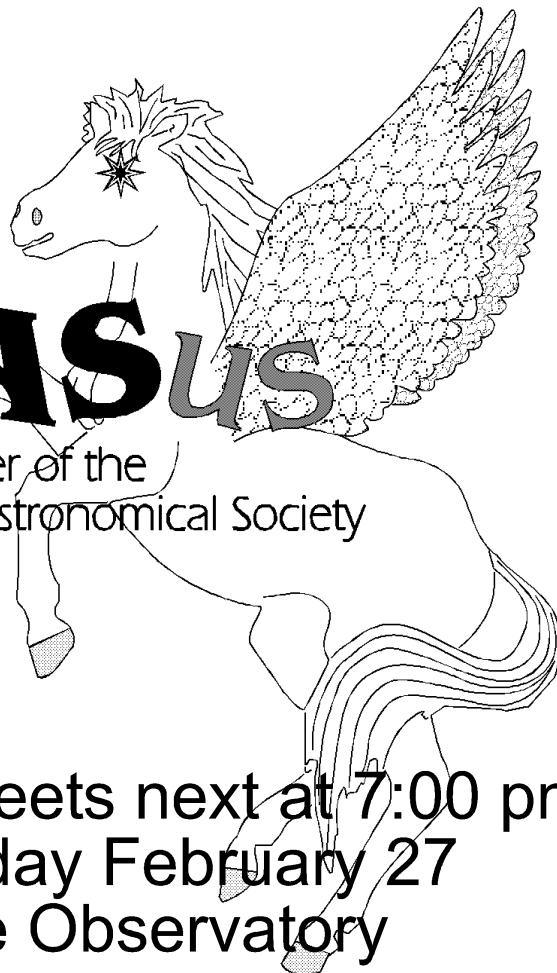


February 2002 ISSUE #118

the

PeGASus

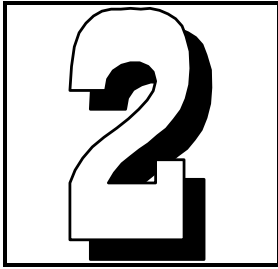
Newsletter of the
The Prince George Astronomical Society



The PGAS meets next at 7:00 pm
Wednesday February 27
at The Observatory

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is published
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*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

March 15

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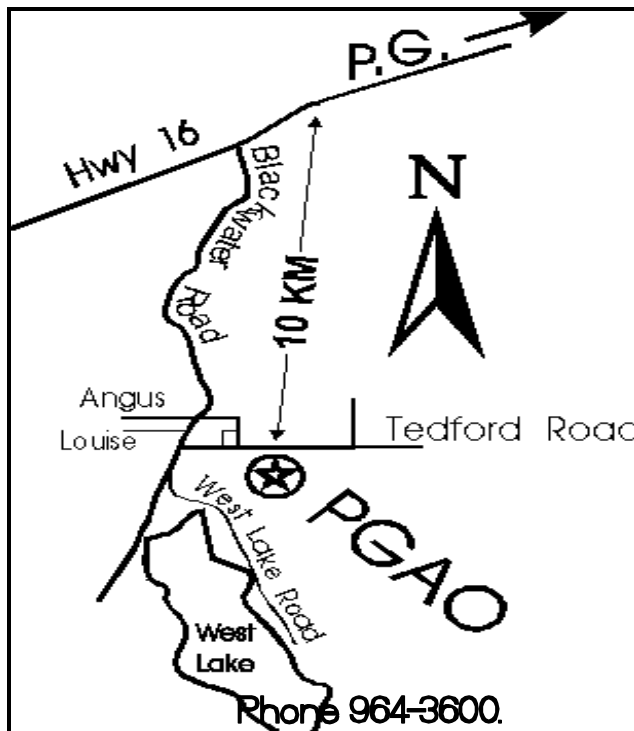
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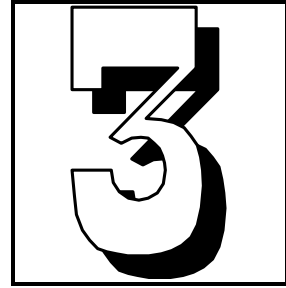
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Editorial

By Gil Self

On February 15th we enjoyed the first of what we hope will be an on-going series of RASC speakers. Mark Kaye, president of the Hamilton Centre spoke on his 30 years of astronomy. This was an ideal talk for amateur astronomers as it detailed the evolution of a first rate astronomer. I thought Mark's talk was very suitable, both for the keen club members in attendance as well as the members of the general public. He showed us his first telescope, the changes he made to that and the stages working toward the observatory that he operates today. It made me think of the number of times I have thought to myself "It would sure be neat if I could afford to do that", or "When I can get a new one of those I will be able to do——". Mark just goes out and builds,/makes,/assembles one.

