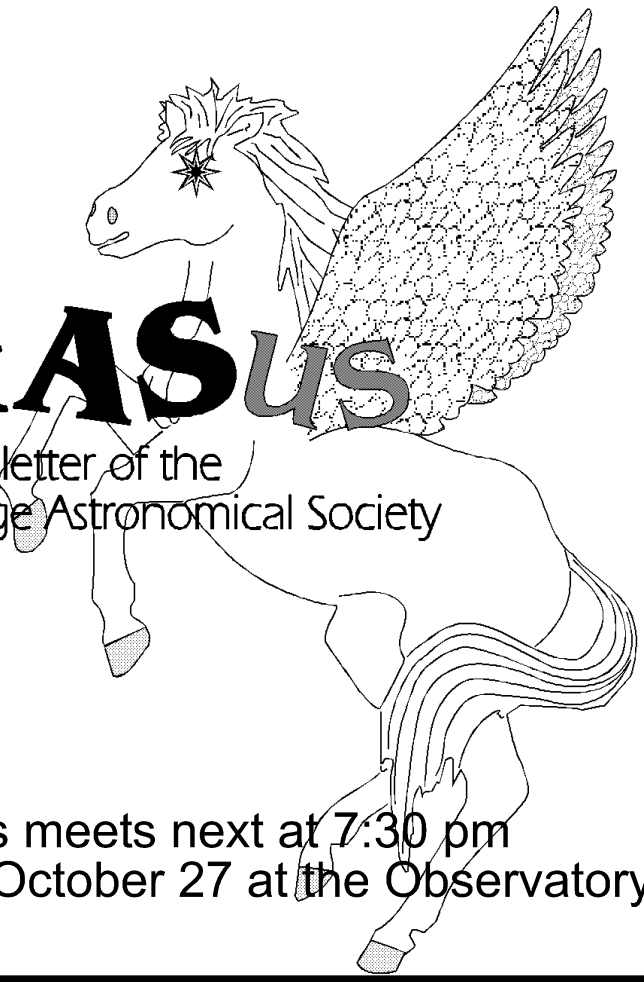
1999 OCTOBER ISSUE #97



the PeGASus

Newsletter of the
The Prince George Astronomical Society

The pgas meets next at 7:30 pm
WEDNESDAY October 27 at the Observatory

INSIDE :

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

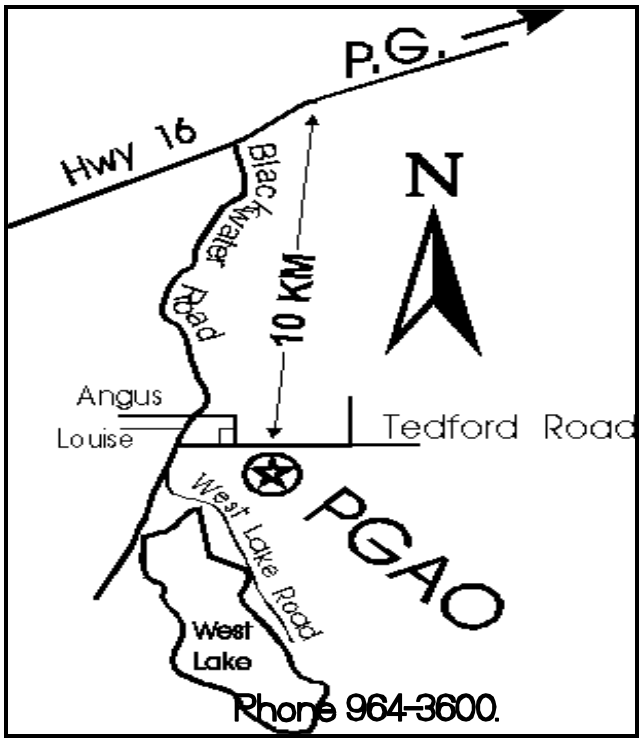
Our pursuits are out of this world.
Our activities are astronomical.
Our aim is the sky.

Contributions to the newsletter are welcome.

