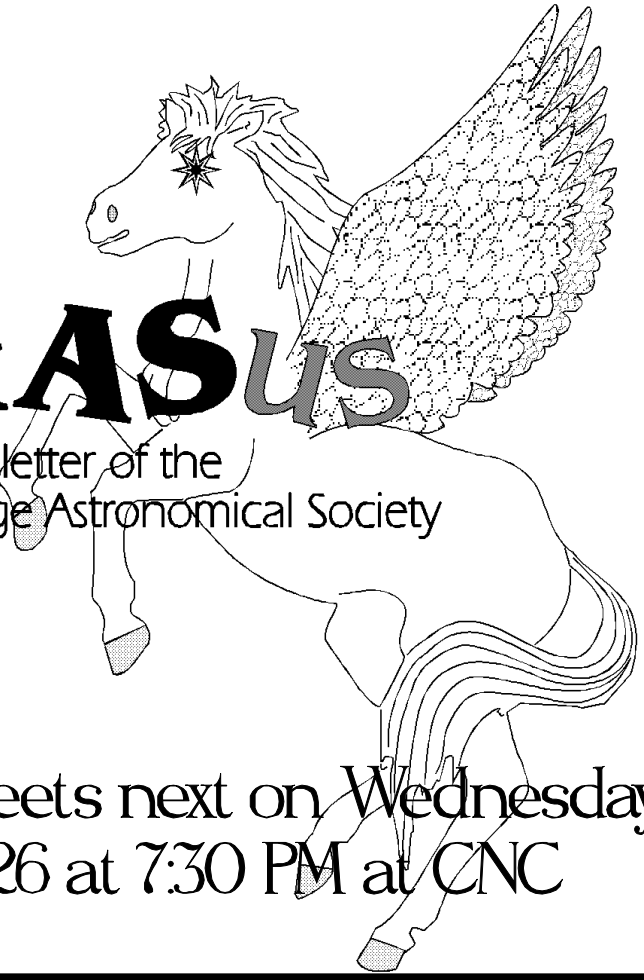
October 1994 Issue #51



the PeGASus

Newsletter of the
The Prince George Astronomical Society

The PGAS meets next on Wednesday
October 26 at 7:30 PM at CNC

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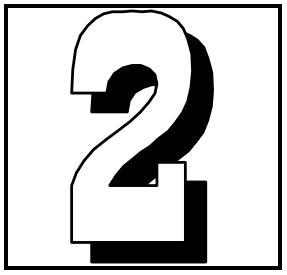

the PeGASus
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Deadline for the November issue is Friday, November 18

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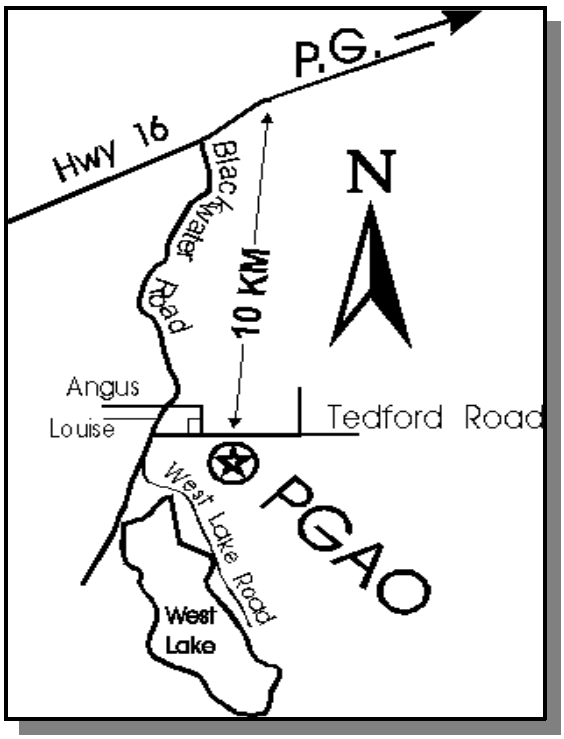

Prince George Astronomical Society Executive, 1993/4

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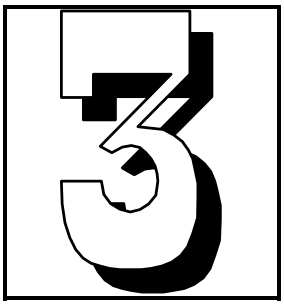
Technical Director
Bob Nelson
Observing Director
Jon Bowen
Promotional Director
Orla Aaquist
PeGASus Editor
Orla Aaquist

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

Editorial

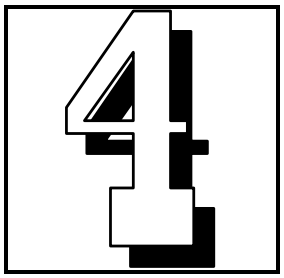


This month's issue of the PeGASus includes an article published in the September issue of *SKYNEWS* (RASC Victoria Centre's newsletter) by Jean Godin. In this article Jean describes the construction of a new observatory at the Lester B. Pearson College of the Pacific. I thought that this article would be of local interest because the PGAS has been in the process of constructing a new observatory over the last two years. Construction at the PGAO has come to a temporary halt due to the lack of funds. We have made two applications for funding: one to The Regional District, and the other to the BC 21 fund. Please, cross your fingers; and if you have any influential contacts, put it a good word for us.