The guy put a telephone pole down the center of his house to support a telescope in the attic— his wife must be a real nice lady.

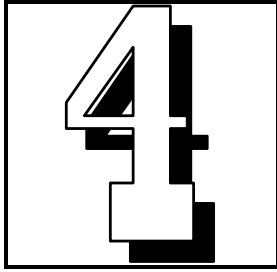
He mentioned several times his intention of keeping things simple and easy to use. This is a good idea to keep in mind as we are planning and building. If something is quick and simple to set up, it will get used.

We are a very fortunate group. The observatory and the equipment we have already accumulated, puts us "way ahead of the curve". Watching the slide show made me think of all the work that has already been done and how easy it is to simply unlock the door and, with only about 15 minutes of setup, be operating a really fine observatory.

Spring observing and public open house begins shortly. This is always something I look forward to, about the only down side is daylight savings time comes back. We have 13 opportunities over the next three months to meet the public on Friday nights and along with that every Saturday night is members night. And along with these 26 planned evening there will be at least 10 tours. That 36 scheduled evenings that require usually two members at most and only one host at some. Lets round that off at 50 "host evenings". Currently we operate with about six key holders that host tours or open house. Do you follow me so far? That's about 8 to 10 events each, some more, some less. That's ok, because I'm pretty sure everybody enjoys what they are doing. We appreciate everybody's time and I would hate to see anyone get burned out, so we hope to generate some new people to host events this spring . Just let us know and we will find a spot for you.

GS

Please be sure to renew your PGAS membership if you have not already done so. You can renew your membership at
<http://www.pgweb.com/~astronomical/> Or with any member of the executive



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 February 27
7:00 pm at The Observatory**

The Night Sky for March 2002

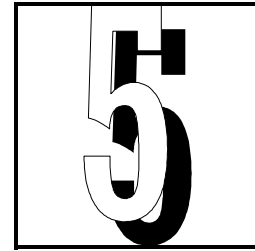
by Bob Nelson, PhD
Hi Folks,

This is my second column from Christchurch, New Zealand, where I am presently on leave at the University of Canterbury. In last month's column, I filled you in about my observing situation here (it involves a 3-hour drive to Lake Tekapo where you stay in the dorm, hoping that the skies will clear). Since I wrote that, we have had one of their worst Januaries in record with much cloud and virtually no clear nights. At one point, I was wishing that Lois and I had gone to Australia instead (horrors!). Anyway, it's been much better of late. On Feb 2, it was wonderfully clear and I visited the West Melton Observatory of the Canterbury Astronomical Society (20 minutes from town) and viewed many of the southern splendours for the first time. These included the Large and Small Magellanic Clouds (superb!!), Eta Carinae Nebula, Omega Centauri (globular cluster), the Tarantula Nebula, 47 Tucanae, Centaurus A (galaxy), and "The Ghost of Jupiter" which is a planetary nebula that looks like a faded disk and quite lives up to its name.

On the weekend of Feb 9-12, I went to a regional star party for all the south islanders when we had TWO beautifully clear nights in a row. People came and camped on the lawn of this bible camp that we rented; others (myself included) slept in the dormitory. There were the usual collection of telescopes, however they were of a smaller aperture than you'd see in North America (the Kiwi dollar is only \$0.40 US, so that hurts their purchasing power). The largest was a 13" Odyssey I (dobsonian, like mine before I remounted it), a Meade LX-200 8", a couple of 10" Dobsonians, a beautiful 6" refractor (on a alt-az mount that its owner admitted was a first step only), a beautiful Nagler 4" refractor, both of which gave wonderful views of deep sky objects. It was great wandering around looking at the objects that the telescope owners proudly showed off. I also gave a talk in which I showed slides from the construction of our observatory, as well as talking about what I do scientifically.