Deadline for the next issue is

November 12

Send correspondence to
The PGAS
3330 - 22nd Avenue
Prince George, BC, V2N 1P8
or
selfs@attcanada.net



Prince George Astronomical Society Executive, 1998/99

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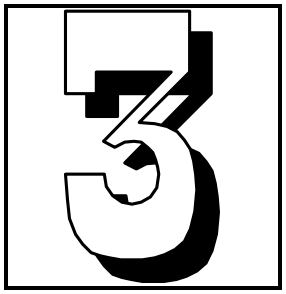


Editorial

Note from The Chair

My, aren't we getting formal! I just thought that I, as your current president, should mention an important issue that has come up. There has been a proposal that we, as a club, join the Royal Astronomical Society of Canada. The latter is Canada's national astronomical organization for both amateur and professional astronomers and has been in existence since 1890 with 23 centres across Canada from St. John's and Halifax in Atlantic Canada, to Vancouver and Victoria in this province (there is also a centre in the Okanagan). There is an annual meeting each summer, called the general assembly, to which Owen and I attended last year -- they're a lot of fun, and it's great to meet astronomers from all across the country. (In addition, I went to the one in Toronto this summer.)

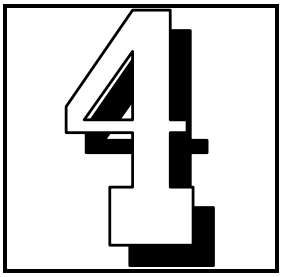
Why would we want to join? (After all, we've been an autonomous club for 20 years now.) Well, Owen and I got to thinking at last year's meeting that we've been isolated for just too long. You learn SO much from talking to other astronomers, picking up ideas, practical tips, and general enthusiasm. In addition, we could expect at least one speaker a year (and maybe two) to address our club, bringing information and good wishes from fellow astronomers.

It's true that our fees would double, but for that extra $20/year, each member would receive the Observer's Handbook (chocked full of information and used at probably every observatory in the world; it retails for $18 US if you order from Sky & Telescope), SkyNews (Canada's astronomical magazine) and the RASC Journal (scientific articles at the semi-technical level). I should also mention that a number of our members also belong to the RASC as unattached members, for which they pay $36/year.

As a club, we would continue to own our own resources (we'd have the largest observatory in the RASC), would have to submit a modest report each year (your executive would take care of that), and would have input to national RASC policy.

Well, what about it? The members present at the last general meeting gave their approval in principle, subject to settling all the details. We'll likely have another vote soon to finalize it one way or the other. Your input at this stage is vital to the future of our club.

Bob Nelson,
President



Coming Events

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

PGAS Meets next Wednesday October 27
7:30 pm at the observatory
Home Hobby Horsepower at the Multiplex October22 23,24. We have a prime location at this show thanks to Arby's and Don Clapper.

The Night Sky for November '99

by Bob Nelson, PhD
Hi Folks,

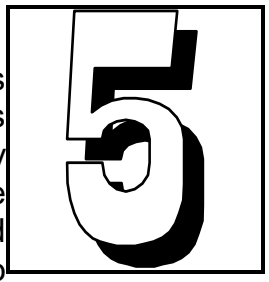
As I write this, it's raining out and I have a break from observing. The weather has been very kind this fall to astronomers in his part of the world, with frequent high pressure regions set for days at a time covering most or all of the province. I've been out observing at least 11 times in September and four so far in October. Some of the nights have been magnificent! What I've been doing is determining times of minimum of eclipsing binaries using our CCD camera; so far I have nine publishable times from September and October (18 in total for the year). Some of the light curves have been better than any to date and the accuracy of the times has been the best yet - - plus or minus 8 seconds for some! In addition -- wait for it -- I may, just may, have discovered a variable star!

This happened when I routinely plotted the uncalibrated magnitudes of the comparison star (from all the frames) versus time throughout the night. Usually the curve is fairly flat (with possible dips due to passing clouds) -- after all the comparison is supposed to be constant. However, much to my surprise, I discovered fine ripples of amplitude 0.02 magnitudes and period about 15 minutes. In addition, there is a larger amplitude variation of amplitude 0.06 magnitudes and period of about 2.4 hours. This may or may not be something significant.

