ahead." However, there is a catch: You have to check with the executive before you do anything. Basically speaking, if the executive feels your project is appropriate, it's all yours...

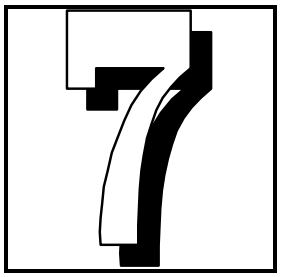
And so we come to meetings. We've tried to change the meeting format a little, both at the general and the executive. At the general meeting, you may have noticed that I don't say much. That's intentional, as I feel the regular members don't want to hear all the day to day details. If I'm wrong, and you do want to hear them, please let me know. At the executive meetings, we have tried to structure them a little more so that we ensure everything gets the attention it deserves. I will also remind you that regular members are welcome to attend and participate, with the exception that you may not vote unless you are a member of the executive. We've been holding the meetings the second Wednesday of the month (not July and August though..:) in the Xerox Office. Give me a call if you want to attend.

The third thing I would like to mention is regarding summer programs. Currently, sitting on my desk, I have requests from five separate groups who would like us to do something over the summer with them, including the Regional Museum, the Family Y, the Prince George Exhibition, Summerfest, etc. So if any of you are going to be around during the summer, and would like to help out, even if you are new to the club and astronomy, please feel free to give me a call.

And last, but not least, have a good summer, eh?

CASCA-95

by Orla Aaquist



The weather was great, the sky was clear, and as far as I know, most of the activity occurred during the day. Over 100 professional astronomers were there but no-one brought a telescope. We just talked and listened. Some of us learned something, others were there to parade their research. I was looking for a job. I took lots of notes, learned a little, and shook hands with David Levy.

Looking at the fallout of the CASCA annual conference, I see a folded business card, a long program of talks, a preliminary report on *Canadian Radio Astronomy in the 21st Century - The Challenge*, a proposal from the *Royal Astronomical Society of Canada* for a new journal, a used airline ticket booklet, restaurant and hotel receipts and many mystifying scrawls and scratches in my notebook. My suitcase is unpacked and the laundry is done. In this essay, I search my memory and notes for details.

WARNING! WARNING! Professional astronomy is not well in Canada. Funding to all major astronomy projects in Canada has virtually disappeared, and the death bell is once again sounding at one of the last two major Canadian astronomical research centres -- the *Dominion Radio Astrophysical Observatory* near Penticton. Astronomers are scrambling for alternatives in light of cutbacks, trying to find a place for their research. As many scientists migrate south, Canada's frontal lobes disappear.

Wolf-Rayet (WR) stars are evolved stars with powerful stellar winds. These winds should sweep out more-or-less spherically symmetric bubbles in the interstellar medium, but they don't. Most often, an ellipsoidal, double lobed shell is seen around these stars, the star itself offset significantly from the geometric centre of the bubble. What is going on here? Perhaps they are two-star systems or bipolar outflows occur from stars. No one knows.

The ROSAT All-Sky Survey (RASS) of the x-ray sky was carried out over a 6 month period in 1990/1 with arc minute spatial resolution. The RASS dataset is an ideal tool to study extended x-ray emission from supernova remnants. Databases such as the RASS are available to anyone on the internet, by the way. You just have to know where to look and what to do with it once you find it.

Some supernova remnants (SNR) have filled centres and some are shells. Why is this? My conference room mate, Brad (soon to be Dr.) Wallace, had evidence that this difference is due to something intrinsic to the explosion, rather than due to interactions with the interstellar medium (ISM).

Someone else said that if supernova (SN) are considered to be point explosions, then their shells should appear circular. They are not, so either SN are not point explosions, or a very inhomogeneous ISM has significant influence on the SNR expansion.

Aikman, from the Dominion Astrophysical Observatory, talked about near Earth asteroids. He reminded us that a collision between an asteroid and the Earth was usually more dangerous for the asteroid than for the Earth. There are only 3 or 4 collisions per million years that have catastrophic effects on the Earth. Comets were not included. Neither were large UFO's.

...Continued on page 10

Announcements

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.

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.

Where are Saturns Rings?

A complete observing guide to the disappearance of Saturn's rings can be found on page 68 of SKY & TELESCOPE's May issue.

Summer Volunteers Wanted

If you can help out over the summer, please let Jon Bowen know (563-9869).

Public Viewing

Remember that the observatory is open every Friday evening from 9 PM to midnight until the end of June and JUNE IS ALMOST OVER.

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.