Outside, I also spend a while gazing up with my naked eyes trying to learn these new and unfamiliar constellations, using a print-out I got from somewhere. I succeeded in learning Centaurus, Crux, Carina, Musca, and Triangulum

Australe before my mind bogged down. In addition, I can now locate Omega Centauri, Eta Carina, the Tarantula Nebula and the south celestial pole from memory. I must say, however, that it is really strange to see the Orion and Leo constellations upside-down. I found myself craning my neck around into impossible angles in an effort to put them right-side up!



Anyway, in short, I plan to bring my CCD camera down (the local club does not have one) and use their 14" telescope for scientific work - IF, that is, I can light a fire under them to get their dome back into operation (the shutter needs a new motor). That way, I can take advantage of any clear night and also take some pictures of their pretties. I have offered to put on some CCD workshops and they enthusiastic about the whole idea.

Anyway, enough babbling for now. Here is what is happening in YOUR sky next month:

PLANET ROUNDUP

MERCURY, is a 5.4" disk of magnitude -0.3. However, it's not observable by northern observers (that's you) until mid-April.

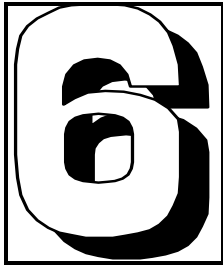
VENUS, sets at mid month at about an hour after sunset. It's a 10.2" disk of magnitude -3.9. (This is the "blob" stage. Wait for it -- it will get bigger, brighter and more spectacular as the weeks roll by!)

MARS, in Aries all month, sets at mid month at about 2 hours after sunset. It's a 4.6" disk of magnitude 1.3. Rather small and featureless.

JUPITER, in Gemini all year, sets at mid month at about 2:20 AM. It's a 40.1" disk of magnitude -2.3. As usual, it and its satellites provide wonderful views. In addition, the Observer's Handbook tells me that it is occulted by the Moon on March 22. Guide 7 tells me that it's a grazing occultation in PG with half the disk hidden at 4:10 AM, PST and the Moon just past quarter phase. [All right, who's getting up to see it?] This time it helps to be at high latitude as Vancouver and points further south will see only a close approach.

SATURN, in Taurus until the end of August, sets at mid month at about midnight. It's a 17.9" disk mag 0.1. It also gets occulted by the Moon, this time on March 20. Guide 7 tells me that the occultation is not visible in PG since the Moon's edge passes some 4 arc minutes to the south at 2:30 AM on that data. Vancouver and points south should get a good view (if Vancouver's rains stop for a brief time).

URANUS, in Capricornus until March 30 when it passes into Aquarius, rises at mid month about an hour before the Sun. As usual, it's a 3.6" disk at about



magnitude 5.7.

NEPTUNE, in Capricornus all year, rises at mid month about 2 hours before sunrise. As usual, it's a 2.3" disk at about magnitude 8.0.

PLUTO, in Ophiuchus all year, rises at mid month at about 12:30 AM. As usual, it's a 0.1" disk at magnitude 13.8. Let's go after it later this spring.

March Equinox occurs on March 20 at 11:16 Am PST. Autumn will have arrived in Christchurch (and, in view of the number of deciduous trees here, we are expecting even higher leaf banks than we saw in Victoria!).

CONSTELLATIONS to look for in March (at 9:00 PM, PST) are Pyxis, Puppis, Western Hydra, Cancer and Lynx.

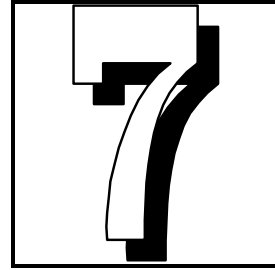
Pyxis ("the compass on the Argonaut's ship") is visible on the extreme south at 9:30 PM on the 15th. It's just at the edge of the Milky Way but contains little of interest (no open clusters, etc.). It does have the recurrent nova T Pyx. According to Burnham's Celestial Handbook, it's normally an object of magnitude 14, but in 1890, 1902, 1920, 1944, and 1966, it brightened suddenly to around 7th magnitude dimming only slowly back to its original level. By the above sequence, it's overdue!! Maybe it'll brighten when *you're* watching.

Puppis ("the stern on the Argonaut's ship") is just to the northwest of Pyxis. Straddling the Milky Way, it contains numerous goodies including open clusters M46, M47, M93, NGC 2477 and others. [Covering a nice chunk of the southern Milky Way, it extends all the way south to -50 degrees; I'll take a look and report back what I see.]