I searched the SIMBAD database from the Hertzburg Institute of Astrophysics web page (to which I have an account) and found nothing. What I really have to do now is wait for a truly clear night and take scads of frames as quickly as possible and over as long a time span as possible. Will it turn into something? I have no idea, but will do my best to follow up on this.

Here's what is predicted to happen in PG Skies November:

(Unless otherwise noted, all events are for the 15th of the month.)



PLANET ROUNDUP

MERCURY starts the month as an evening object and ends it as a morning object. But in between, on November 15th, it transits the Sun!! According to the Observer's Handbook, transits by Mercury (i.e., passages across the face of the Sun) occur, on the average, 13 times per century. This one is a grazing transit and will be visible from here. Here in Prince George, according to Guide 7, first contact will occur at 1:12 PM, second contact at 1:22 PM, third contact at 1:59 and last contact at 2:10 PM. I'll likely set up the orange C-8 (complete with solar filter, of course) in front of the College (it's a Monday) if it's clear.

VENUS, in Virgo all month, is a fine morning object. It reached maximum elongation (angular distance from the Sun) of 46 degrees at the beginning of the month with this distance decreasing slowly to 44 degrees by month's end. On the middle of the month, it rises about 3 1/2 hours before the Sun and is a 21" disk of magnitude -4.3. In phase, it's half illuminated at the start of the month, becoming a smaller and smaller gibbous shape as it zooms away from the Earth before passing behind the Sun sometime next year.

MARS, in Sagittarius until the 25th, then Capricornus, is visible low in the southwest at sunset and sets some 4 hours after the Sun. It's a 6" disk of magnitude 0.8 or so (not too many surface details are visible from here, I'm afraid!).

JUPITER, in Pisces, is a fine evening object all month. On the 15th, it transits (crosses the meridian) at about 10 PM and is a 49" disk of magnitude -2.3 (big, bright, beautiful!!). Come out and see the main rings in breathtaking colour through the club's 24" telescope! (Watch for periods of steady air when many more details should be visible.) There will be a double shadow transit in the early evening of November 4, from 5:30 PM, PST to about 7:00 PM. (Io's shadow crosses the equatorial regions from about 5:03 to 7:12 while Ganymede's shadow crosses the south temperate regions from about 5:27 to 7:39 PM. Io reappears away from Jupiter at about 6:54 while Ganymede reappears at about 6:15 PM.) If it's clear we *may* try to set something up at the observatory. Regrettably, the event will be only 12 degrees above the eastern horizon near the start (5:30 PM) and 24 degrees near the end (7:00 PM) and Jupiter will likely be lost in the trees for the big scope.

SATURN, in Aries all month, seems to have become Jupiter's fainter companion, trailing behind it by some 15 degrees or so. At mid-month, it's a 20" disk of magnitude -0.2 (much smaller than Jupiter, but with its fabulous rings wide open at this point in Saturn's orbit). It reaches opposition on the 6th.

URANUS, in Capricornus all year, is in the south at sunset and sets some 5 hours after the Sun. It's a 3" disk (i.e., barely discernable as a disk) of magnitude 5.8. Look for its moons Ariel, Umbriel, Titania and Oberon (all about 14th magnitude -- see my CCD image from last month).

NEPTUNE, in Capricornus all year, sets almost 5 hours after the Sun. As usual, it's a 2.3" disk at about magnitude 8.0. Look for its giant moon Triton (again, see my CCD image from last month).

PLUTO, in Ophiuchus all year, rises at 8 AM and sets at 6 PM and therefore is invisible to us. As usual, it's a 0.1" disk at magnitude 13.8

Watch out for the Leonid meteor shower on the 17th -- it's supposed to be at its peak and very spectacular this year. See the November Sky and Telescope for details.

CONSTELLATIONS to look for in November (at 9:00 PM, PST) are Sculptor, Western Cetus, Pisces and Andromeda.