Spot Spotted

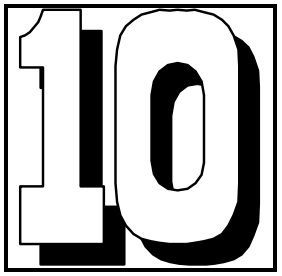
There were no spots on the Sun on June 16 as far as 40 grade 8 students from Vanderhoof could tell. These students were visiting our observatory as part of a field trip to West Lake. On the other hand, nice sunspots can materialize even though we are approaching solar minimum. As always, use appropriate filters and other safety precautions whenever you view the Sun. We have an excellent solar filter at the observatory for your use.

Solar Filters Missing

We use to have ten sheets of #14 welders glass for viewing the Sun. On Friday, June 16 I could only find three. Please check your pockets. Thanks.

Seeing "MIR":

For those who are tracking the Mir space station, SKY & TELESCOPE would be especially eager to receive reports from observers who can follow -- or photograph -- the station through their telescopes.



Apparently, only 1 out of every 10,000 comets orbiting Jupiter will result in a Shoemaker-Levy 9 type collision. So, what you saw last year was very spectacular and very rare. That piece of information was supported in part by NASA Planetary Geology and Geophysics Grant # NAGW-2061.

This year's winner of the Plaskett Medal was Michael Richer. This medal is given annually to someone who has done outstanding work in his/her doctoral thesis. Michael talked on "*Planetary Nebulae - Their Use as a Tool to Probe the Evolution of Galaxies"*. My own doctoral thesis was on planetary nebulae. Michael was a kindred spirit! I listened intently to his presentation but understood very little, so I spent the rest of the afternoon in the bar. Actually, I talked to Angela Boyles, manager of the "*Scientist & Innovators in the Schools Program"*, about the educational efforts of the PGAS and the future of such programs.

When my ego had recovered, I learned from A.G.G.M. Tielens that you can't tell the difference between auto exhaust and the molecules and dust in the Orion Nebula.

I was most impressed with a talk from Ralph Pudritz from McMaster University who had the courage to stand up and state that magnetic fields were essential in the formation of molecular jet-like flows from young stellar objects. Generally, astrophysicists ignore magnetic fields, claiming that they are too week; however, I have always suspected that the reason magnetic effects are ignored is because they are too difficult to deal with. This is certainly why I ignore them.

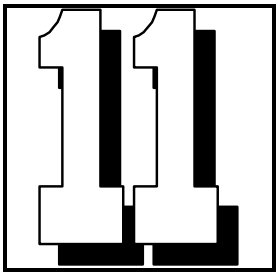
Finally, here is a challenge for the keen eyes of Alan Whitman and Bob Nelson. The R.M. Petrie Prize Lecture was given by George Herbig (of the infamous Herbig-Haro objects). George Herbig did not talk about his famous globules, rather he presented us with another interesting knot of gas, IC349 - Barnard's Merope Nebula. To describe this object, I can do no better than quote the abstract of Dr. Herbig's presentation:

> IC349 is the brightest area of the Pleiades reflection nebulosity, by an order of magnitude. It was discovered visually by Barnard in 1890, but it lies only 30" from the 4th magnitude star 23 Tauri and hence is lost on conventional photographs. Its form is very interesting: a fan with the apex pointing very nearly toward 23 Tau. Although its shape is reminiscent of some bipolar nebulae associated with pre-main sequence stars, IC 349 is not only unipolar, but is clearly a different kind of object. It will be argued that the semi-stellar nucleus at the apex of the fan is a dense condensation in the molecular cloud near which the Pleiades star cluster is now passing, and that IC 349 is the result of that condensation being dissipated in the radiation field of 23 Tauri.

Finally, I traded the CASCA Society Banquet for a hamburger, a trip through the Penticton burn area from last year's fire, an hour of bushwhacking, a quick swim, sauna, and an extra $15 in my pocket.

JRASC to be Replaced?

(*Extracted, in part from the CASCA Annual Meeting*)



Some of you are members of the RASC, and as you know the society produces a bimonthly journal called *The Journal of the Royal Astronomical Society of Canada* (JRASC). JRASC is the only scientific publication in Canada which specifically invites the submission of research papers in Astronomy. It has provided timely reports on the activities of individuals and institutions, both professional and amateur; has recorded the honours and awards received by Canadian astronomers, and reported their deaths; and has informed us of new developments in the teaching of astronomy; to name but a few features.

In spite of its successes, the JRASC has been the subject of criticism and controversy. The most frequently heard criticism is that it is a professional journal which does not meet the needs of the amateurs ... and the RASC is primarily a society of amateurs. The companion publication, *The Bulletin*, is exclusively a publication for the amateurs but cannot publish, for example, the long articles and papers which appear in the JRASC even when the latter are intended for the amateur.