There has been some progress at the observatory. Bob tells me that gas has been installed up to observatory building, including a gas meter. However, we still do not have a furnace. Hopefully, that will be remedied in the near future. If anyone has suggestions for acquiring a furnace, let your thoughts be known. Also, Bob has constructed a new finder for the 24" telescope. The finder has a 150 cm, 4" doublet and a 30mm eyepiece giving a magnification of 50X. He reports that the contrast in the new finder is good, and that he was able to get a good view of M57 under a full moon. The 24" has been out of balance due to the addition of the new finder; hopefully this problem will be fixed before you read this newsletter. The new Pluto software has been installed on the Observatory's 486. It has some new useful features, like being able to show the size of the field of view of the telescope. Bob is determining the field of view of the various optics at the observatory and will post the list at the observatory. Finally, the digital setting circles have been installed and are working. Give Bob Nelson a call to get checked out on the new software and setting circles.

A good response was received from members for my suggestion for a Messier Hunt. Matthew Burke is off to a good start with several under his belt. Matt made use of our newly installed digital setting circles to quickly find his targets. He reports that the setting circles seem to work; however, the target object does not always appear in the field of view of the main optics, but it is my understanding is that the setting circles are accurate enough to locate the target within its field of view of the new 4" finder. Bob says the digital setting circles seem to be off a little for targets far away from the guide stars. He suggests that if the circles seem to be off that you simply go into the align mode and align on a guide star closer to your target.

This month, Jon Bowen showed our observatory to 10 members of the PG Photography Club and 15 members of a local youth group; and Bob Nelson and Jon did the same for 15 students from CNC's Science I class. Orla Aaquist visited a grade 9 class at Duchess Park Secondary on behalf of the PGAS.



Monthly Meetings

by Orla Aaquist

The next meeting of the PGAS will be held at the **CNC** on Wednesday, October 26th at 7:30 PM.

The October meeting is our annual election of the executive. Please thinking about who you want to sit on the executive, and if you are on the executive, if you want to stand for another term. Also, October is the traditional time for members to renew their membership. Please support the club by PAYING YOUR ANNUAL DUES. You can bring your dues to the next meeting of the PGAS, or mail a cheque to the address given on the Application Form on page 15 of this newsletter. There is no need to send along the application form if you are already in our database. Your support is greatly appreciated since it helps pay for the publication and mailing of this wonderful newsletter, and it provides funding for cookies, coffee, and hot chocolate at our monthly meetings.

As of writing these notes, I am still looking for speakers for the next meeting. I have a brief presentation based on some visual photometry work done by my second year students at the University of Manitoba in 1991, and Dave Kubert and Ted Biech would like to show their latest version of a Colliding Galaxies program which they are marketing; look for their advertisement in the November issue of *Astronomy*.

At the last meeting, Jon Bowen showed portions of the video they took at the observatory of the Shoemaker-Levi collision with Jupiter, and they described how to hook a video camera up to the telescope. I showed few computer images of the Shoemaker-Levi collision which I pulled off INTERNET during my visit to The University of Calgary. No one had read the most recent Sky & Telescope summary of the collision so there were no enlightening discussions of this 'event-of-the-century'. Al Whitman brought some slides of this summer's annular solar eclipse and some fantastic slides of lightning strikes which he captured while chasing tornados somewhere south of the border. Time also permitted me to present the results of some research on Planetary Nebulae I am involved with at the University of Calgary.

The Night Sky

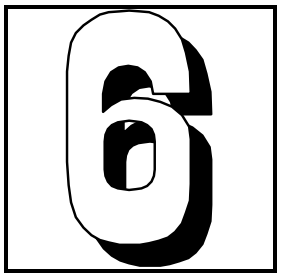
by Alan Whitman

Saturn is the only bright evening planet. By November, rapidly brightening orange Mars rises before midnight but is still best viewed in the morning sky. Mercury should become visible in the dawn by about October 31st and will be found near the crescent moon in morning twilight on November 1st and 2nd. Venus goes through inferior conjunction (passes between the Earth and Sun) on November 2nd and should be visible within a week or so. Its very thin crescent will be full minute or arc in diameter and will be visible even in rigidly-held good binoculars. To make positive identification of elusive Mercury, look for it 5 degrees to the left of Venus on the mornings of November 12th through 15th, low in the ESE.