Hydra ("the Sea Serpent") extends all the way up to declination +5 . The western part contains M48, another fine open cluster. It also contains R Hydrae, a fine Mira star discovered in 1704. Miras are red giants that pulsate over long periods (around a year or more) expanding, cooling, contracting and becoming hotter. Because of the radiation laws, the star in its hotter (surface) state emits a much larger fraction of its light in the visible range (the rest is in the infrared) and so is brighter by hundreds of times (in addition to emitting more power overall). This translates into a magnitude range of many magnitudes. In the case of R Hya, it rises from a relatively faint 10.9 mag (just visible in binoculars) to a whopping 3.5 mag. It is also peculiar in that the period appears to be shortening, from 500 days in the early 1700s to around 390 days today. The explanation for this shortening is apparently unknown. It's a little hard to see from PG at -23 deg, but worth a try.

Cancer ("the Crab") is more familiar to us northerners, lying as it does between Gemini and Leo. It contains the famous "Praesepe" or "Beehive" Cluster, M44. This fine open cluster is one of the largest, brightest and nearest such clusters and is visible to the naked eye. Another famous cluster in Cancer is M67, a rich

cluster containing some 500 stars and lying at a distance of 2500 light years (767 pc). M67 is one of the oldest "Galactic" or open clusters known, at 10 billion years old. Cancer also contains Zeta Cancri, a fine triple system. The inner, or AB pair, are separated by 1 to 1.5" (and therefore are pretty well impossible for us to split) revolve with at a period of 59.6 years. The outer star, C is about 6" away and revolves about the inner pair with a period of 1150 years! The elements of the outer orbit are uncertain (no kidding!).



Lynx ("the Lynx" -- gee!) lies to the north of Cancer, out of the Milky Way and contains only NGC 2419, the famous "Intergalactic Wanderer", the most distant of the globular clusters. It was discovered in 1788 by William Herschel (and rediscovered by his son John in 1833), observed by Lord Rosse in 1861, and finally classified as a globular in 1922 when photos were taken by the 42" reflector at Lowell Observatory. The distance was determined by observing 31 RR Lyrae stars in the cluster; it's some 182,000 light years (55,800 pc) from us (and 210,000 light years = 64,400 pc) from the galactic centre. This distance is comparable to that of the Magellanic Clouds and suggests that this cluster indeed is intergalactic. My call last year produced NO results, so I am repeating: Let's get a CCD image of it! I'll be making inquiries when I get back. [:-)]