A membership survey, conducted a few years ago, revealed the full spectrum of opinions about both publications: a clear consensus does not exist. The single relevant conclusion which one might draw from the survey is that a majority of members would welcome changes in the content and style of the publications, especially in the JRASC.

Following many discussions, a model/mockup of a possible new journal has been developed. The working title of the model publication is "Astronomy Canada" and it will replace the JRASC and The Bulletin.

Copies of the *Astronomy Canada* mockup will be distributed in the summer of 1995. After all members of the RASC, and other interested parties, have had an opportunity to examine the mockup, they will be invited to 'vote' to accept or reject it.

If you are interested in seeing a copy of this new journal, give Orla Aaquist a call at 964-9626.

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.

DO PULSARS HAVE JET ENGINES?: X-ray images of the Vela Pulsar reveal a 20-light-year-long jet extending from the spinning star. Although its axis is not aligned with the pulsar's observed proper motion, the Vela pulsar's jet might still have had a hand in driving the star from its birthplace.

NASA CUTBACKS PLANNED: The proverbial axe fell at NASA on Friday, May 19, when plans to remove more than 28,000 civil-service and contractor personnel from the agency's payroll by the year 2000 was announced. That would leave the agency with a civil-service workforce of 17,500. The biggest losers, based on the percentage of workers to be lost, are Ames Research Center in California (35%), Lewis Research Center in Ohio (33%), and NASA Headquarters itself (30%). The action was taken because President Clinton wants the projected NASA budget for the next 5 years pared by a total of $5 billion.

SPEKTR ARRIVES: A 21-ton Russian spacecraft called Spektr finally docked to the Mir space station on June 1st, bringing with it nearly a ton of scientific and medical equipment for astronaut Norman Thagard. The spacecraft was supposed to arrive in February, well before Thagard got there himself. But the launch slipped three months because Spektr was not yet ready and because the NASA equipment was tied up by Russian customs officials. At least seven Space Shuttles will visit Mir over the next three years, including a docking by Atlantis planned for later this month.

THE STEAMY SUN: A team of solar observers has found water on the Sun -- or, more precisely, they have identified water in spectra of the dark umbra of sunspots. The water molecule is stable below temperatures of about 4,000 K. The Sun's photosphere is quite a bit hotter than that, nearly 5,800 K, at which water breaks down into hydrogen and OH radicals. But sunspots are relatively cool oases on the photosphere, and the sunspot umbra studied by Lloyd Wallace and his colleagues had an estimated temperature of only 3,300 K, cool enough for water to exist stably. The sunspot observations were actually made years ago, in July 1991. But the Sun's spectrum is so complex that it's taken this long to find the absorption lines due to water, and show that they were *not* due to water in Earth's atmosphere. Other molecules already known to exist on the Sun include carbon monoxide, hydrogen fluoride, hydrogen chloride, and silicon oxide. Details appear in SCIENCE magazine for May 26th.

A COSMIC CIGAR: Last August, when asteroid 1620 Geographos cruised 5.1 million km from Earth, Steven Ostro of JPL used the Goldstone 70-meter tracking antenna in California to bombard it with a 450-kilowatt beam of radio

energy. The resulting radar echoes allowed him to construct detailed maps of the asteroid's shape. As Ostro's team reports in NATURE for June 8th, Geographos proved very elongated. The overall shape is irregular, nonconvex, and has an aspect ratio of nearly 3 to 1. This makes Geographos the most elongated solar- system object known.

HST SEES VIOLENT STARBIRTH: New images from the Hubble Space Telescope show collapsing disks of gas and dust surrounding three embryonic stars called Herbig-Haro objects. Remarkably, in these cases starbirth seems to be accompanied by blowtorch-like jets of hot matter ejected at nearly 1,000,000 km per hour. According to observer Chris Burrows, "For the first time we are seeing newborn stars close up -- at the scale of our solar system -- and probing their inner workings."

IS SPACE DISCONTINUOUS? Several theories attempt to combine quantum mechanics, which reigns supreme in the microcosmic world of atoms, and gravity, which governs the macrocosmos of planets and galaxies. In one theory introduced by Oxford scientist Roger Penrose, space itself is quantized into discrete volumes (each consisting of a spinning loop). Lee Smolin of Penn State and Carlo Rovelli of the University of Pittsburgh have now extended the work of Penrose and others. Without making any assumptions about the nature of space, they discover that space is indeed lumpy. In other words, just as quantum mechanics obliges atoms to exist in only certain energy states, so the combination of quantum mechanics and gravity results in space itself being quantized. (Nuclear Physics B, 29 May 1995.)