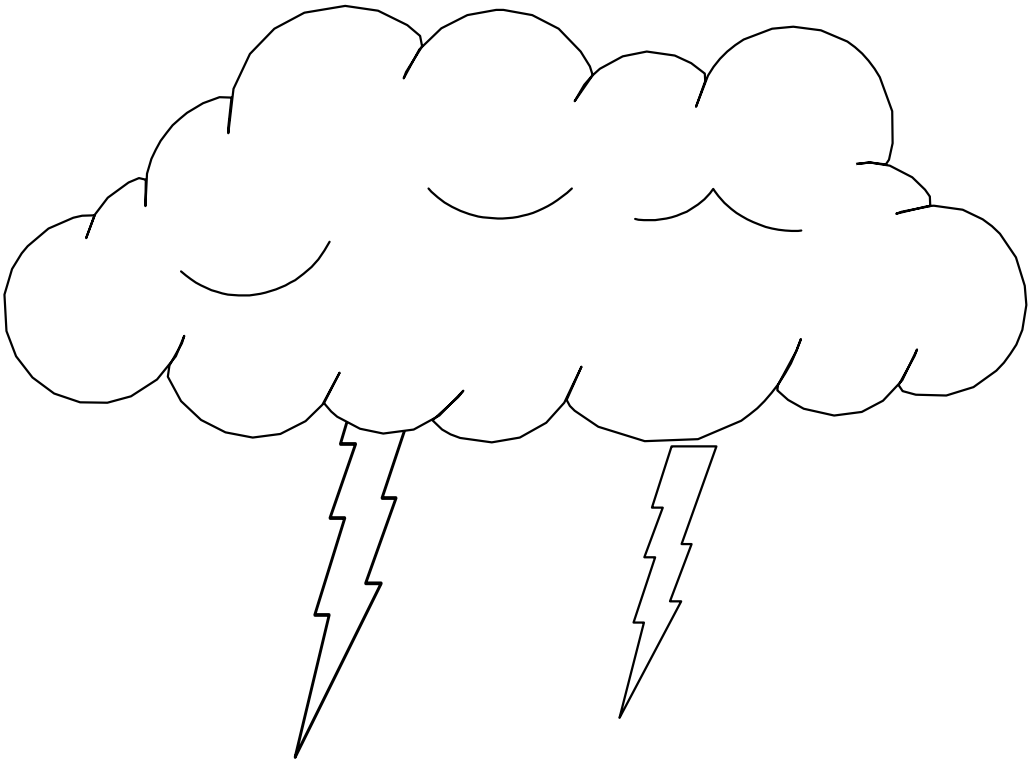
Messier Club: The Andromeda Galaxy, M31, is the most distant object visible to the unaided eye. The light we see from this largest galaxy in the Local Group has been travelling for about 2,400,000 years. At magnitude 3.4 its elongated oval is visible even from suburban skies and should be high on your list of objects to point out to your non-astronomical friends. Small telescopes reveal M31's starlike nucleus and the small bright elliptical satellite galaxy M32, lying in front of M31's disk. A four inch telescope will show M110, the other close satellite galaxy. It is on the opposite side of M31 from M32 and is farther from the main galaxy. M110's light is spread over a larger area than M32's and it appears fainter, but with a distinct nucleus.

M31's most prominent feature after its nucleus is a large starcloud at the same end of the ellipse as M32 but across the long axis and farther out from the nucleus. The starcloud is easy to find in an 8" on any transparent night. An 8" will reveal two long darklanes on a superbly transparent night; both darklanes lie on the same side of the long axis as M110 and the starcloud. These darklanes are easy to see in big Dobsonians such as the 17.5" ones common at star parties.

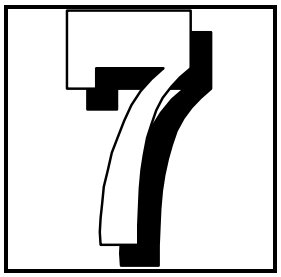
The Andromeda Galaxy offers some real challenges



for experienced observers. About seven degrees away in Cassiopea you can find two more elliptical companion galaxies with an 8", 12th magnitude NGC 185 and NGC 147. Finally, many of the Andromeda Galaxy's globular clusters are visible in the 24". They appear stellar so you will need a chart to distinguish them from the foreground stars in our galaxy. Walter Scott Houston's column for November, 1979 has a chart on page 490 which identifies 15 of them. This issue of Sky and Telescope is available in the CNC library stacks. In the early 1980's I used to make a yearly pilgrimage to the Goldendale Observatory east of Portland which has a 24" very much like ours. I once spent two hours painstakingly starhopping with the tiny 10 minute field of view of the telescope across the huge 4 degree expanse of the Andromeda Galaxy. My haul was only 3 globulars but it was a memorable night. The brightest one lies in the Cassiopea-like asterism just across the main axis from the star cloud and is an easy find.



