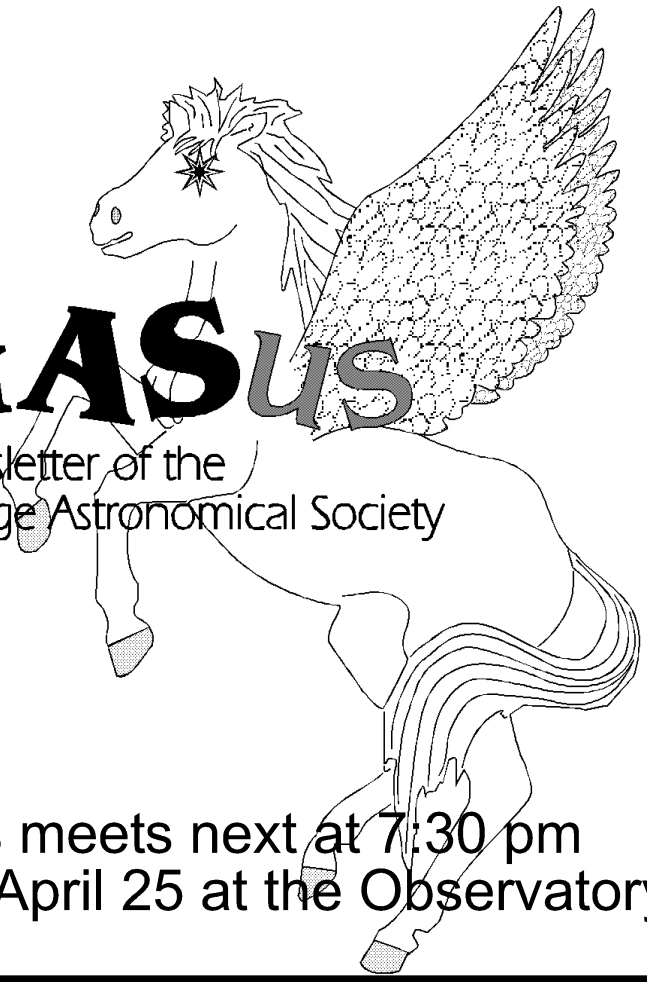
APRIL 2001 ISSUE #111



the PeGASus

Newsletter of the
The Prince George Astronomical Society

The pgas meets next at 7:30 pm
Wednesday April 25 at the Observatory

INSIDE :

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

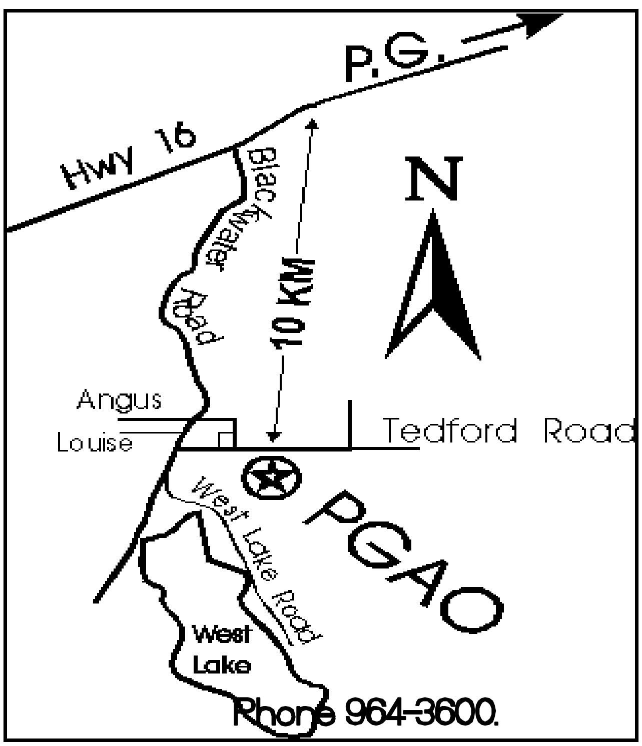
Our pursuits are out of this world.
Our activities are astronomical.
Our aim is the sky.