Sculptor (Scl, "The Sculptor's Tools"), another southern constellation at the limit of our visibility here in Prince George lies out of the Milky Way. It contains a few faint galaxies, a faint globular, NGC 288 and, near the latter, the south galactic pole which, at declination 27.5 degrees south, is just visible from Prince George. Let's take a CCD image of the field (which will be about 10 degrees above the southern horizon, Nov 15th at 9:40 PM, PST).

Western Cetus (Cet, "The Sea Monster"), contains a number of galaxies, including M77. It also contains the variable star Omicron Ceti a.k.a. Mira ("The Wonderful" -- I think it's wonderful, too!), the first pulsating variable star to be discovered (David Fabricus, 1596 Aug 13). It varies in brightness from 9th to 3rd or 4th magnitude over a period averaging 331 days. It's the prototype of a large class of long-period pulsating variable stars, has been continuously monitored longer than any other variable star, has been much researched and was, I believe, one of the stars that led to the formation of the American Association of Variable Star Observers (AAVSO) to which I've belonged since 1978.

Pisces (Psc, "The Fishes"), lies on the Zodiac. It contains M74, mentioned last year and, according to Burnham, one of the faintest and most elusive of the Messier objects requiring a dark sky and suitable eyepiece. Who-all's seen it? Pisces also contains, according to Norton's 2000.0 Star Atlas, the galaxies NGC 487 and 524.

Andromeda (And, "The Princess of Ethiopia"), is probably familiar to most of us; it contains the "Great Andromeda Galaxy" M31 along with its satellite ellipticals, M32 and NGC 205 (a.k.a. M110 -- but not really on Messier's list). M31 has been known at least as far back as 905 AD; it appeared on star charts long before the discovery of the telescope in 1609. Simon Marius is usually credited with the first telescopic observation in 1611 or 1612. Early observers thought the "nebula" consisted of glowing gases but long photographic exposures early in this century revealed it to be a vast star system. Edwin Hubble, observing Cepheid variables with the 100" Mt Wilson telescope, established the distance as around 90,000 light years, well out of this galaxy. Later, corrected calculations in 1953 extended the distance out to 2.2 million light years. We now know that M31, along with M33 and our galaxy, are the three largest members of the "Local Group", gravitationally bound and

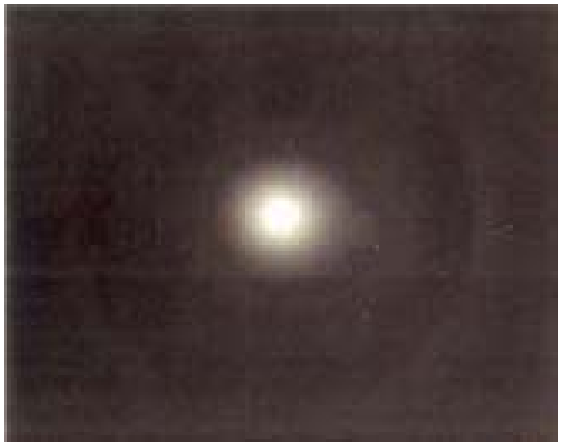
holding numerous smaller galaxies, including the Large and Small Megallanic Clouds. Needless to say, M31 has been the subject of many studies by professionals using the largest telescopes and is also a fine object for amateur study and photography.