After Flash



Well I'll be darned--I wasn't imagining that after all!

by Alan Whitman

Discussing the cometary impact of Jupiter, the July Sky and Telescope said on page 34: "Two phenomena will be associated with impacts of fragments larger than about 1/2 km across: the bolide flash lasting a couple of seconds, and the explosive fireball beginning some seconds later and lasting perhaps a minute or more." The only favourable impact from British Columbia was that of fragment R, a medium-sized fragment judging from the Hubble photograph of the comet. Tiny V was the only other possibility. These later impacts would not be quite as far behind the limb as the earlier impacts. The chance of seeing anything seemed remote but I watched for both events.

Clouds on July 20th forced my family 47 km south of Prince George to find clear skies. The transparency was excellent behind a cold front and Jupiter was found easily with the naked eye two minutes before sunset. I set up my 8" f6 Meade Newtonian, using 116x with a light blue filter. The following is all verbatim from my observing journal, written that evening.

"The seeing was atrocious at Jupiter's low altitude, sometimes with 'flames' running around the edge of the disk. The fireball would have to be long-lived to positively identify it. Saw the brown spot from the impact of fragment K and Europa's shadow (only one glimpse of the shadow) plus the NEB and SEB, as well as four moons. Forecast impact times for R were 10:41 PDT (July Sky & Tel), 10:59 (Aug Sky & Tel), 10:26 (Skyline 3 days ago), 10:36 (Skyline 2 days ago), and finally 10:17 (Skyline today). Started observing carefully at 10:07; got clouded out at 10:16 when an altocumulus grew in place to four times the area, decided against moving as it was a high and distant cloud; and remained clouded out until 10:29; thought I might have seen a flare of light at the correct spot at 10:31 PDT (SE limb) but the seeing was so bad and the flare so brief (about the 2 seconds of a typical meteor) that I would have to learn that the impact was actually at 10:31 to think I might have seen it; and watched from then to 10:55, battling hordes of mosquitoes."

About midnight, immediately upon reaching home, I called

continued on page 10...

Announcements

PGAS Executive Meeting

The PGAS executive will meet on September 28 at 6:30, just prior to the monthly meeting.

Membership Dues

It is time to renew your membership the the PGAS. A membership application/renewal form is included in on page 15 of this newsletter to remind you this annual fee. You do not need to send us this form if you are already listed on our database. Please support the club by paying your dues on time.

For Sale

10" F4.8 Dobsonian telescope with 60 mm 2" eyepiece, research-grade mirror cell and spider from Kenneth Novak, and a full-thickness mirror by Leo van der Byl.
$500.00
Phone John Pazder at 479-2456

Wanted

C90, or similar, to use as a guide scope. Must be in good, complete condition. Call Bill Almond at 478-6718 (daytime)

Setting Circles and Pluto

New setting circles have been installed on the PGAO's 24" telescope, and the latest version of Pluto has been installed on the PGAO's computer. To get help with these, call Bob Nelson at 563-6928

Messier Hunt

Several members have shown an interest in the Messier Hunt proposed in the last issue of *the PeGASus*. We now need someone to coordinate the project.

PG Free-Net

There is now an astronomy forum on Free-Net moderated by Orla Aaquist and Chris Brougham, PGAS members. A text version of *the PeGASus* is also put in the astronomy area of Free-Net. If you want access to Free-Net, you have to apply for an account. Application forms can be obtained from either the public or CNC Library. More information can be obtained by signing on to the Free-Net as a **guest** user. To do this, have your computer dial 563-3977. The modem settings should be 2400 baud, 8 bit, 1 stop bit, no parity, duplex full, and terminal emulation set to VT100, VT102, or VT220.

Collider 1.0

Ted Biech and Dave Kubert have completed version 1.0 of their colliding galaxies simulation program. They will be displaying their completed version of their software at the next meeting. See also their advertisement in the November issue of Astronomy Magazine.

After Flash ... *continued from pg 7*

the Prince George Astronomical Observatory and mentioned my possible sighting to Jon Bowen. This was partly to record my sighting in case it verified but I represented it as the longshot that I really thought that it was. I didn't really think that anything serious could have been accomplished with such atrocious seeing. In addition, I had completely forgotten about the possibility of seeing a 2 second bolide flash; I was thinking only of the chance of seeing a fireball. Since a fireball was predicted to last about a minute, I further discounted my 2 second flare.