Contributions to the newsletter are welcome.

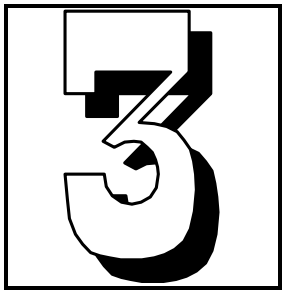
Deadline for the next issue is

May 18

Send correspondence to
The PGAS
3330 - 22nd Avenue
Prince George, BC, V2N 1P8
or
gil-pg@home.com



http://www.pgweb.com/astronomical/



EDITORIAL

Every month , I worry about this page. I consider it a privilege to receive five minutes of your time while you read my point of view. So I would like to make it coherent, thoughtful, interesting, Ah what the heck----------

What do Canadians have to be proud of?

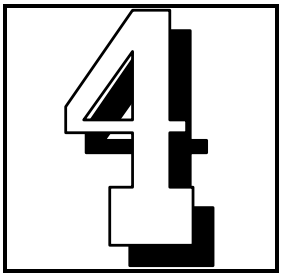
1. Smarties
2. Crispy Crunch & Coffee Crisp
3. The size of our footballs fields and one less Down
4. Baseball is Canadian
5. Lacrosse is Canadian
6. Hockey is Canadian
7. Basketball is Canadian
8. Apple pie is Canadian
9. Mr. Dress-up kicks Mr. Rogers a**
10. Tim Hortons kicks Dunkin' Donuts a**
11. In the war of 1812, started by America, Canadians pushed the Americans back...past their 'White House'. Then we burned it...and most of Washington, under the command of William Lyon McKenzie who was insane and hammered all the time. We got bored because they ran away, so we came home and partied... Go figure...
12. Canada has the largest French population that never surrendered to Germany.
13. We have the largest English population that never ever surrendered or withdrew during any war to anyone anywhere.
14. Our civil war was a bar fight that lasted a little over an hour.
15. The only person who was arrested in our civil war was an American mercenary, who slept in and missed the whole thing...but showed up just in time to get caught.
16. We knew plaid was cool far before Seattle caught on.
17. The Hudsons Bay Company once owned over 10% of the earth's surface and is still around as the worlds oldest company.
18. The average dog sled team can kill and devour a full grown human in under 3 minutes.
19. We still know what to do with all the parts of a buffalo.
20. We don't marry our kin-folk.
21. We invented ski-doos, jet-skis, velcro, zippers, insulin, penicillin, zambonis, the telephone and short wave radios that save countless lives each year
22. We ALL have frozen our tongues to something metal and lived to tell about it.

BUT MOST IMPORTANT!

23. ....the handles on our beer cases are big enough to fit your hands in with mitts on.

OOoohhhhh Canada!!

Oh yeah... and our elections only take one day.



Coming Events

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

The **PGAS.**
meets next May 25 , 7:30 pm at the Observatory
(continued on page

The Night Sky for May 2001

by Bob Nelson, PhD
Hi Folks,

Well, last month, I rambled on about my backyard observatory, moaning about its problems. Well, the good news is that it is working better. (I still have a few problems to work out, though. Doesn't that sound familiar?) Last night, I set it on a eclipsing binary and went to bed at around 4 AM. My wife (who gets up early) kindly did the shut-down procedure and closed the roof while I slept til noon. Thanks, Lois! I was happy to get a super light curve, and a good time of minimum which confirms that this system's period is slowing down, likely the result of a mass transfer.

Anyway, with better performance for my "BYO", and the end of the teaching year for me, I will be able to turn my attention to the trusty 24" telescope. I plan to install the 'flip' secondary sometime in May or June and make other improvements. Stay tuned!