Clear skies, Bob

Photo Gallery
By Owen Salava

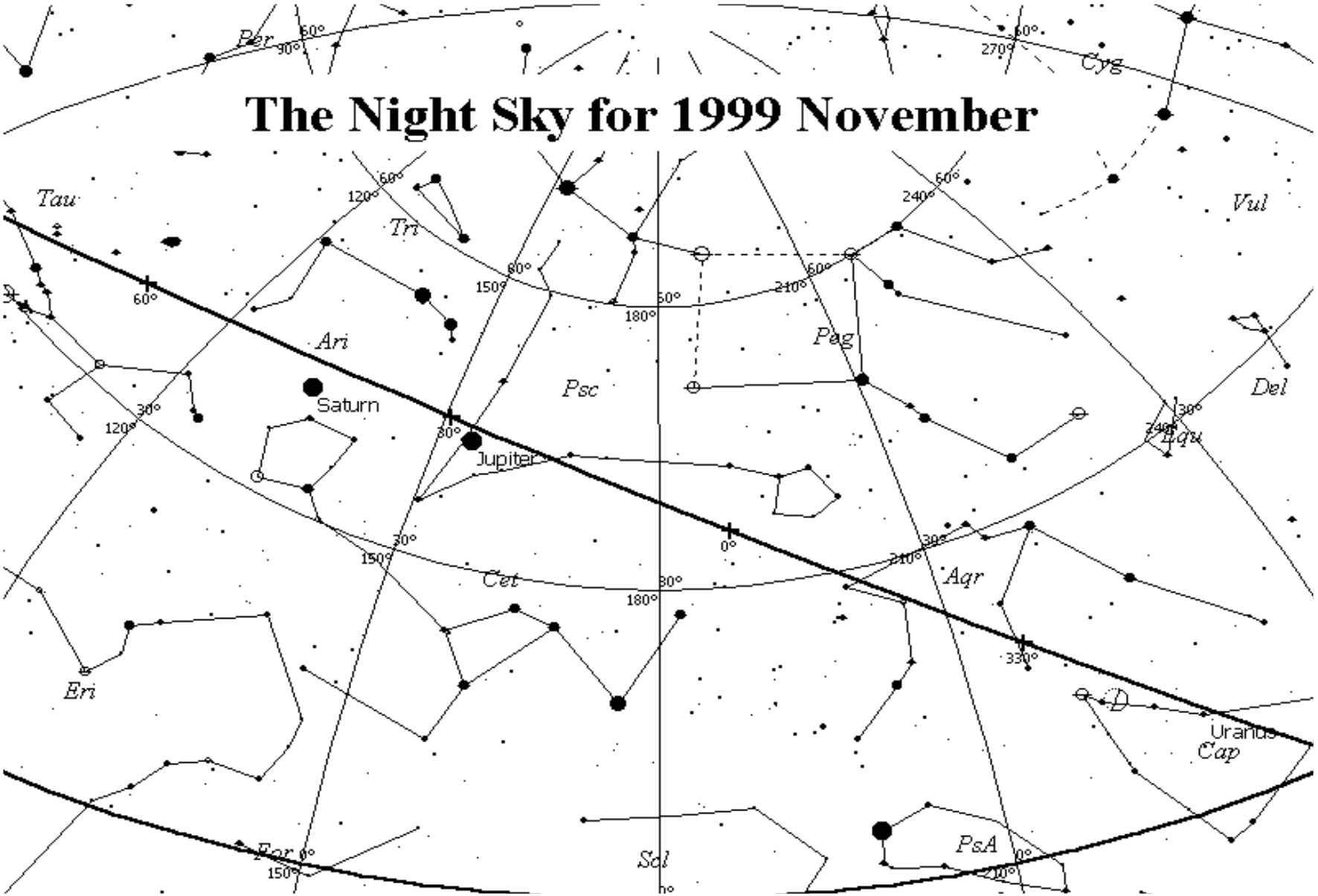
Orion's Belt

Orion Nebula



Moon Halo

Sun Activity

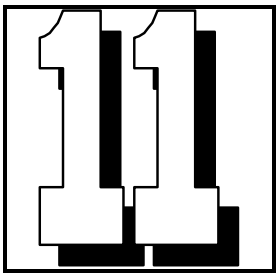


November 15 Skys for Prince George courtesy Dr Bob Nelson

10

Kane & Brian's Homemade Tripod and Barndoor Tracker

Notes from Al Whitman



Last night (10 UT, Sept 14th) the combination of excellent seeing and transparency allowed me to see blue supergiant stars in the Andromeda Galaxy with my 16-inch f/4.5 Meade Newtonian at 261x (7 mm orthoscopic).