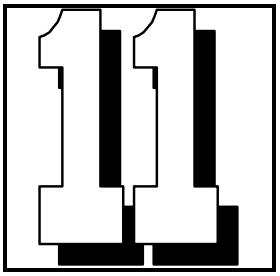
A caption on page 23 of the October, 1994 Sky and Telescope reads: "Astronomers using the giant Keck 1 telescope on Mauna Kea were among the few to witness the meteoric flash created by an incoming piece of the comet. This sequence of nine images at 2.3 microns begins July 21st at 5:33 UT. It shows two, 15 second flashes from fragment R spaced 45 seconds apart; about 8 minutes later the ensuing fireball erupted into view." This caption certainly caught my attention as 5:33 UT is 10:33 PDT which is very close to the time that I had recorded of 10:31. Was the discrepancy too large? I wasn't sure how accurate my time of 10:31 was since I know that I didn't look at my watch until I was sure that the flare was definitely over. The other problem was that the Keck flashes were of 15 seconds duration while mine was one of 2 seconds. This seemed a minor problem as it was easy to postulate that I saw only the brightest 2 seconds of the 15 second bolide or that the exposures were actually 15 seconds long rather than the bolide lasting so exceptionally long.

On page 33 of the November Sky and Telescope it says: "When fragment R hit at around 7:30 p.m. Hawaiian Standard Time on July 20th, Jon Lomberg of Honaunau, Hawaii, saw "the faint suggestion of a small bright blur on the limb of Jupiter that lasted several seconds:. This observation is virtually identical to mine and 7:30 HST is 10:30 PDT. Mr. Lomberg's observing site is 32 degrees south of mine and farther west so Jupiter would have been much higher in the sky from his site and his view was presumably far superior.

My observation was too uncertain to stand on its own but it should serve to confirm Mr. Lomberg's observation of a flash in visual wavelengths during the impact of Fragment R.

New Observatory at Pearson College

by Jean Godin



We at the Pearson College are very happy and proud of the agreement established between the Victoria Centre of the RASC and the College on September 8, 1994. The sharing of the Van der Byl Telescope corresponds very well with the educational goals of both institutions! It is with great enthusiasm that we undertook the construction of a small observatory on a hill 76 metres above sea level.

The Construction: Last summer we opened a 460 metre road, the "Milky Way", through a Douglas fir forest to the site splendidly overlooking the Juan de Fuca Straight and the Olympic Mountain Range. We discovered middens near a small pond suggesting that native people used the site in the past. It is curious, considering that the site is relatively far away from the coast and up the hill. During the last academic year a boat builder in Victoria, Mr. John Booth of Booth Enterprises, constructed separately the two half domes and the slit door. The Dome is made of balsa wood covered with a fibre-glass skin. A motor rolling along a fixed chain opens the slit door in four minutes. (On the first night with the students, it is my intention to play the music of the film "2001" as the door opens. Unfortunately, the chosen music piece extends for only three minutes!)

Last April the contractor started to build the observatory following the plans of Mr. Kenney Nickerson from Sooke. The building surrounds the concrete pier of an old windmill abandoned more than ten years ago. It is interesting to know that the wood used for the frame of the building came from trees we had to cut on our own campus. A portable mill on campus produced the planks. An engineer made sure that the observatory will survive a 7.5 earthquake!

It is a two-level building. On the first floor an unheated covered porch gives access to a heated room (4.9m x 7.3m) equipped with chairs, tables, bookshelves, maps, magazines, a projection screen, and a fully equipped 486 computer (475 MB HD, 16 MB Ram, DX 2 66 MHz) to be used for CCD image processing and astronomical software ("Earth Centered Universe", "Sky Pro" ...). Students and guests (the RASC members indeed!) will use the room to plan observations, exchange ideas and share dreams. The planning room has also a good collection of coats and sweaters! In any case, this room will be a good place to warm up with the help of hot chocolate. (No competition with the Newtons...!)

From the porch the staircase climbs to the 4.9m diameter dome housing the RASC 500mm telescope standing impressively on the "old" pier. Thanks to the Victoria Centre, the telescope will soon be robotized. In the telescope room, a 386 computer will read "Sky Pro" to slew the instrument toward the chosen object. A 286 will carry the software of a ST6 CCD camera. Later on another computer will lock on a star and guide the telescope during the exposure period. For this purpose, it is our intention to mount a refractor on the telescope. The dome is also equipped with stepladder, white and red lights, and necessary furniture.