Anyway, here is what is happening in the sky next month:

PLANET ROUNDUP

MERCURY, on the 15th sets almost 2.5 hours after the Sun. At sunset, it lies about 15 degrees above the western horizon. This is a very favourable apparition for northern observers. Just after the Sun has set, look for Mercury in an arc backward from where the Sun crossed the horizon.

VENUS is a morning object all month but is low (10 degrees above the horizon on the 15th) in the east at sunrise; however, the situation improves as the weeks roll on. Again on the 15th, it's a 32" crescent, 34% illuminated, of magnitude -5.3.

MARS, in Sagittarius all month, rises on the 15th at around midnight and is a 16"

disk of magnitude -1.8. It will get better in the next few months!

JUPITER, in Taurus until July, sets around 11 PM and is a 32" disk of magnitude -1.8. On May 15, there is a transit of the Great Red Spot at 9:21 PM (PDT). This will be just after sunset, but should be easily visible. There are the usual shadow transits and eclipses all month. Ask me for more details if you are interested, or purchase Guide 7 which has it all! (Or look in the Observer's Handbook, if you are an RASC member.)

SATURN, in Taurus all year, sets on the 15th at 9:45 PM and is a 16.4" disk of magnitude -0.3. It's going fast, folks! However, you can see it before sunset if you know where to look.

URANUS, in Capricornus all year, is a morning object this month. It rises on the 15th at 2:38 AM (PDT) and is a 3.5" disk of magnitude 5.8. Look for it in the coming months.

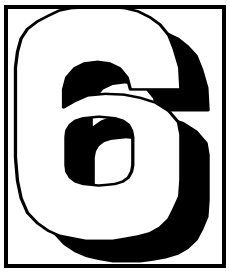
NEPTUNE, in Capricornus all year, is also a morning object all month. On the 15th, it rises at about 2 AM (PDT) As usual, it's a 2.3" disk at about magnitude 8.0.

PLUTO, in Ophiuchus all year, rises on the 15th at about 9:30 PM (PST). As usual, it's a 0.1" disk at magnitude 13.8.

CONSTELLATIONS to look for in May (at 11:00 PM PDT) are Eastern Hydra, Corvus, Virgo, Coma Berenices, Bootes and Canes Venetici.

Corvus ("The Crow") is the small lectern-shaped constellation southeast of Leo (the top two stars point up and left towards Spica to the northeast). It contains NGC 4782, a galaxy located halfway towards Spica and NGC 4361, a planetary nebula inside the figure. Messier 104 is just over the north boundary in Virgo. It also contains NGC 4038 - the "Ring-Tail Galaxy" about 3.7 WSW from Gamma Corvi. (Follow the top two pointer stars for about the same distance down and to the right.) According to Burnham's Celestial Handbook, it's 'sometimes' regarded as a gravitationally interacting (or actually colliding) pair of galaxies. (Today, I think there's no doubt that they are colliding galaxies.) Deep images (and RealSky does a good job) show a kidney- shaped object with two curved tails extending north and south. Radial velocity measurements show that the system lies about 90 million light years distant, giving it a diameter of 100,000 light years and total luminosity of 20 billion suns. There is also another galaxy (NGC 4027) lying 0.7 degrees away that is "almost certainly" gravitationally linked. This should be an easy target, next time you are out at the observatory.

Hydra ("The Sea Serpent") is a sprawling constellation running from 8 hours to 15 hours right ascension and from -35 to +5 degrees declination. In this month's region of interest, there is globular cluster M68, lying 3.8 degrees southeast of Beta Corvi