In the April, 1998 issue of ASTRONOMY Richard Jakiel said of the O-B association NGC 206 in M31: "With a 16-inch or larger telescope you may resolve the brightest stars in this cloud, luminous blue supergiants. The brightest of them glow meekly at magnitude 15.5, making these stars 250,000 times brighter than the sun. With a 20-inch scope at very high power I have seen eight very faint stars in NGC 206".

I have been waiting for the perfect night to try. Yesterday afternoon the charts showed that a major upper ridgeline was forecast to pass over the Southern Interior of British Columbia at 12 UT. This meant that very good seeing was likely. In fact, it turned out to be excellent as I saw Encke's Division in the outer part of Saturn's A-ring at 348x at 1240 UT. In preparation, I uncovered my mirror in the early evening and by 10 UT it had
been cooling for eight hours. The transparency was also excellent -- for the third night in a row M33 was a naked-eye object (although it required averted vision, unlike Saturday night when it could be seen with direct vision). Lastly, M31 was in the zenith.

The star cloud NGC 206 was overlain with four or five brighter Milky Way stars. But behind them were perhaps eight stars flickering in and out of visibility, at the limit of vision (which is about magnitude 15.5 or 15.6 on this telescope). I carefully checked four areas immediately surrounding NGC
206 of the same size, but did not see any stars in the mag 15.5 range in those areas. So I am confident that the majority of the glimmerings that I saw were indeed some of the about 20 blue supergiants which are so prominent in NGC 206 in the best colour photographs of the galaxy. Nowhere else in photographs of the galaxy is there such a marked concentration of blue
supergiants.

While excellent transparency is the norm here, excellent seeing is rare in
this mountain valley. But the upper ridge came through bigtime!

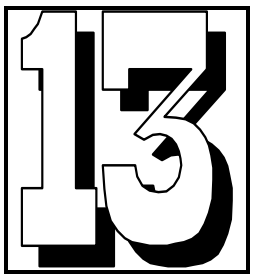
A lesser thrill was my first view of Hyperion, 1.6' SW of Saturn. Found at 261x using GUIDE 7, it was confirmed using the position of Dione and two field stars. The nearest star was magnitude 15.0, so there can be no doubt
of magnitude 14.2 Hyperion. Hyperion, which can be viewed with Saturn just outside of the field, was actually no tougher than inner satellite Enceladus which was near eastern elongation. Besides my second-ever view Of Encke's Division, the crepe ring was continuously visible, while the SEB had an elongated (E-W) darker area on the central meridian on the equator-ward side of the belt.

Noteworthy features on Jupiter at 12 UT at 348x and 522x included: a large vaguely kidney-shaped darker area in the NPR; a chaotic jumble of red-brown and white areas within the mostly doubled NEB, many darker patches, with an especially dark elongated (E-W) patch on the preceeding end of the NEBn; an unusually large grey festoon on the following side extending from the NEBs into the EZ; the most prominent Equatorial Belt in years; and seeing the SSTB far wider and darker than the faded, thin STB -- very unusual. There was a wide white zone between the SSTB and SPR -- I don't recall ever before seeing such a wide zone at that latitude. Even the SPR had a darker contrast feature. The four moons could be distinguished by the diameters of their disks alone, easily graded by size.

A memorable night!

The previous night, Sept 12th-13th, conditions were good enough to pick up four of the "Planetaries Beyond the NGC" in Jay McNeil's Aug/99 Sky&Tel article -- an enjoyable romp. All were plotted on the Millenium Star Atlas, so star-hopping worked best. Bi-polar Humason 1-2 (PK 86-8.1 in MSA) I highly recommend on a night of steady seeing. IC 5217 in Lacerta is upstaged by the beautiful perfect arc of nine stars about 9' N.p., well within the same 174x field. The finest NGC Object PN IC 289, notoriously difficult without a detailed chart in an 8-inch (mine included) was very obvious in the 16-inch at 174x with an OIII filter; in fact, it seemed annular on that night of exceptional transparency and very good seeing.