On June 14 and 15 the dome was assembled on the tennis court of the College and the wheels installed on the round wall of the second floor of the observatory. On June 16 I slept nervously. On June 17 a helicopter landed on the tennis court. The RASC trailer was opened and the required preparations for the lift undertaken. Around 11:00 A.M. the helicopter took off with a cable attached to the tube of the telescope. It was followed by the base that was lowered on the top plate of the pier. Then the pilot lifted the dome with the slit opened over the tall fir trees and up the hill -- quite a sight! It fitted perfectly on the first try. The operation took 17 minutes. I slowed it down to be able to change the film in my camera! Here we were, standing under the dome, filled with relief, joy and pride. People grouped under the dome and we toasted! Later on an electric cable donated by GEC Alsthom International Canada Inc. was put into the

ground. The Building has power; in the coming months it will have water and a telephone line, possibly fibre-optic. The inside finishing, insulation, carpet, etc., will be complete in the near future. A washroom and a ramp for wheelchairs will also be installed.

The Program: We look forward to meeting members of the RASC at our own observatory and observing together. No doubt our students will value meeting you! The students at Pearson College represent 75 countries. About thirty students will choose astronomy in a given term. Last term this group represents twenty countries.

We will invite physically challenged people and school children to come and visit us regularly. Some astronomy students will also visit interested schools. We will also use the modem to send CCD images to schools! Schools in Vancouver, Kamloops, and in the Northwest Territories have already shown great interest. We also hope to participate in a scientific magazine on Internet. The students will together establish a realistic "research program". Some will choose to do their International Baccalaureate Extended Essay in astronomy. (Last year a student did a study of a few variable stars in the globular cluster M3.) We are considering organizing an astronomy workshop (one two-week event?) on campus during the summer when the College rents the facilities to different groups.

The coming months will be exploratory/organizational months. No doubt they will be challenging but also very exciting. The suggestions and experience of RASC members will be of great value.

Acknowledgments: The Pearson College Astronomical Observatory was made possible because of the special generosity of The RASC (Victoria Centre), The Galen Weston Foundation (Toronto), The James Wallace Foundation (Vancouver), GEC Alsthom (Ontario). I must also underline the cooperation of many people at the Canadian Coast Guard and the Dominion Astrophysical Observatory. Mr. Chris Spratt offered us books and magazines. The Johnston Company (Vancouver) helped with the carpet. Mr. John Pazder is presently working on the robotics. Mr. Ken English and Mr. John Wilkinson of Tri-City Auto (Metchosin) are helping us with the installation of the Meade. Mr. Mike Cowpland of Corel Corporation and Mr. Age Sehgal of the Sehgal Corporation (Ontario) have also been kind to us. Construction Aggregates in Colwood contributed to the access road. Finally, I must underline the strong encouragement and support of Alice and Jack Newton. Pearson College is privileged indeed to have them as patrons!

All will be invited to the opening ceremony this fall. The date will be determined in the next month.

I must also recognize the cooperation we are getting from the community surrounding our campus relative to light pollution. We ourselves are in the process of giving the example by bringing up a few changes to our light system.

Please do not hesitate to phone me for information at 478-5591 (work) or 478-9676 (home on campus). We will soon establish a simple protocol to permit access to the observatory. Remember, members of the RASC are welcome at Pearson College! I look forward to hearing from you.

Jean Godin is the Director of Studies and physics teacher responsible for the astronomy program at Lester B. Pearson College of the Pacific. This article was taken from the September 1994 issue (No. 156) of SKYNEWS, published by the Royal Astronomical Society of Canada, Victoria Centre. The editor of the PeGASus apologizes for any omissions or errors which may have occurred while retyping this article for publication in The Pegasus.

Electronic News

SkyNews comes to us over the electronic highway from Sky & Telescope Magazine by way of palmer@sfu.ca (Leigh Palmer at Simon Fraser University). This version has been severely edited for publication in this newsletter. For a full transcript, call the editor's office.

September 17, 1994: P/MACHHOLZ 2: Thanks to some poorly written news stories, some of you may now be thinking that Periodic Comet Machholz 2, 1994o, is headed for a close brush with Earth -- if not an outright collision. Fear not! First, the comet is actually moving **away** from Earth now, and in its present orbit it can't come any closer to us than about 15 million km. But the comet's orbit is brief, roughly 5 years, and conceivably it could venture near Jupiter at some point in the distant future. Then all bets would be off, but a close approach to Jupiter would most likely toss Machholz 2 out of the solar system altogether.

Meanwhile, the comet continues to coast among the predawn stars north of the Beehive Cluster in Cancer. John Bortle says that on September 12th, the brightest of its five pieces was magnitude 7.7 and fading. But since the coma is 5 arc minutes across and highly condensed, it's actually relatively easy to spot. There's also a short tail pointing northwest. All the other pieces are much fainter.