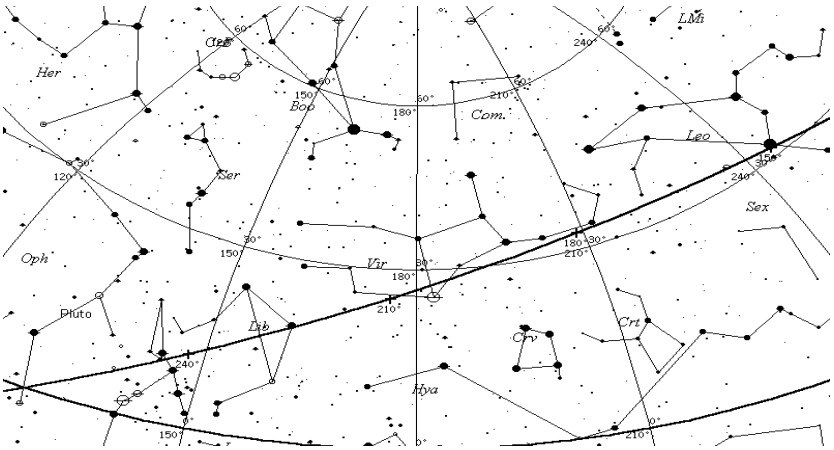


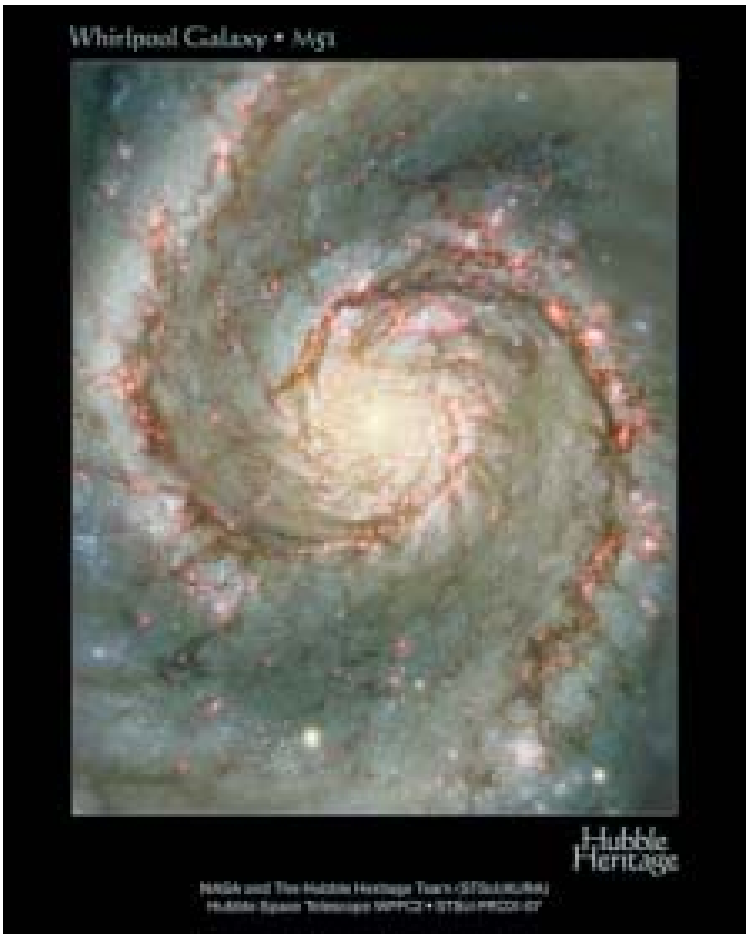
(the star at the lower left corner of Corvus), and several galaxies, M83, NGCs 5061, 3923, and 3821. It also contains NGC 5694, one of the more remote globular clusters that are still part of our galaxy. It lies at the eastern end of the 'tail'. It was discovered by Sir William Herschel in 1784, recognized as a globular by Clyde Tombaugh and friend at Lowell Observatory in 1932. Measurements soon after, and also later, reveal that it is about 100,000 light years away on the far side of our galaxy and about 85,000 from the galactic centre. Its stars are hard to resolve and furthermore, at declination -26 , it is a difficult object for us to see. Brian, Doug?