THE COSMIC INFRARED BACKGROUND, the supposed radiant heat from the first stars in the universe, is hard to detect since so many foreground objects, such as the Milky Way and our solar system, throw off heat of their own. The Cosmic Background Explorer (COBE), so proficient in mapping the microwave background, has failed so far to discern an infrared background. Discussing their measurements at a workshop in April, COBE researchers have, however, put new upper limits on the magnitude of an infrared background which serve to constrain cosmological models, at least those that called for early massive black holes or quasars. In order for COBE to say anything intelligible about cosmological infrared, it must understand (and subtract) the foreground infrared. This exercise has led to new insights about our galaxy (the central bulge of stars seems more football-shaped than spherical) and the near-Earth environment. (Science, 19 May 1995.)

14

Image Gallery

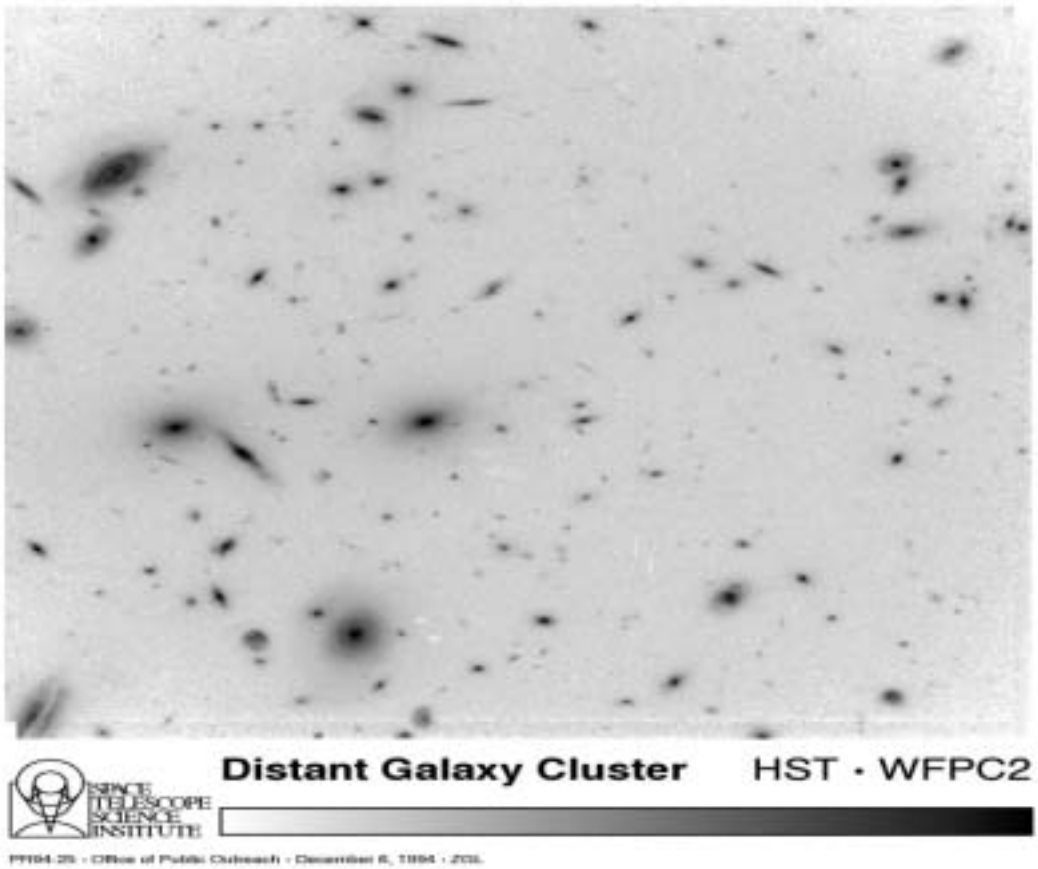
(PHOTO RELEASE NO.: STScI-PR94-25)

This NASA Hubble Space Telescope (HST) image of the central portion of a remote cluster of galaxies (CL 0939+4713) as it looked when the universe was two-thirds of its present age. Hubble's high resolution allows astronomers to study, for the first time, the shapes of galaxies as they were long ago.

The Space Telescope pictures are sharp enough to distinguish between various forms of spiral galaxies. Most of the spiral, or disk, galaxies have odd features, suggesting they were easily distorted within the environment of the rich cluster. Hubble reveals a number of mysterious "fragments" of galaxies interspersed through the cluster.

The HST picture confirms that billions of years ago, clusters of galaxies contained not only the types of galaxies dominating their descendant clusters today, but also several times as many spiral galaxies. These spiral galaxies have since disappeared through mergers and disruptions, as evident in the Hubble image.

This visible light image was taken with HST's Wide Field Planetary Camera 2 in Wide Field Camera mode, on January 10 and 12, 1994.



Credit: Alan Dressler (Carnegie Institution) and NASA

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.