Clear skies,
-Bob

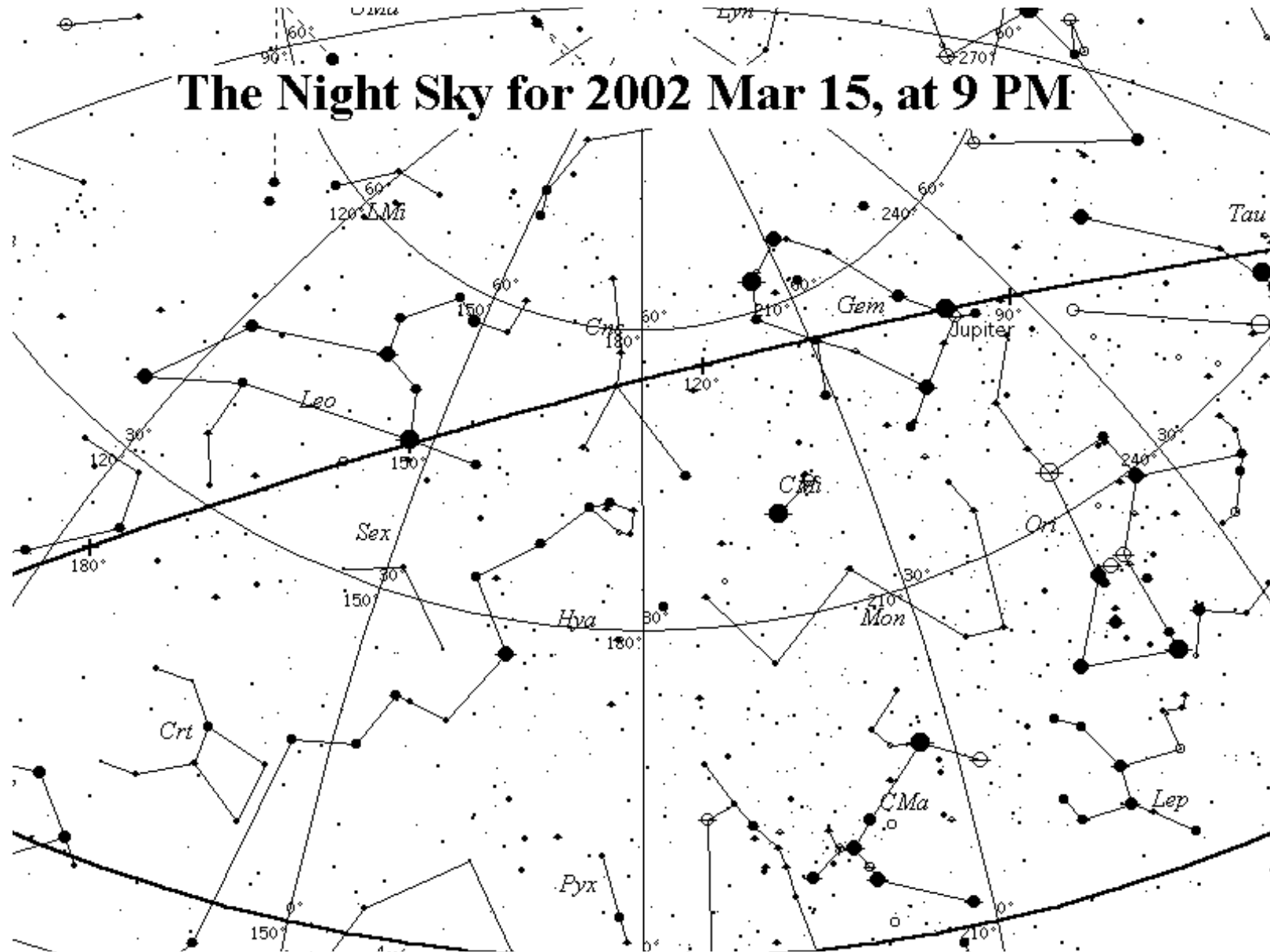
This from the AmAstro mailing list,,, **interesting!**

Reply-To: amastro@yahogroups.com

Brent,

Confirming what you indicated about the visibility of the space tether, I saw it naked eye on an early morning in March 1996. Hadn't a clue what it was until Barry Gordon cleared up the mystery for me several days later. Was taking a break from an all-nighter in the observatory when I looked up and saw this bright orange line (oriented north/south) moving leisurely eastward across the sky at an elevation of about 40 degrees off the southern horizon. I could have sworn I heard creepy music, and was thinking the UFO whackos might be right after all. From my Arizona site (110.2 west, 31.5 north) the tether was larger and brighter than you described. It filled more than half of the 6 degree field of a pair of binoculars, and so was probably 3 1/2 to 4 degrees long. (continued on page 11)

The Night Sky for 2002 Mar 15, at 9 PM

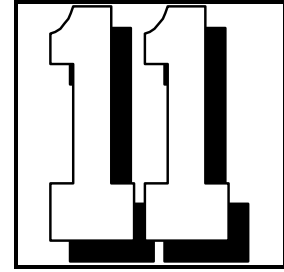


10



Digital astrophotography

The images on page 10 represent some of the best of what I was able to do in 2001 in the realm of astrophotography with my Nikon Coolpix 995 & its best auxiliary converter lenses; the wide angle 0.63 power lens & the telephoto 3.0 power lens. The images were taken from UNBC's east prospect. The camera was tripod mounted, and the images were cropped on a Corel Photo-Paint 9 program. The top image was adjusted for brightness on that program.



All settings were automatically determined by the camera except for my setting the focus to infinity & activating the digital zoom. When the telephoto lens is attached, the Coolpix will not focus when set to infinity. I would not bother to use the digital zoom again, the same effect can be duplicated later in a photo software program.

To avoid camera shake, I used the Coolpix's timer while photographing the crescent moon. When the timer is used, the camera focuses when the shutter opens. The Coolpix alone has a 35 mm camera equivalent optical focal length range of 38 - 152 mm, the converter lenses expand that range to 24 - 456 mm.

Crescent Moon & Venus over Prince George, September 15th, 2001.