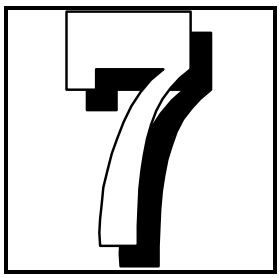
Virgo ("The Virgin") and Coma Berenices ("Bernice's Hair"), lying to the east of Leo, are the regions of the sky rich in galaxies. Virgo contains 11 Messier objects, all galaxies and many NGC objects too numerous to mention. These are part of the giant Virgo cluster of galaxies lying some 20 megapasecs (65 million light years) from Earth. This contains some 1000 galaxies and shines with the light of 10^14 suns. It is thought that the local group (containing the Milky Way Galaxy, M31, M33 and others) may be falling towards the Vigo Cluster. Nearby in the sky, but much more distant is the even larger Coma cluster which lies some 150 megaparsecs (500 million light years) away. It contains some 10,000 galaxies and shines with the light of 10^15 suns.

Also in western **Coma Berenices** lie the globular clusters M53 and NGC 5053, about 1 degree apart. In Canes Venatici, about 15 degrees to the northeast, lies M3, one of the three finest globular clusters in the northern sky, (the others are M13 and M5). Discovered by Messier in 1764, it glows with the apparent magnitude of a 6th magnitude star and lies about 35,000 light years distant.

Another event, on about May 5, is the **Eta Aquarid** meteor shower (in Aquarius, of course). As usual, it's best after midnight. See the Observer's Handbook for details.
Clear skies,
-Bob