OTHER COMETS: Bortle also reports that Comet Nakamura-Nishimura-Machholz, 1994m, is down to magnitude 10.1, with a diffuse coma only 3 arc minutes across. A better bet, he says, is the periodic Comet Borrelly. Bortle reports was magnitude 10.3 and brightening when he observed it on the 12th. It has a small stellar nucleus that will make finding it easier than you might think, and it's located well up in the predawn sky just east of Orion.

MAGELLAN's FINAL EXPERIMENTS: NASA's Magellan orbiter is nearing the end of its tremendous mission at Venus. On September 14th, the spacecraft completed a novel "windmill" experiment. Magellan was turned so its solar panels faced "into the wind" of Venus's upper atmosphere, then they were angled like a windmill's. By noting how much the on-board thrusters were needed to counteract the spacecraft's urge to spin, engineers learned details about upper atmospheres that will prove valuable on future missions. Magellan has since resumed its mapping of Venus's gravity field. But on October 10th commands from Earth will fire the craft's thrusters and cause it to drop much lower down, where heat from atmospheric drag will destroy it in just a few days.

SOLAR ACTIVITY: Caspar Hossfield reports that solar activity continues to be low, with a sunspot index averaging 20.7 for the week ending September 14th.

October 1, 1994: HST COMET-CRASH NEWS: This week NASA scientists showed off new images of Jupiter and other data taken by the Hubble Space Telescope during and after the planet's head-on collision with Comet Shoemaker-Levy 9. In many ways the spots are evolving as might be expected, stretching out in longitude and gradually decreasing in contrast. But there have been surprises. For example, the comet's interactions with the Jovian magnetosphere were surprisingly strong. At one point, during impact of fragment K on July 19th, the orbiting Rosat observatory detected a burst of X-rays coming from Jupiter's **northern** hemisphere (the comet itself struck at latitude 44 degrees south). Scientists believe ions in K's fireball were accelerated and propelled northward along magnetic field lines, causing a temporary auroral display at both ultraviolet

and X-ray wavelengths. But the process responsible for this remains unexplained, at least for now.

MACHHOLZ 2 (1994o): Periodic Comet Machholz 2 has been undergoing some changes, say observers. The brightest of its five pieces, A, has become more diffuse, and its magnitude has faded to about 9 or 9.5. Meanwhile, component D has done just the opposite, brightening and becoming much more condensed. It's now estimated at magnitude 9 also.

SATURN SPOT: Saturn now looms brightly in our evening skies, and new activity has been sighted in its Equatorial Zone. Unlike the low-contrast spot reported a couple months ago, this is a bright white feature fairly prominent in amateur instruments. Ohio amateur Tom Dobbins first sighted a spot 4 arc seconds long on September 23rd at 3:16 Universal time. The spot's System I longitude is 206 degrees. You'll find Saturn situated low in the southeast among the stars of southern Aquarius as darkness falls. It's a gleaming, yellow-white beacon, the brightest point of light in that region of the sky.

October 8, 1994: P/MACHHOLZ 2 (1994o): Periodic Comet Machholz 2 is now in six pieces, as D was recently found split in two. You'll find it in the predawn sky near Regulus and the Sickle of Leo. SKY & TELESCOPE columnist John Bortle says Machholz 2 appears obviously double through a moderate telescope, as pieces A and D are much brighter than their siblings. Component A is magnitude 9.4 with slight condensation and a 2.5' coma. D is 10.1 with a diffuse 2' coma. Bortle notes this is the first comet in nearly 140 years to show fragments with distinct comas. Comet West did break apart in 1976, but its nuclei remained embedded in a single coma.

P/BORRELLY (1994l): Perhaps easier is Periodic Comet Borrelly, which rises about midnight about halfway between the bright stars Procyon and Betelgeuse. Bortle says Borrelly is very obvious, even in large binoculars, because its coma is strongly condensed with a stellar nucleus. He rates it magnitude 9.0 overall. Look for a short jet coming from the east side of the nucleus.

MAGELLAN's GRAND FINALE: This week should see the dramatic conclusion to one of NASA's greatest success stories in planetary exploration, the Magellan orbiter. Beginning the 11th, engineers at the Jet Propulsion Laboratory will fire Magellan's thrusters and force the craft deeper into the upper atmosphere of Venus. Contact may be lost within a day thereafter, with a final destructive plunge coming on Thursday or Friday. Magellan has been orbiting Venus for five years, providing spectacular radar images of that cloudy world and, more recently, providing a sensitive probe of the planet's gravity.

A SPACE RECORD TIED: For those of you who enjoy trivia, as this is written there are 12 humans in orbit -- six on the current shuttle mission, and six aboard Mir, the Russian space station. That ties the record for the greatest population in space. The last time this happened, notes space sleuth Jim Oberg, was in July 1992. And the maximum likely -- either now or in the foreseeable future is 13, assuming some future shuttle carries seven instead of six.