Matrix metering, 1.0 seconds, 2.6 aperture, 8.2 mm focal length, infinity focus, & wide angle lens. Image adjustments: brightness + 19%, contrast + 11%, & intensity + 14%. **Lower photo** Center-weighted metering, 1.0 sec, 5.1 ap, 55.8 mm f.l., af, & telephoto.

Dan Hicks

(continued from page 7)

If the tether wire was cylindrical in shape, the sun's reflection off it, as seen from earth, was from an area of the wire much less than its full ~1 cm diameter. So were we resolving an object .001 arcseconds in diameter? Sheesh! ————Dave Healy
At 11:23 AM 2/6/02 -0700, you wrote:

Somewhat relevant to the discussion of the visibility of lines against a background are observations of the space tether deployed during the STS-75 mission (see <http://liftoff.msfc.nasa.gov/Shuttle/STS-75/tss-1r/tss-1r.html>)

The tether and its attached satellite broke free from the shuttle just before it reached full deployment of about 20 km in length (it was later found the tether probably arced due to the electrical potential it had acquired, and then melted and broke.

The point to be made here is that many folks saw this tether directly from the ground. I was able to observe it with 7x35 binoculars from Falls Church, VA, low in the south on the morning of 1996 March 3. It appeared about 1 degree in length.

Estimating a magnitude for the line was difficult, but I estimated any given point on the line to be shining at about 5th magnitude. In any case, this is an observation of a ~1 cm wide object from an approximate distance of ~800 km (500 mi). If I've done the math right, this is a resolution of about 0.003 arcseconds with 7x35 binoculars!

And it's my understanding that from darker skies, some folks were able to see the tether with the unaided eye.

Clearly a line with sufficient contrast against a background can be seen with resolutions that are in no way related to theoretically or even empirically determined resolution limits for point sources. ————Brent Archinal



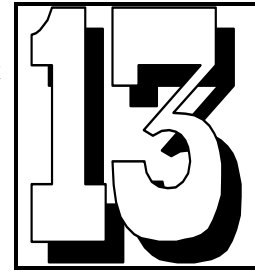
Memorable Nights

There are some objects in our night sky that are so faint, even if you are looking at them you can miss seeing them. These conditions need an experienced, skilled observer. And it doesn't hurt to be a trained meteorologist. Well longtime friend of the PGAS, Alan Whitman more than fills the requirements. And to top it off his vivid descriptions are so clearly written, it's almost like being there (except for the cold feet). GS

I've been working through the list of Deep-Sky Challenge Objects in the RASC Observer's Handbook. So far I've seen 36 of the 45 challenge objects and seven of the nine that I haven't seen are winter objects. Our skies here in the southern interior of British Columbia are some of the cloudiest on the continent in winter. Ever since late fall I've been waiting for a suitable night to try Barnard's Loop in Orion, an object that I had never attempted. This afternoon the wind howled, building roaring whitecaps on the lake, and the sky turned the pristine blue of spring. Could this finally be the night? I took a break from the Olympics and got a good two hours of sleep, to rest my eyes up for Barnard's. When I got up at 6:30 PM the sky was 60% cloudy; after dinner at 7:30 PM it was overcast. Ah well. At 8 PM I wandered outside and it was clear and, only two minutes after leaving a brightly-lit room, the zodiacal light grabbed my attention. The zodiacal light with only two minutes of dark adaption? Yes, this was the night that I had been waiting for! Except that Barnard's Loop would culminate in about 40 minutes and the car wasn't packed or anything. I grabbed my 4.1-inch RFT (an Astroscan), two low-power eyepieces, a Hydrogen-beta filter, my 7x50 binoculars, and Sky Atlas 2000.0. After a twenty minute drive I was at the roadside parking lot of the Dominion Radio Astrophysical Observatory, a great low-altitude dark site at about 2000 feet only.