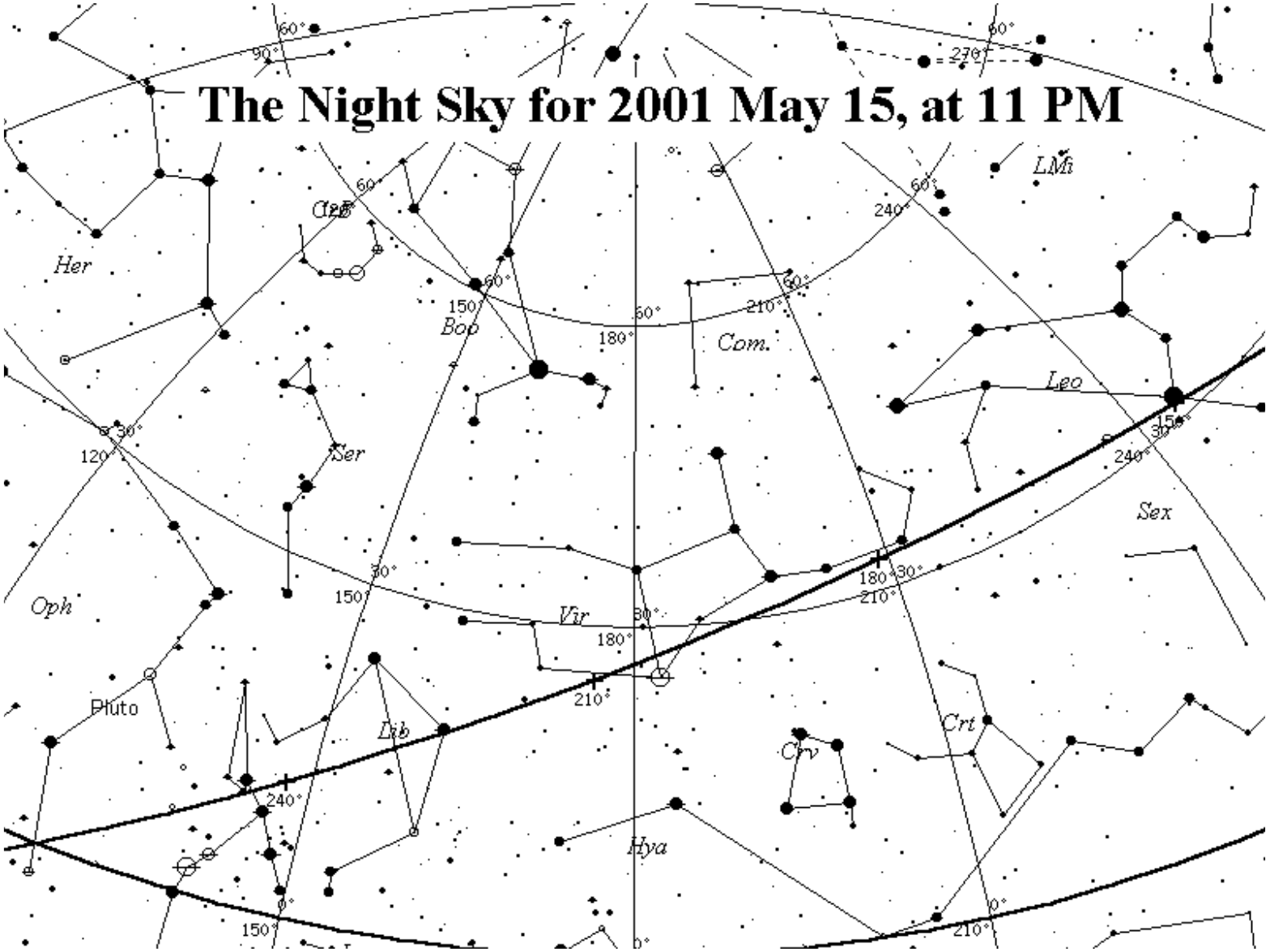


New images from NASA's Hubble Space Telescope are helping researchers view in unprecedented detail the spiral arms and dust clouds of a nearby galaxy, which are the birth sites of massive and luminous stars.

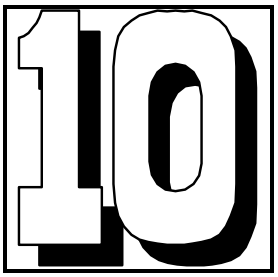
The Whirlpool galaxy, M51, has been one of the most photogenic galaxies in amateur and professional astronomy. Easily photographed and viewed by smaller telescopes, this celestial beauty is studied extensively in a range of wavelengths by large ground- and space-based observatories. This Hubble composite image shows visible starlight as well as light from the emission of glowing hydrogen, which is associated with the most luminous young stars in the spiral arms.

M51, also known as NGC 5194, is having a close encounter with a nearby companion galaxy, NGC 5195, just off the upper edge of this image. The companion's gravitational pull is triggering star formation in the main galaxy, as seen in brilliant detail by numerous, luminous clusters of young and energetic stars. The bright clusters are highlighted in red by their associated emission from glowing hydrogen gas.

(continued on page 10)



MAY Sky Map courtesy Dr Bob Nelson



This Wide Field Planetary Camera 2 image enables a research group, led by Nick Scoville (Caltech), to clearly define the structure of both the cold dust clouds and the hot hydrogen and link individual clusters to their parent dust clouds. Team members include M. Polletta (U. Geneva); S. Ewald and S.Stolovy (Caltech); R. Thompson and M. Rieke (U. of Arizona).

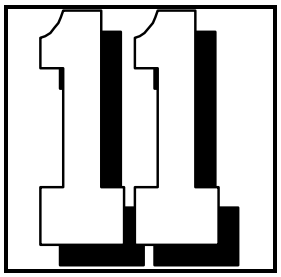
Intricate structure is also seen for the first time in the dust clouds. Along the spiral arms, dust "spurs" are seen branching out almost perpendicular to the main spiral arms. The regularity and large number of these features suggest to astronomers that previous models of "two-arm" spiral galaxies may need to be revisited. The new images also reveal a dust disk in the nucleus, which may provide fuel for a nuclear black hole.

The team is also studying this galaxy at near-infrared wavelengths with the NICMOS instrument onboard Hubble. At these wavelengths, the dusty clouds are more transparent and the true distribution of stars is more easily seen. In addition, regions of star formation that are obscured in the optical images are newly revealed in the near-infrared images.