Best,
Alan Whitman



STARRY BULGES YIELD SECRETS TO GALAXY GROWTH

NASA's Hubble Space Telescope is uncovering important new clues to a galaxy's birth and growth by peering into its heart -- a bulge of millions of stars that resemble a bulbous center yolk in the middle of a disk of egg white.

Hubble astronomers are trying to solve the mystery of which came first: the stellar disk or the central bulge? Two complementary surveys by independent teams of astronomers using Hubble show that the hubs of some galaxies formed early in the Universe, while others formed more slowly, across a long stretch of time.

Hubble confirms that the evolutionary paths of bulges and disks are connected. The central bulge stabilizes a galaxy's development and largely controls the ebb and flow of star birth in the core. The central bulge holds secrets as to how and when a galaxy formed. Before Hubble, astronomers had detailed information only about the complex core of our galaxy, which has a small bulge peppered with massive young star clusters and a
telltale bar structure funneling gas to the center. Hubble allows astronomers to see bright star clusters, bars and other structures deep inside the bulges of other galaxies.

A group led by Reynier Peletier from the University of Nottingham, in the United Kingdom, has confirmed that the central bulges of more tightly wound spirals were all created at more or less the same time in the early universe.

A second team, led by C. Marcella Carollo of Columbia University in New York, surveyed galaxies that have small bulges and bar-like structures that bisect the nucleus like the slash across a no-smoking sign. They found that the bulges in these galaxies grew more recently, through markedly different processes happening within the galaxy's disk.

Both surveys used Hubble's precise resolution to peer into bulbous hubs of more than 200 neighboring galaxies, out to a distance of 100 million light-years. Using Hubble's visible-light and infrared cameras to

penetrate deep into the cores of the galaxies, astronomers were able to untangle the stars' true colors -- a measure of age -- from their apparent colors, which are made redder by interstellar dust.

Peletier's team used Hubble to look into the center of 20 spiral galaxies that have large bulges. The team found that elliptical bulges of stars formed over a relatively brief period very early in the young universe. This could have happened through the collapse of a single cloud of hydrogen or merger of primeval star clusters.

"Apparently everywhere in the universe these intermediate- sized galaxies must have started forming early on," reports Peletier in a paper to be published in the Monthly Notices of the Royal Astronomical Society. "The bulges of early spiral galaxies are old, and at least the outer parts of their disks are considerably younger."

Carollo's team found that in a different class of spiral galaxy, a small bulge probably formed early on, but was later fed by gas flowing into the galaxy's core, likely along a bar-like structure caused by instabilities in the surrounding disk of stars. The gas fueled the birth of new stars, and the bulge inflated like a beach ball as brilliant star clusters populated the center.

Carollo's results, to be published in the Astrophysical Journal,

Something to look forward to !

A faint comet discovered on September 27th by MIT Lincoln Laboratory's LINEAR robotic telescope in Socorro, New Mexico, may become a naked-eye object next summer. The location of Comet LINEAR (C/1999 S4) then is still uncertain by a couple of degrees. Although extremely faint right now, this comet is expected to reach perihelion next July 24th after dipping inside the Earth's orbit to about 0.75 astronomical unit from the Sun (that is, at roughly the same distance as Venus from the Sun). Around the time of the total lunar eclipse on July 16th, C/1999 S4 could be as bright as magnitude 3 or 4, low in the northwest evening sky.

NEW BOOKS AT THE PUBLIC LIBRARY.

By Yvonne Whebell.

A SKYWATCHER'S YEAR. By Jeff Kanipe.
Cambridge University Press, 1999 ISBN: 0-521-63405-9.
This book describes what can be seen, either with the naked eye or binoculars, throughout the year, by date. Both the northern and southern hemisphere sights are included. The text is interesting and well-written, and conveys the beauty of the night sky. Diagrams are clear and well-labelled.

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
Xerox Canada	1,300
Regional District of Fraser-Fort George	1,000
Prince George Rotary Club	1,000
The Pas Lumber Co	750
Rustad Broth & Co Ltd	750
Canfor Polar Division	744
Bisque Software	500
Canfor Clear Lake	500

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

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