I've always found that my eyes reach nearly full dark-adaption while driving, so without looking at a chart, I tried my 7x50s on Barnard's Loop as soon as I arrived. I suspected something right away, but wasn't sure. So I put the 4.1-inch Astroscan on M78 at 16x and then inserted a Hydrogen-beta filter. The brightest section of Barnard's Loop, just NE of M78, was obvious with the Astroscan when I swept back and forth across it, much easier than I had ever imagined that it could be. I followed it a little ways southwards, but quickly lost it. Then I tried the binoculars again (no filters) and with the extra 10 minutes of dark adaption Barnard's Loop was obvious in the binoculars, just beside a distinctive Z-shaped star pattern. I quickly panned the 7x50s over to the Rosette Nebula. Then patchy low cloud started forming in the area and simultaneously headlights appeared on the road out of the observatory. I seized on these two excuses to quit, since my feet were already cold -- in my big rush to leave the house I hadn't taken time to get proper winter footwear. The radio observatory is located in a ring of hills that look suspiciously like an ancient caldera and it is always about 10 degrees Celsius colder out there on a winter night than at my lakeside backyard.

I checked Sky Atlas 2000.0 for the first time tonight and it showed Barnard's Loop right beside the Z-shaped star pattern that I had noted with the binoculars. All right! After he cleared the observatory's gate, the departing professional astronomer drove up and stopped to ask what I was observing. He was suitably impressed when I told him that the transparent night had yielded Barnard's Loop.



Funny thing, here I had this wonderfully transparent night, but the stars were twinkling so wildly that I couldn't think of anything else that could usefully be observed on such a night of wonderful transparency but poor seeing. So I didn't bother to set up my 8-inch in my backyard when I got home. I did go outside just now (11:30 PM) and only five to ten minutes after leaving the computer (that is after only five to ten minutes of dark adaption) I could see the gegenschien just west of the Sickle of Leo from my backyard -- a wonderful night, too bad the seeing isn't steadier!

I love it when I have a night that I know that I'll never forget. Barnard's Loop was certainly the most important object in the northern half of the sky that I had not seen.

Clear skies,

Alan Whitman

In the direction of the constellation Orion, approximately centered on the Great Orion Nebula M42 and M43, there drifts a giant cloud of interstellar gas and dust within the Milky Way galaxy. This cloud was formed when a density wave, related to the Galaxy's spiral structure, moved through the medium of the Galactic disk. It is about 1600 light years away and several hundred light years across.

This giant cloud, or complex of clouds, of interstellar matter and young stars contains, besides M42 and M43 and the nebulosity associated with them (NGC 1973-5-7), a number of famous objects: Barnard's Loop, the Horsehead Nebula region (also containing NGC 2024 = Orion B), and the reflection nebulae around M78.

Within this cloud, stars have formed recently, and are still in process of formation. These young stars make up the so-called Orion OB1 Association; OB because the most massive, most luminous, and simultaneously hottest of these stars belong to spectral types O and B. Because they are so luminous, they use up their nuclear fuel quickly and have only a short time to live. The association can be divided in subgroups, usually called 1a, 1b, and 1c, where the subgroup 1b includes and surrounds the stars of Orion's Belt, the subgroup 1a lies north-west (preceding) of the belt stars, and the subgroup 1c contains Orion's Sword. The stars of the Orion Nebula, M42 and M43, form a subset of this group, and are sometimes separately counted as subgroup 1d, the very youngest stars of the Orion OB1 association.



March Star Hop in Puppis

Puppis is a fairly large constellation which only partly rises in our northern skies. The part we can see is rich in open clusters including M46, M47 and M93 as well as many others. The accompanying map shows no less than 25 open clusters within the boundaries of Puppis. Puppis was originally part of a larger constellation called Argo Navis. The International Astronomical Union created Puppis along with Carina, Vela and Pyxis from Argo Navis when they defined the official 88 constellations. Argo Navis was said to be the ship that Jason and his Argonauts sailed in their search for the Golden Fleece.

Hop #1: M47 – Open Cluster.

The easiest way to find this cluster seems to be to star hop about 8° east from Gamma Canis Major. Gamma Canis Major is a mag 4 star east of Sirius (they are about 5° apart) If you draw an imaginary line between Sirius and Gamma Canis Major and extend it east you will pass close to M47. M47 should be easy to spot as it is mag 4.4 and has a 30 arcminute diameter. It is even visible to the naked eye!

Hop #2: M46 – Open Cluster.

Once you have found M47 you are only about 1.25° away from M46. It is to the east and a bit south of M47 – be careful to look at the right cluster because there is another one, NGC 2423, about $1/2^\circ$ to the north of M47. M46 has about 150 members brighter than mag 13 within a diameter of 27 arcminutes. It is magnitude 6.1

Hop #3: NGC 2438 – Planetary Nebula.