This image was composed by the Hubble Heritage Team from Hubble archival data of M51 and is superimposed onto ground-based data taken by Travis Rector (NOAO) at the 0.9-meter telescope at the National Science Foundation's Kitt Peak National Observatory (NOAO/AURA) in Tucson, AZ.
Image Credit: NASA and The Hubble Heritage Team (STScI/AURA)
Acknowledgment: N. Scoville (Caltech) and T. Rector (NOAO)

M51 is truly a deep sky wonder, under rare extremely good viewing conditions it just about jumps out of the eyepiece at you. I have been lucky to have caught it twice with our 24 inch main scope. A wonderful sight. M-51 is currently almost overhead and worth a trip out to the observatory on the next moon-less clear night.

Gil



THROUGH THE EYEPIECE

by Brian Battersby

I thought I would share with you a first: my first observing log entry. Doug Wayland encouraged me to start an observing log as we started our viewing session under a clear spring sky. I never kept an observing log before because I couldn't have been bothered. It seemed tedious and boring, shades of high school I guess, but now that I have written one, I can see their value. It didn't take long, I just quickly jotted down a couple of thoughts as I looked through the eyepiece and it helped to "settle down" my viewing. That night I concentrated on one constellation only and tried to view everything in it that was listed in my *National Audubon Society Field Guide to the Night Sky* book. Usually, I would jump around from object to object only looking at what I knew I could find from memory. I also looked at each object for a longer period of time and experienced a feeling of satisfaction in knowing that I had seen all that I could see in the constellation of Auriga on that particular night. Observing logs are interesting because they record what you see (or *think* you see) at that particular moment. I could view all these objects again at a different time of night or season and record completely different impressions simply because the conditions are not the same. They also help you decide what to attempt to view the next night out. For instance, I tried to view IC2149 but I couldn't find it because it was still too light out. Next time, I'll most likely plan on trying to find it later in the evening. (That will probably have to wait until next winter now.) I could also start a sky tour and move on to the adjoining constellation of Gemini. Well, without further blabbing on, here it is, my first observing log entry. I hope you find something interesting in it and will start your own observing logs – maybe when we are all old and in the nursing home we can read each others records and remember the "good ol' days" when we could actually see the stars!

Date:	April 11, 2001
Time:	9:30pm
Location:	P.G.A.S.O.
Seeing:	8 (out of 10)
Transparency:	7 (out of 10)
Limiting Magnitude:	4.5
Weather Conditions:	Clear skies, smoky, not very dark
Observing Notes:	Towards the end of the night Doug W & I realized why the skies were so smoky – an Aurora was building and started to shine just as we were leaving.
1)	M37 – Auriga – Open Cluster Sky not dark yet 30x – shows up best w/ averted vision – white cloud 60x – individual stars visible loose central glob w/ many stars spreading outwards

2) M36 – Auriga – Open Cluster
Easy to see – sky darker – passed by it (M36) earlier without realizing it was there.
30x – about a dozen stars visible
60x – about 25 stars visible - very loose – no central blob

3) M38 – Auriga – Open Cluster
Found it no problem!
60x – a loose cross of stars

4) IC2149 – Auriga – Planetary Nebula
30x – nothing
60x – nothing – right area, no nebula!

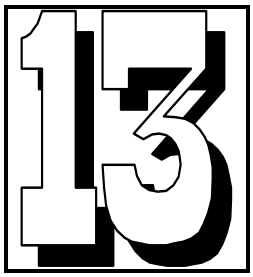
5) NGC2281 – Auriga - Open Cluster
30x – very small – fairly tight – maybe 15 – 20 stars
60x – resolves into a nice little cluster.
B.B.
Ps. We have some blank observing log sheets if you would like some just say so. Gil

NEW BOOKS AT THE PUBLIC LIBRARY.
by Yvonne Whebell

STARDUST: SUPERNOVAE AND LIFE; THE COSMIC CONNECTION. by John Gribbin.
The author describes chemical and physical aspects of the universe from the big bang to the formation of the planets. He talks about what makes the planets different from one another, what occurred in their history to make them that way, and how scienists have reached their understanding of the history of the universe.