MEMBERSHIP APPLICATION

Prince George Astronomical Society

College of New Caledonia
3330 - 22nd Avenue
Prince George, B.C.
V2N 1P8

Names: _____

_____

_

Address: _____

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_____

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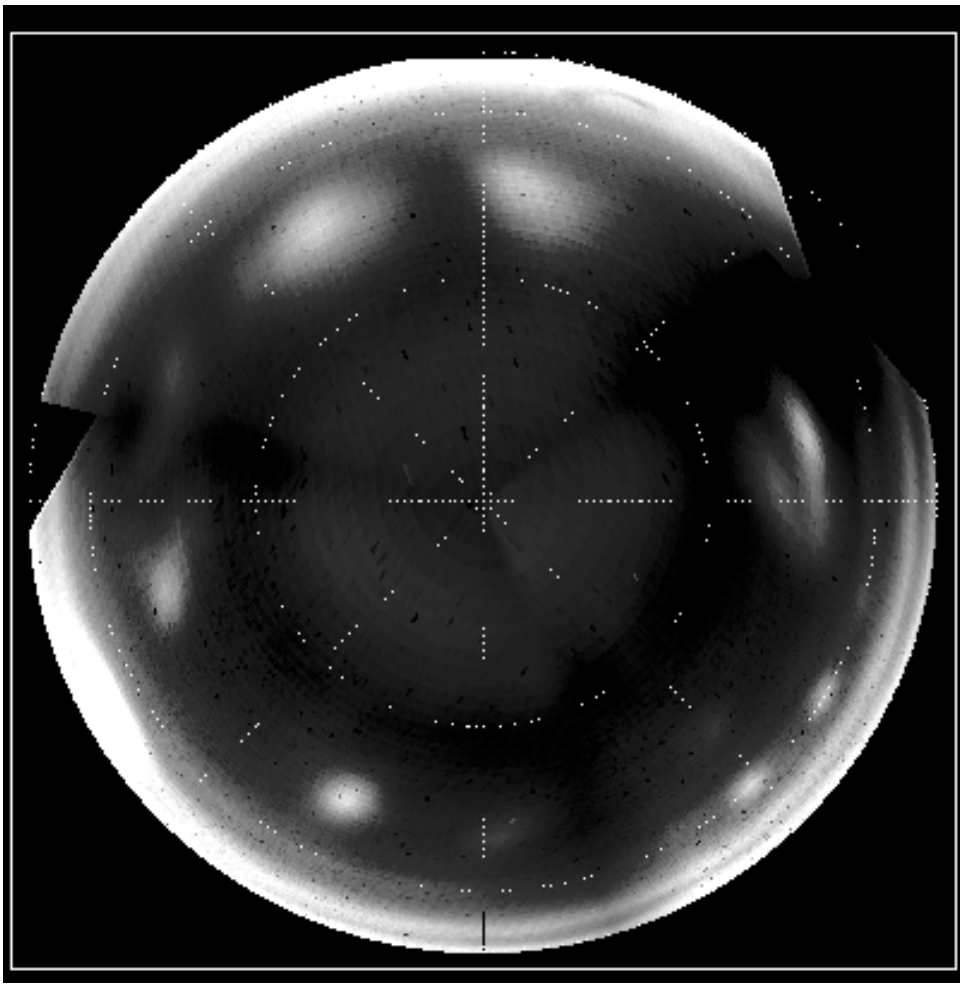

10 Fragment Impacts

This image is a polar orthographic mosaic of Jupiter, constructed from three near-infrared images taken at the 5-m Hale Telescope at Palomar Observatory on July 23 UT. The wavelength is 2.00 microns, where methane and hydrogen absorption in Jupiter's atmosphere is relatively weak. The image shows Jupiter as it would appear to an observer located below the south pole. The individual images were taken over a period of 6 hours, during which time Jupiter's rapid rotation permitted all 9 visible impact sites to be observed. Clockwise from the top of the picture the impact sites are: L, K/W (the prominent hook-shaped feature at 2:30 o'clock), C, A (at 6 o'clock), E/V/F, H, Q1, R, and G/S. (Feature R appears as a faint westward extension to G.) Two bright ovals appear at 30 degrees South and about 225 and 240 degrees longitude, while the Great Red Spot is just visible at the edge of the mosaic at 20 degrees South and longitude 116 degrees.

P. Nicholson, G. Neugebauer, K. Matthews, O. Othman, J. Moersch, J. Goodman, A. Weinberger, T. Hayward, C. McGhee, J. VanCleve, J. Miles and D. Shupe (Cornell University/Caltech/Air & Space Museum).