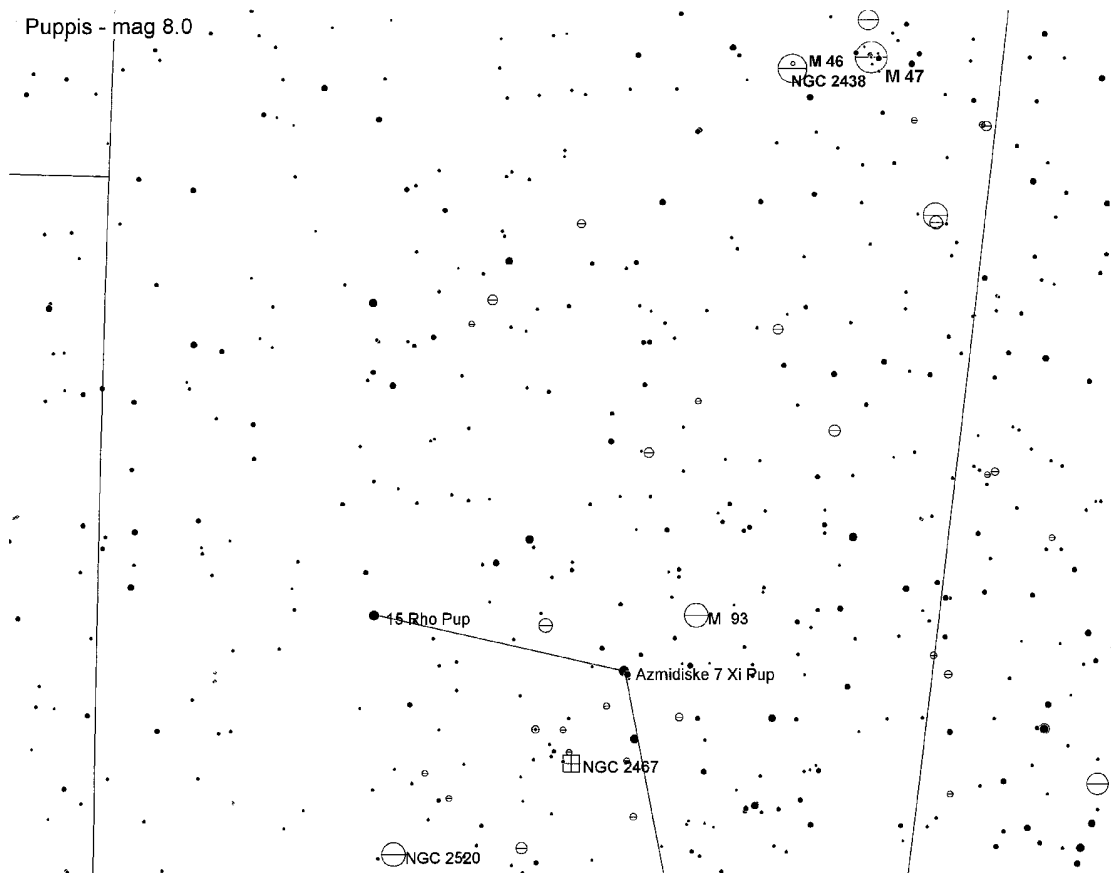
M46 is interesting and famous for another reason besides being an open cluster, within its boundaries lies the planetary nebula NGC 2438. NGC 2438 is mag 11 and only measures 1.1×1.1 arcminutes so it will be hard to spot in small scopes. The 24" scope would show it easily, especially if you use the CCD camera, therefore it would be a great object to look for on members night. Check out this link for more information on M46 & NGC 2438 <http://www.seds.org/messier/m/m046.html> The write up includes some reasons why it is believed that the nebulae is not part of the cluster.

Hop #4: NGC 2467, Chained Brooch – Open Cluster + Nebula.

This interesting and difficult object lies just 1.5° south of Xi Pup. It is about the same distance away from Xi Pup as M93 is just in the opposite direction. (see map) The freeware planetarium software HNSKY has this to say about it; “with large (>20-inch) aperture, the main nebulosity is accompanied by a larger, fainter mass of nebulosity some 10' E, a N-S-oriented oblong larger by a factor of 3; the two masses are connected at their S ends by a drooping chain of veil-like, knotty nebulosity; a truly detailed and beautiful complex!”

Good viewing and good luck!

Brian Battersby



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.