A TRIBBLE'S GUIDE TO SPACE: HOW TO GET TO SPACE AND WHAT TO DO WHEN YOU'RE THERE.
Allan C. Tribble. Princeton University Press, 2000.
Written by a man who spent his time designing spacecraft for Rockwell International Space Systems Division, this book takes a practical approach to technological questions about space missions, both in history and in fiction.

Yvonne Whebell,
Acquisitions Coordinator
Prince George Public Library
887 Dominion Street
Prince George, B.C. V2L 5L1
e-mail: ywhebell@lib.pg.bc.ca

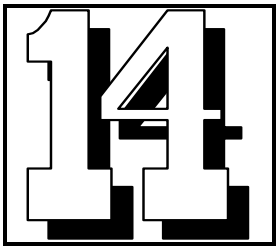


Japanese single-electron devices progress

Single-electron device research has moved forward with two breakthroughs by Japanese researchers. Toshiba Corp. reports a room-temperature single-electron transistor (SET) that is said to function not only as a transistor but also as a memory device and as part of a circuit. The SET depends on the Coulomb Blockade Effect or the fact that two electrons cannot enter one "quantum hole." A small enough quantum dot creates electron repulsive energy strong enough to operate a SET at room temperature.

Nippon Telegraph and Telephone claims the world's first single-electron charge-coupled device, which could be a breakthrough in atomic-level circuitry. The CCD is reportedly made of two silicon-wire MOSFETs in close proximity on an SOI wafer that acts as a CCD and is able to perform single-electron sensing. Holes can be stored in either MOSFETS' channels and their positions monitored as they are transferred between the two. Researchers believe sensing capabilities will enable control of the number of stored charges.

While the entire news item above foreshadows some almost science fiction devices in the near future, the last paragraph is by far the most interesting. Single electron triggered mosfets acting as a CCD mean that in a short while we could be seeing CCD's that are so sensitive they are activated by single photons of light. This isn't just a big improvement it is a really **big** improvement.



Planned Events Calendar
Prince George Astronomical Society
sans The Prince George Chapter of The Royal Astronomical Society of Canada

May 18 2001 June newsletter deadline
May 30 2001 PGAS general meeting, at the observatory 7:30 pm

June 23 2001 Club social / star party, maybe we can do some solar viewing
There will be no newsletter or meeting in June and July.
There will be several work-bees depending on funds TBA

August 3 2001 Fall open house begins. We will be open to the public every Friday night up to and including October 26 2001 .And don't forget members night every Saturday throughout the viewing season.
August 11 2001 Annual Perseids open house , Saturday and last quarter !!
August 17 2001 September Newsletter deadline
August 29 2001 PGAS general meeting at the observatory 7:30pm

September 14 2001 October newsletter deadline
September 26 2001 PGAS annual General meeting at the observatory 7:30

October 19 2001 September newsletter deadline
October 26 2001 Last night fall 2001 open house
October 31 2001 PGAS general meeting at the observatory 7:30 pm

November 16 2001 December newsletter deadline
November 28 2001 PGAS general meeting at CNC Physics lab

There will be no newsletter or meeting in December
January 18 2002 February newsletter deadline
January 30 2002 PGAS general meeting at CNC Physics lab

Bob kindly provided me with several interesting astronomical events during this year , Plans to be announced.
May 4 2001 Venus greatest brightness
June 4 2001 Pluto at opposition
June 21 2001 Summer solstice (00:38 local) // Mars closest approach//
a new moon and my birthday -- sounds like a party
July 30 2001 Neptune at opposition
(continued on page 15)

August 15 2001 Jupiter occluded by moon 13:00 daytime occultation, possibly on Bob's telescope

September 10 2001 Saturn occluded by moon 06:00
September 22 2001 Autumnal Equinox

October 7 2001 Saturn occluded by moon 12:00. Another daytime occultation possible on Bob's Paramount robotic mount.

December 13 2001 possible open house Geminids meteor shower

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.